

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: 47 CFR FCC Part 15, Subpart C (Section 15.247)
Report No.: RFBAYG-WTW-P25030312-2
FCC ID: A94443987
Product: Wireless headphone
Brand: BOSE
Model No.: 443987
Received Date: 2025/3/12
Test Date: 2025/4/9 ~ 2025/4/10
Issued Date: 2025/6/12
Applicant: Bose Corporation
Address: 100 The Mountain Road Framingham Massachusetts 01701-9168 United States
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. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
FCC Registration / 198487 / TW2021
Designation Number:

Approved by: _____

Jeremy Lin

Jeremy Lin / Project Engineer

, Date: _____

2025/6/12

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Prepared by : Jessica Cheng / Senior Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFBAYG-WTW-P25030312-2	Original release.	2025/6/12

1 Certificate

Product: Wireless headphone

Brand: BOSE

Test Model: 443987

Sample Status: Engineering sample

Applicant: Bose Corporation

Test Date: 2025/4/9 ~ 2025/4/10

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

Measurement ANSI C63.10-2013

procedure: KDB 558074 D01 15.247 Meas Guidance v05r02

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.

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
Standard / Clause	Test Item	Result	Remark
15.247 (a)(1)	RF Output Power	Pass	Meet the requirement of limit.
15.247(a)(1) (iii)	Number of Hopping Frequency Used	Pass	Meet the requirement of limit.
15.247(a)(1) (iii)	Dwell Time on Each Channel	Pass	Meet the requirement of limit.
15.247(a)(1)	Hopping Channel Separation	Pass	Meet the requirement of limit.
15.247(a)(1)	20 dB Bandwidth	-	Refer to Note 1
15.247(d)	Conducted Out of Band Emissions	Pass	Meet the requirement of limit.
15.207	AC Power Conducted Emissions	Pass	Minimum passing margin is -11.52 dB at 0.52963 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -12.2 dB at 802.12 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -10.9 dB at 2483.50 MHz
15.203	Antenna Requirement	Pass	No antenna connector is used.

Notes:

1. If the Frequency Hopping System operating in 2400-2483.5 MHz band and the output power less than 125 mW. The hopping channel carrier frequencies separated by a minimum of 25 kHz or two-thirds of the 20 dB 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.

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:

Parameter	Specification	Expanded Uncertainty (k=2) (±)
RF Output Power	-	1.1 dB
Dwell Time on Each Channel	-	2.18 %
Hopping Channel Separation	-	390 Hz
20 dB Bandwidth	-	960 Hz
Conducted Out of Band Emissions	9 kHz ~ 40 GHz	2.7 dB
AC Power Conducted Emissions	9 kHz ~ 30 MHz	2.9 dB
Unwanted Emissions below 1 GHz	9 kHz ~ 30 MHz	2.55 dB
	30 MHz ~ 1 GHz	5.77 dB
Unwanted Emissions above 1 GHz	1 GHz ~ 6 GHz	4.71 dB
	6 GHz ~ 18 GHz	5.3 dB
	18 GHz ~ 40 GHz	4.98 dB

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description

Product	Wireless headphone
Brand	BOSE
Test Model	443987
Status of EUT	Engineering sample
Power Supply Rating	5Vdc from host equipment & 3.85Vdc from battery
Modulation Type	$\pi/4$ QPSK (HSL2, HSL3) $\pi/4$ DQPSK (HSL4) 8PSK (HSL5) D8PSK (HSL6)
Modulation Technology	FHSS
Transfer Rate	2 Mbps, 6 Mbps
Operating Frequency	2.404 GHz ~ 2.478 GHz
Number of Channel	37
Output Power	29.174 mW (14.65 dBm)

Note:

1. The EUT uses following accessories.

Item	Specification
Type C cable	Shielded without core, 1.0m
Audio cable	Nonshielded without core, 1.1m

2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Gain (dBi)	Antenna Type	Connector Type
0.7	Printed antenna	NA

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

3.3 Channel List

37 channels are provided for QHS:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2404	11	2424	22	2446	32	2466
2	2406	13	2428	23	2448	33	2468
3	2408	14	2430	24	2450	34	2470
4	2410	15	2432	25	2452	35	2472
5	2412	16	2434	26	2454	36	2474
6	2414	17	2436	27	2456	37	2476
7	2416	18	2438	28	2458	38	2478
8	2418	19	2440	29	2460		
9	2420	20	2442	30	2462		
10	2422	21	2444	31	2464		

3.4 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	1. EUT can be used in the following ways: XYZ 3-axis. Pre-scan in these ways and find the worst case as a representative test condition. 2. EUT has internal Battery(493141PN4)/EUT with internal Battery(M483242-R01). Pre-scan these modes and find the worst case as a representative test condition 3. For Unwanted Emission above 1 GHz has Mode A / Mode B / Mode E of power supply. Pre-scan these modes and find the worst case as a representative test condition 4. For Unwanted Emission below 1 GHz has Mode A / Mode B / Mode C / Mode D / Mode E of power supply. Pre-scan these modes and find the worst case as a representative test condition
Worst Case:	1. X/ Y/ Z Worst Condition: Y Axis for Unwanted Emission above 1GHz and Unwanted Emission below 1GHz. 2. EUT's internal Battery Worst Condition: Battery(493141PN4) 3. For Unwanted Emission above 1 GHz Worst Condition: Mode A. 4. For Unwanted Emission below 1 GHz Worst Condition: Mode A / Mode C.

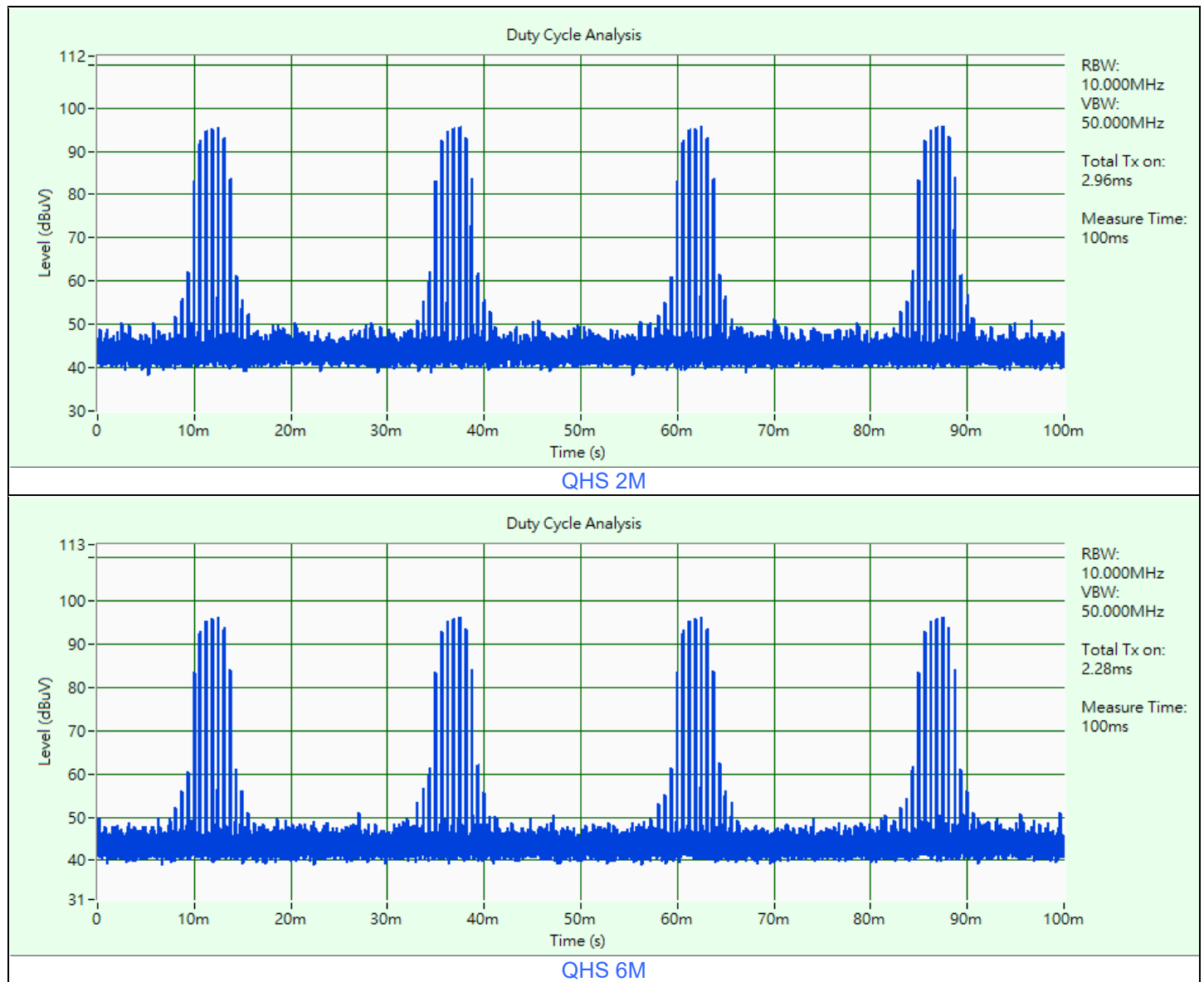
Following channel(s) was (were) selected for the final test as listed below:

Test Item	EUT Configure Mode	Mode	Tested Channel & Tested Frequency	Modulation	Data Rate Parameter
RF Output Power	A	QHS 2M	1, 19, 38	$\pi/4$ QPSK	2Mb/s
		QHS 6M	1, 19, 38	D8PSK	6Mb/s
Number of Hopping Frequency Used	A	QHS 2M	Hopping	$\pi/4$ QPSK	2Mb/s
		QHS 6M	Hopping	D8PSK	6Mb/s
Dwell Time on Each Channel	A	QHS 2M	Hopping	$\pi/4$ QPSK	2Mb/s
		QHS 6M	Hopping	D8PSK	6Mb/s
Hopping Channel Separation / 20 dB Bandwidth	A	QHS 2M	1, 19, 38	$\pi/4$ QPSK	2Mb/s
		QHS 6M	1, 19, 38	D8PSK	6Mb/s
Conducted Out of Band Emissions	A	QHS 2M	Hopping 1, 19, 38	$\pi/4$ QPSK	2Mb/s
		QHS 6M	Hopping 1, 19, 38	D8PSK	6Mb/s
AC Power Conducted Emissions	A	QHS 6M	19	D8PSK	6Mb/s
	B	QHS 6M	19	D8PSK	6Mb/s
	C	-	-	-	-
	D	-	-	-	-
Unwanted Emissions below 1 GHz	A	QHS 6M	19	D8PSK	6Mb/s
	C	-	-	-	-
Unwanted Emissions above 1 GHz	A	QHS 2M	1, 19, 38	$\pi/4$ QPSK	2Mb/s
		QHS 6M	1, 19, 38	D8PSK	6Mb/s
EUT Configure Mode:	A	EUT with USB cable(Laptop) and without Audio cable			
	B	EUT with USB cable(Adapter) and without Audio cable			
	C	EUT with USB cable(Laptop) and Audio cable			
	D	EUT with USB cable(Adapter) and Audio cable			
	E	EUT with internal Battery and without Audio cable			

3.5 Duty Cycle of Test Signal

QHS 2M: Duty cycle = 2.96 ms / 100 ms x 100% = 3.0%

QHS 6M: Duty cycle = 2.28 ms / 100 ms x 100% = 2.3%

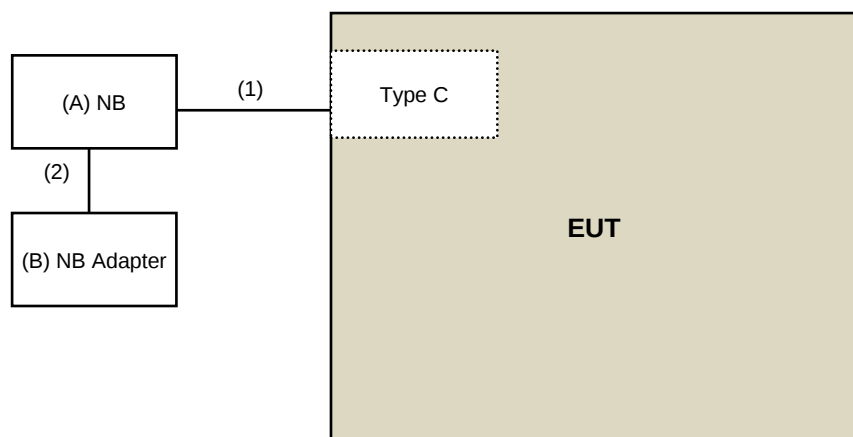


3.6 Test Program Used and Operation Descriptions

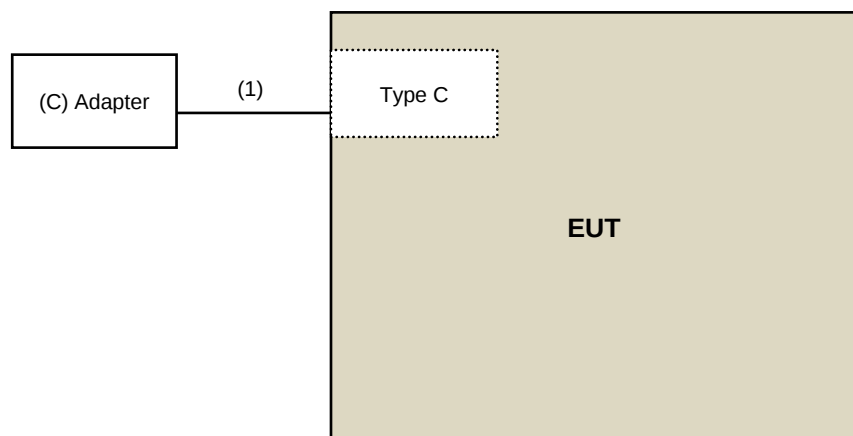
Controlling software (Blue Test3) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.7 Connection Diagram of EUT and Peripheral Devices

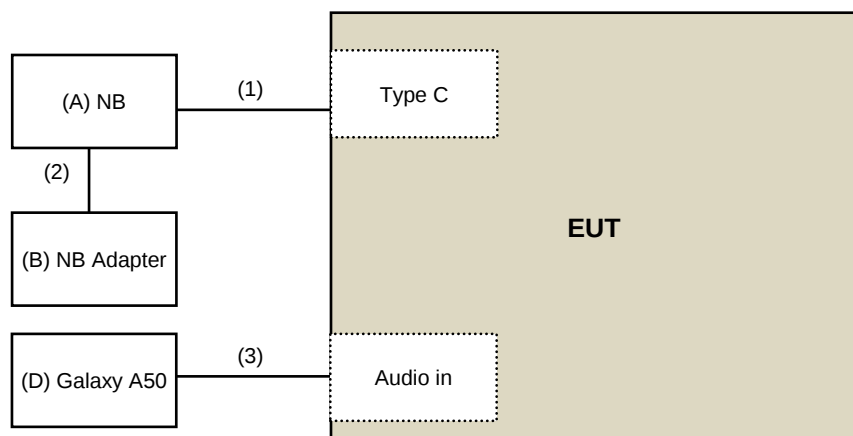
Mode A



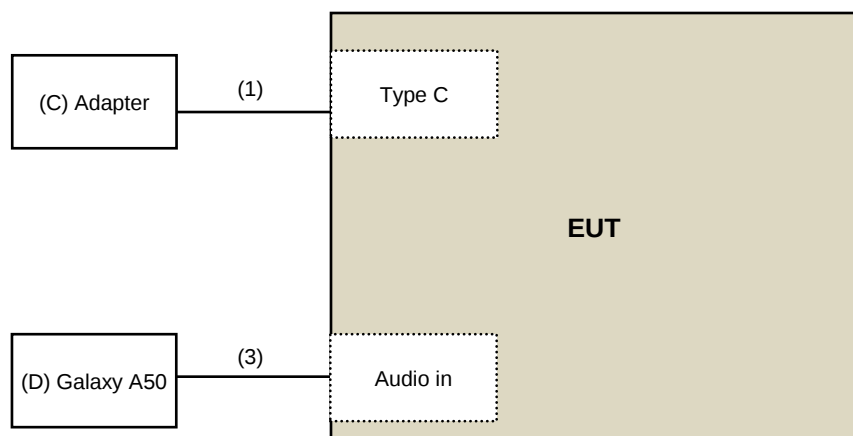
Mode B



Mode C



Mode D



3.8 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	NB	Lenovo	IdeaPad 5 15ITL05	N/A	N/A	Provided by Lab
B	NB Adapter	Lenovo	ADLX65CLGU2A	N/A	N/A	Provided by Lab
C	Adapter	Belkin	WCB007dq	N/A	N/A	Provided by Lab
D	Galaxy A50	SAMSUNG	SM-A505GN/DS	R58M74MNP1P	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	Type C cable	1	1	Y	0	Supplied by applicant
2	NB Adapter DC Cable	1	1.9	N	0	Provided by Lab
3	Audio Cable	1	1.1	N	0	Supplied by applicant

4 Test Instruments

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

4.1 RF Output Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Pulse Power Sensor Anritsu	MA2411B	0738404	2024/5/13	2025/5/12
RF Power Meter Anritsu	ML2495A	0842014	2024/5/13	2025/5/12
USB Wideband Power Sensor Keysight	U2021XA	U2021XA_001	2024/6/7	2025/6/6
Fixed Attenuator Solvang Technology	STI02-3310-10	STI02-3310-10_013	2024/6/19	2025/6/18

Notes:

1. The test was performed in LK - Oven
2. Tested Date: 2025/4/10

4.2 Number of Hopping Frequency Used

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
PXA Signal Analyzer Keysight	N9030A	MY54490260	2024/7/17	2025/7/16
Signal Analyzer R&S	FSV40	101042	2024/9/12	2025/9/11
Software	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Fixed Attenuator Solvang Technology	STI02-3310-10	STI02-3310-10_013	2024/6/19	2025/6/18

Notes:

1. The test was performed in LK - Oven
2. Tested Date: 2025/4/10

4.3 Dwell Time on Each Channel

Refer to section 4.2 to get the tested date and information of the instruments.

4.4 Hopping Channel Separation

Refer to section 4.2 to get the tested date and information of the instruments.

4.5 20 dB Bandwidth

Refer to section 4.2 to get the tested date and information of the instruments.

4.6 Conducted Out of Band Emissions

Refer to section 4.2 to get the tested date and information of the instruments.

4.7 AC Power Conducted Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
50 ohm terminal resistance LYNICS	0900510	E1-011284	2024/9/16	2025/9/15
		E1-011285	2024/9/25	2025/9/24
EMI Test Receiver R&S	ESR3	102412	2024/12/26	2025/12/25
		102414	2024/12/11	2025/12/10
Fixed Attenuator STI	STI02-2200-10	NO.4	2024/8/30	2025/8/29
High Voltage Probe Schwarzbeck	TK9420	00982	2024/12/6	2025/12/5
LISN R&S	ENV216	101196	2024/5/22	2025/5/21
LISN Schwarzbeck	NNLK 8121	8121-731	2024/6/12	2025/6/11
		8121-808	2024/4/26	2025/4/25
	NNLK 8129	8129229	2024/10/14	2025/10/13
	NSLK 8128	8128-244	2024/11/11	2025/11/10
Passive Voltage Probe R&S	ESH2-Z3	100073	2024/5/16	2025/5/15
RF Coaxial Cable PEWC	5D-FB	Cable-CO5-01	2025/1/17	2026/1/16
Software BVADT	Cond_V7.4.1.0	N/A	N/A	N/A

Notes:

1. The test was performed in Linkou Conduction 5.
2. Tested Date: 2025/4/10

4.8 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Bi_Log Antenna Schwarzbeck	VULB 9168	137	2024/10/9	2025/10/8
Coupling / Decoupling Network Schwarzbeck	CDNE-M2	00097	2024/5/28	2025/5/27
	CDNE-M3	00091	2025/3/20	2026/3/19
MXE EMI Receiver Keysight	N9038A	MY55420137	2024/5/8	2025/5/7
Preamplifier Agilent	8447D	2944A11064	2025/2/14	2026/2/13
Preamplifier EMCI	EMC001340	980269	2024/6/25	2025/6/24
Radiating Loop Antenna TESEQ	RLA 6120-20	80002	2024/7/30	2025/7/29
RF Coaxial Cable Pacfic	8D-FB	Cable-CH6-02	2024/6/25	2025/6/24
Signal Analyzer R&S	FSV40	101544	2024/6/20	2025/6/19
Software BVADT	Radiated_V8.7.08	N/A	N/A	N/A
Tower ADT	AT100	0306	N/A	N/A
Turn Table ADT	TT100	0306	N/A	N/A

Notes:

1. The test was performed in Linkou 966 Chamber 6 (CH 6).
2. Tested Date: 2025/4/9

4.9 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Boresight antenna tower fixture BV	BAF-02	6	N/A	N/A
High Pass Filter Wainwright	WHK 3.1/18G-10SS	SN 8	2024/5/24	2025/5/23
Horn Antenna EMCO	3115	00028257	2024/11/10	2025/11/9
Horn Antenna ETS-Lindgren	3117-PA	00215857	2024/11/10	2025/11/9
Horn Antenna Schwarzbeck	BBHA 9170	212	2024/10/18	2025/10/17
		BBHA9170190	2024/11/10	2025/11/9
MXE EMI Receiver Keysight	N9038A	MY55420137	2024/5/8	2025/5/7
Notch Filter Micro-Tronics	BRC50703-01	010	2024/5/24	2025/5/23
	BRM17690	005	2024/5/24	2025/5/23
Preamplifier EMCI	EMC0126545	980076	2025/2/14	2026/2/13
		980175	2024/8/25	2025/8/24
		980235	2025/2/14	2026/2/13
Preamplifier HP	8449B	3008A01201	2025/2/14	2026/2/13
RF Coaxial Cable EMCI	EMC104	190801	2024/7/5	2025/7/4
		190804	2024/7/5	2025/7/4
RF Coaxial Cable EMEC	EM102-KMKM-100	02	2024/7/5	2025/7/4
RF Coaxial Cable HUBER+SUHNER	SF-104	Cable-CH6-01	2024/7/5	2025/7/4
Signal Analyzer R&S	FSV40	101042	2024/9/12	2025/9/11
		101544	2024/6/20	2025/6/19
Software BVADT	Radiated_V7.7.1.1.1	N/A	N/A	N/A
Tower ADT	AT100	0306	N/A	N/A
Turn Table ADT	TT100	0306	N/A	N/A

Notes:

1. The test was performed in Linkou 966 Chamber 6 (CH 6).
2. Tested Date: 2025/4/9

5 Limits of Test Items

5.1 RF Output Power

The Maximum Output Power Measurement is 125 mW (21 dBm).

5.2 Number of Hopping Frequency Used

At least 15 channels frequencies, and should be equally spaced.

5.3 Dwell Time on Each Channel

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

5.4 Hopping Channel Separation

At least 25 kHz or two-third of 20 dB hopping channel bandwidth (whichever is greater).

5.5 20 dB Bandwidth

Maximum bandwidth is not specified.

5.6 Conducted Out of Band Emissions

Below 20 dB of the highest emission level of operating band (in 100 kHz Resolution Bandwidth).

5.7 AC Power Conducted Emissions

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

Notes:

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

5.8 Unwanted Emissions below 1 GHz

Radiated emissions up to 1 GHz 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

Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

5.9 Unwanted Emissions above 1 GHz

Radiated emissions above 1 GHz 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)
Above 960	500	3

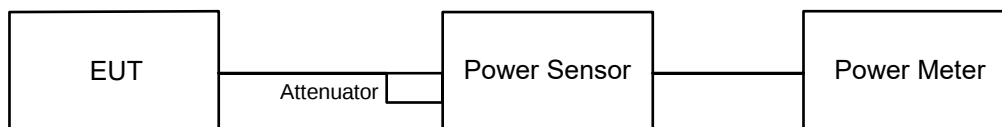
Notes:

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 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.

6 Test Arrangements

6.1 RF Output Power

6.1.1 Test Setup



6.1.2 Test Procedure

Peak Power:

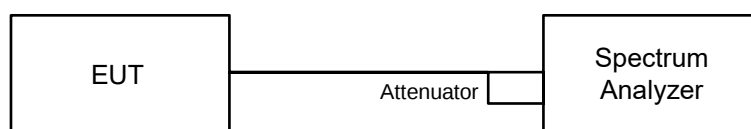
A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

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.

6.2 Number of Hopping Frequency Used

6.2.1 Test Setup

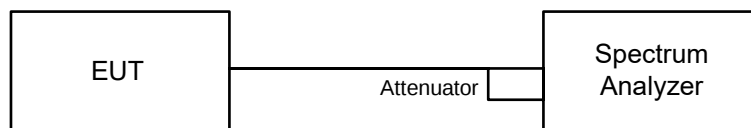


6.2.2 Test Procedure

- Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- Set the SA Sweep time = Auto, Detector function = Peak.
- Set the SA trace on Max hold mode and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
- Set the SA on View mode and then plot the result on SA screen.
- Repeat above procedures until all frequencies measured were complete.

6.3 Dwell Time on Each Channel

6.3.1 Test Setup

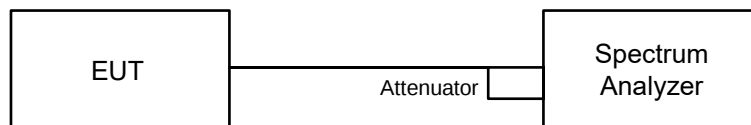


6.3.2 Test Procedure

- Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
- Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
- Repeat above procedures until all different time-slot modes have been completed.

6.4 Hopping Channel Separation

6.4.1 Test Setup

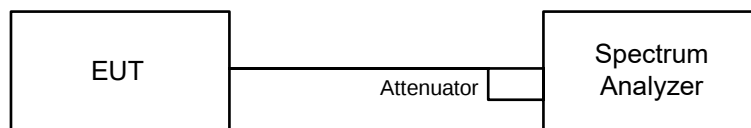


6.4.2 Test Procedure

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
- Set the SA Sweep time = Auto, Detector function = Peak.
- Set the SA trace on Max hold mode and record the separation of two adjacent channels.
- Measure the frequency difference of these two adjacent channels by SA marker-delta function. And then plot the result on SA screen.
- Repeat above procedures until all frequencies measured were complete.

6.5 20 dB Bandwidth

6.5.1 Test Setup

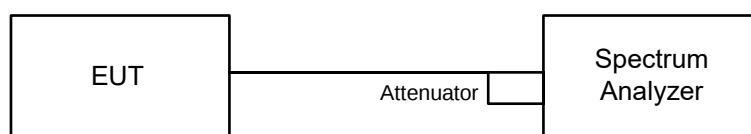


6.5.2 Test Procedure

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 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.
- Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
- Repeat above procedures until all frequencies measured were complete.

6.6 Conducted Out of Band Emissions

6.6.1 Test Setup



6.6.2 Test Procedure

MEASUREMENT PROCEDURE REF

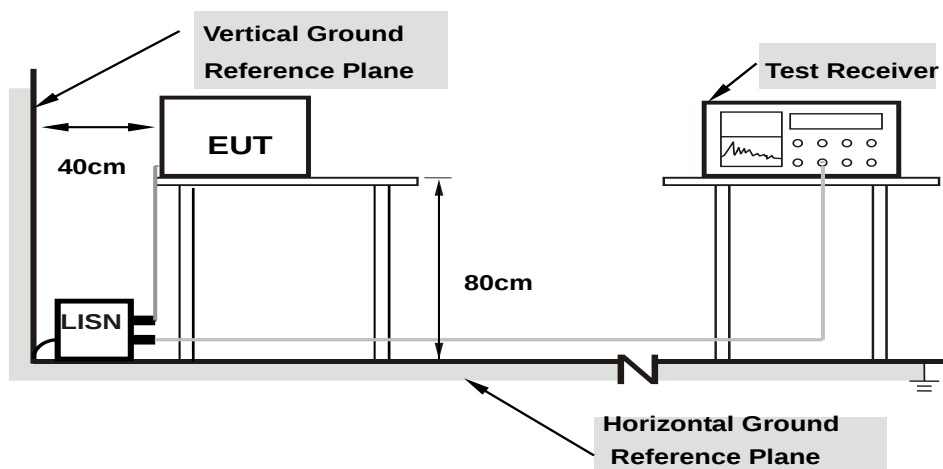
- Set the RBW = 100 kHz.
- Set the VBW $\geq$ 300 kHz.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOB

- Set RBW = 100 kHz.
- Set VBW $\geq$ 300 kHz.
- Detector = peak.
- Sweep = auto couple.
- Trace Mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level.

6.7 AC Power Conducted Emissions

6.7.1 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).

6.7.2 Test Procedure

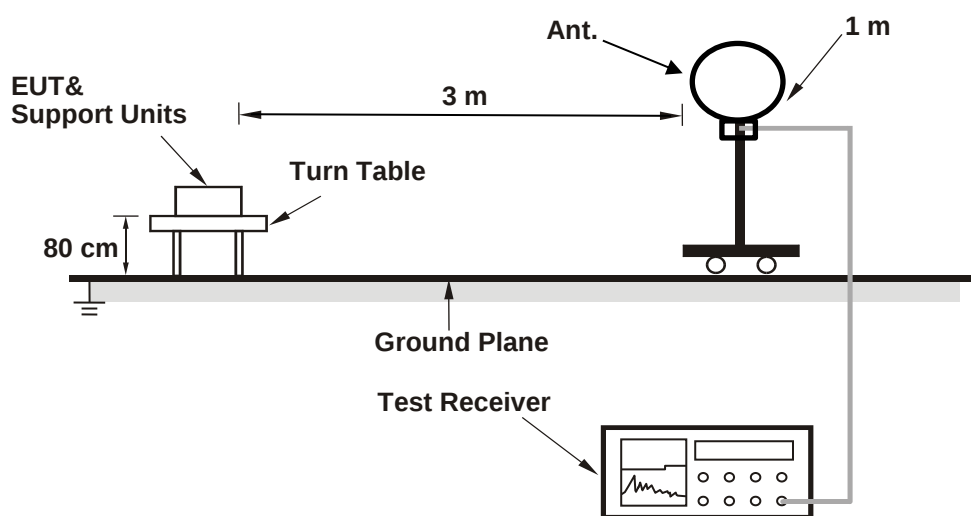
- The EUT was placed on a 0.8 meter to the top of table and placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50 uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

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

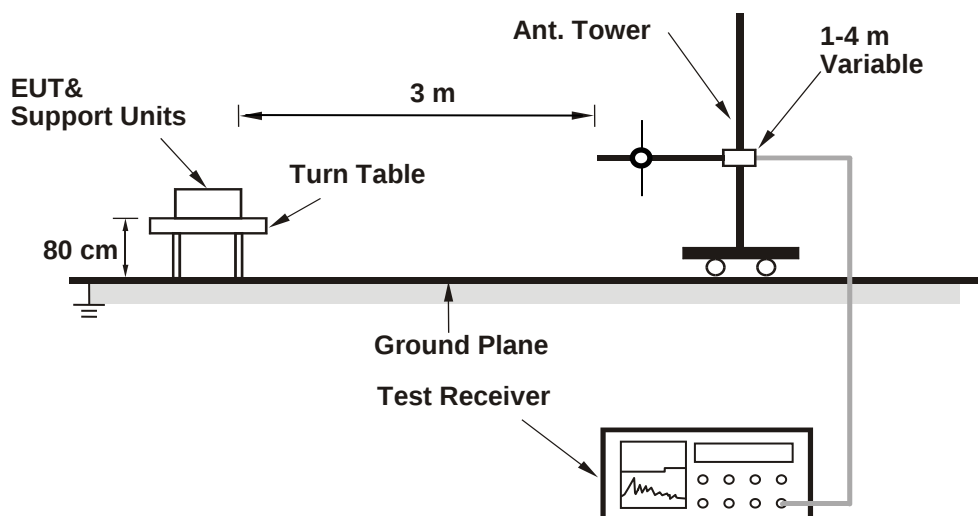
6.8 Unwanted Emissions below 1 GHz

6.8.1 Test Setup

For Radiated emission below 30 MHz



For Radiated emission above 30 MHz



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

6.8.2 Test Procedure

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 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. 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 to 90 kHz and 110 kHz to 490 kHz) set to average detect function and peak detect function.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 200 Hz at frequency below 150 kHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz or 10 kHz at frequency (150 kHz to 30 MHz).
3. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated emission above 30 MHz

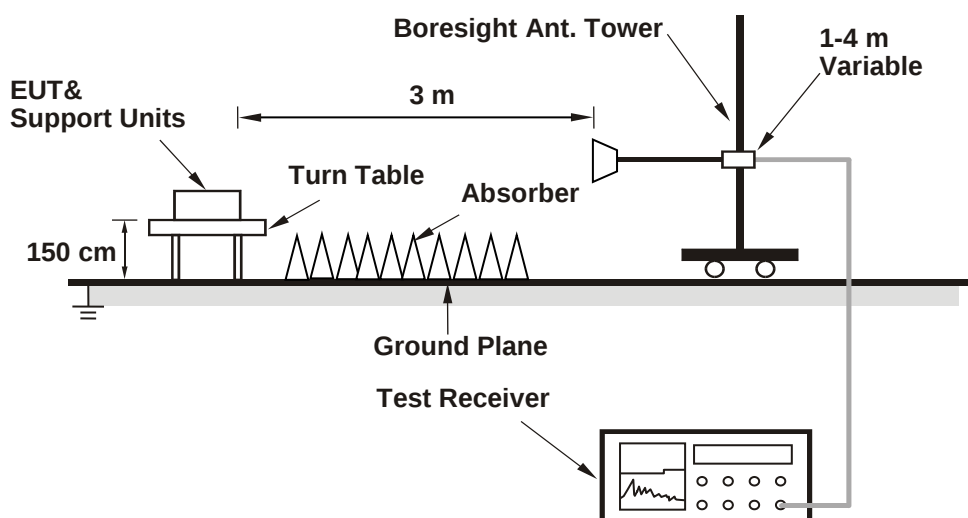
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the 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.

Notes:

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

6.9 Unwanted Emissions above 1 GHz

6.9.1 Test Setup



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

6.9.2 Test Procedure

- The EUT was placed on the top of a rotating table 1.5 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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.
- The test-receiver system was set to peak and average detects 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.

Notes:

- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) and Average detection (AV) at frequency above 1 GHz.
- According to ANSI C63.10 section 6.6.4 and 4.1.4.2.2. For fundamental and harmonic signal measurement, according to ANSI C63.10 section 7.5, the average value = peak value + duty cycle correction factor. For duty cycle correction factor values, see the Test Signal Duty Cycle section in this report.
- All modes of operation were investigated and the worst-case emissions are reported.

7 Test Results of Test Item

7.1 RF Output Power

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Waydi Tuan
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For Peak Power

QHS 2M

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Test Result
1	2404	26.792	14.28	21	Pass
19	2440	28.973	14.62	21	Pass
38	2478	26.73	14.27	21	Pass

Note: The antenna gain is 0.7 dBi < 6 dBi, so the output power limit shall not be reduced.

QHS 6M

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Test Result
1	2404	26.915	14.30	21	Pass
19	2440	29.174	14.65	21	Pass
38	2478	26.977	14.31	21	Pass

Note: The antenna gain is 0.7 dBi < 6 dBi, so the output power limit shall not be reduced.

For Average Power

QHS 2M

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2404	16.218	12.10
19	2440	18.323	12.63
38	2478	15.776	11.98

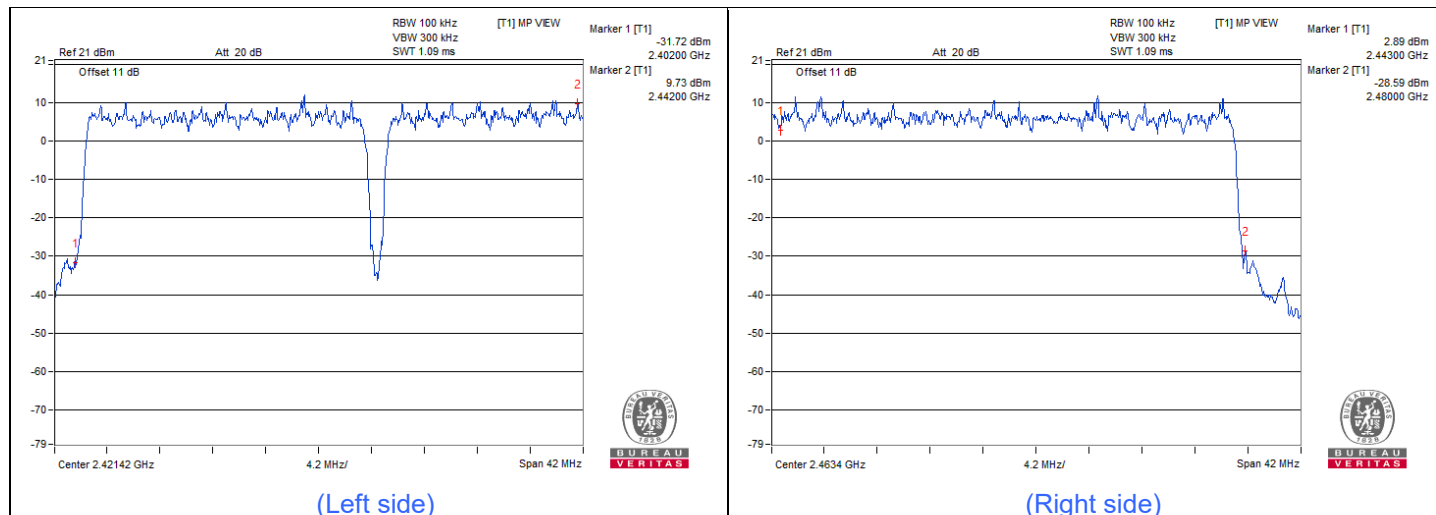
QHS 6M

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2404	16.558	12.19
19	2440	18.535	12.68
38	2478	15.56	11.92

7.2 Number of Hopping Frequency Used

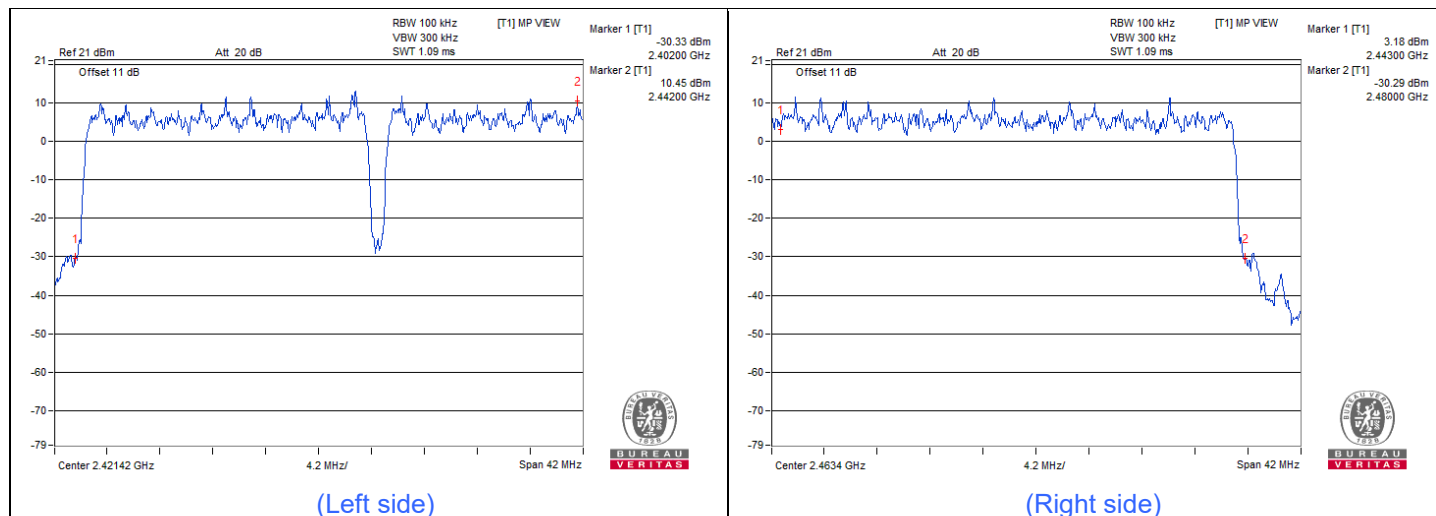
Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Waydi Tuan
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QHS 2M



Note: There are 37 hopping frequencies in the hopping mode. On the plots, it shows that the hopping frequencies are equally spaced.

QHS 6M



Note: There are 37 hopping frequencies in the hopping mode. On the plots, it shows that the hopping frequencies are equally spaced.

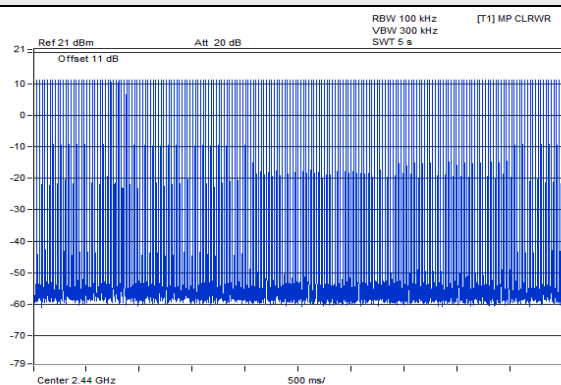
7.3 Dwell Time on Each Channel

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Waydi Tuan
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QHS 2M

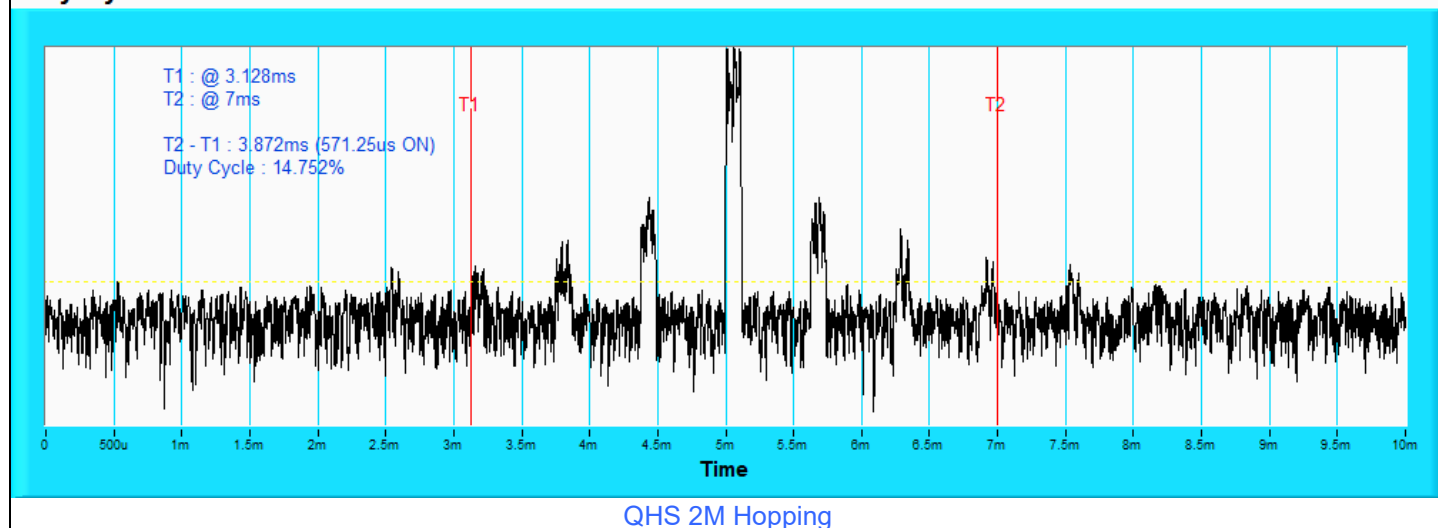
Mode	Number of transmission in 14.8 sec	Length of transmission time (msec)	Dwell Time (msec)	Limit (msec)	Test Result
Hopping	$200 \text{ (times / 5 sec)} * 2.96 = 592 \text{ times}$	0.57125	338.18	400	Pass

Spectrum plots of Dwell Time



QHS 2M Hopping

Duty Cycle

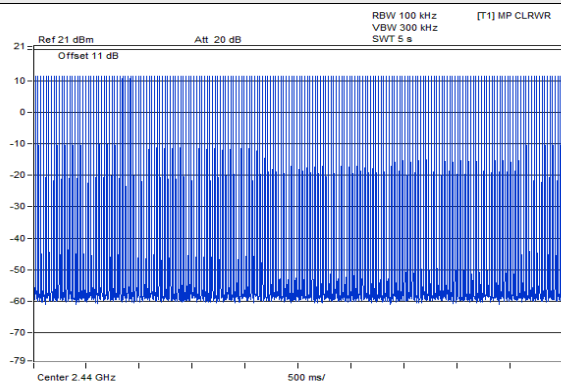


QHS 2M Hopping

QHS 6M

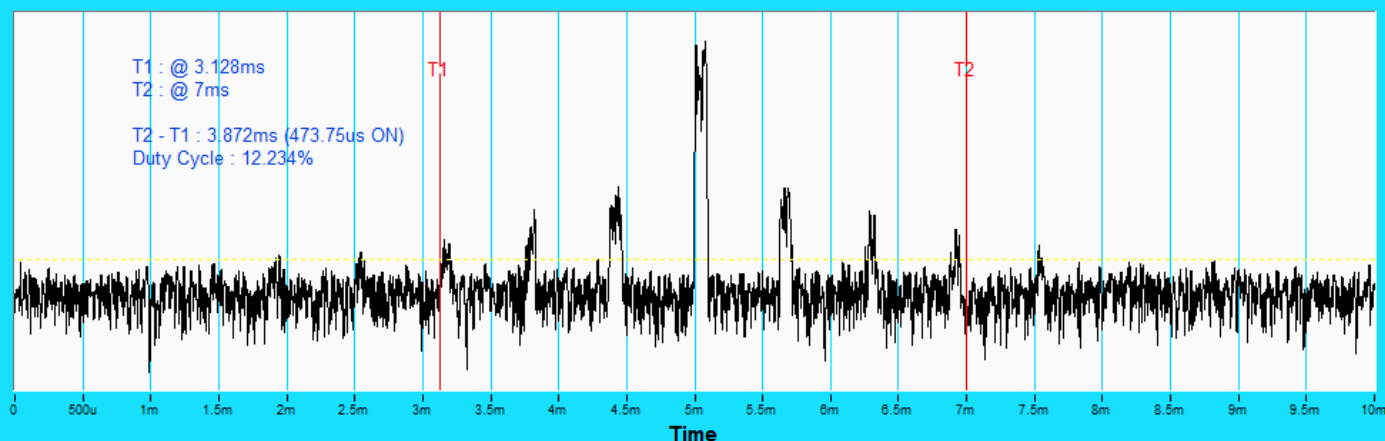
Mode	Number of transmission in 14.8 sec	Length of transmission time (msec)	Dwell Time (msec)	Limit (msec)	Test Result
Hopping	200 (times / 5 sec) * 2.96 = 592 times	0.47375	280.46	400	Pass

Spectrum plots of Dwell Time



QHS 6M Hopping

Duty Cycle



QHS 6M Hopping

7.4 Hopping Channel Separation

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Waydi Tuan
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QHS 2M

Channel	Frequency (MHz)	Hopping Channel Separation (MHz)	Minimum Limit (MHz)	Test Result
1	2404	2.00	1.71	Pass
19	2440	2.01	1.71	Pass
38	2478	2.01	1.71	Pass

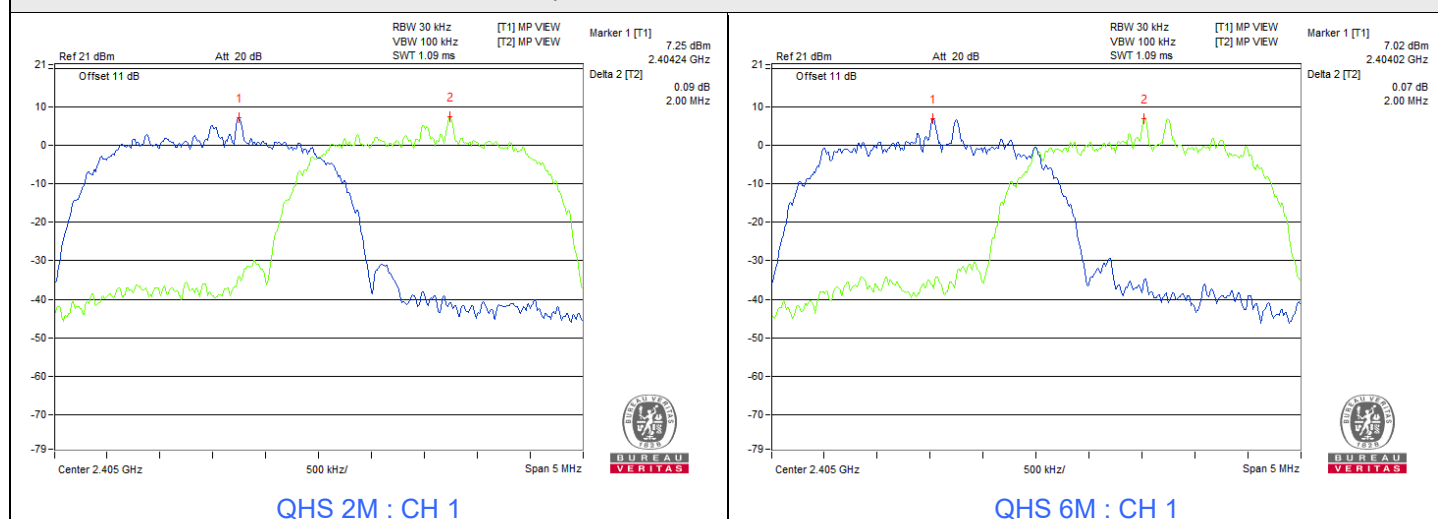
Note: The minimum limit is two-third 20dB bandwidth.

QHS 6M

Channel	Frequency (MHz)	Hopping Channel Separation (MHz)	Minimum Limit (MHz)	Test Result
1	2404	2.00	1.7	Pass
19	2440	2.00	1.7	Pass
38	2478	2.00	1.71	Pass

Note: The minimum limit is two-third 20dB bandwidth.

Spectrum Plot of Minimum Value



7.5 20 dB Bandwidth

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Waydi Tuan
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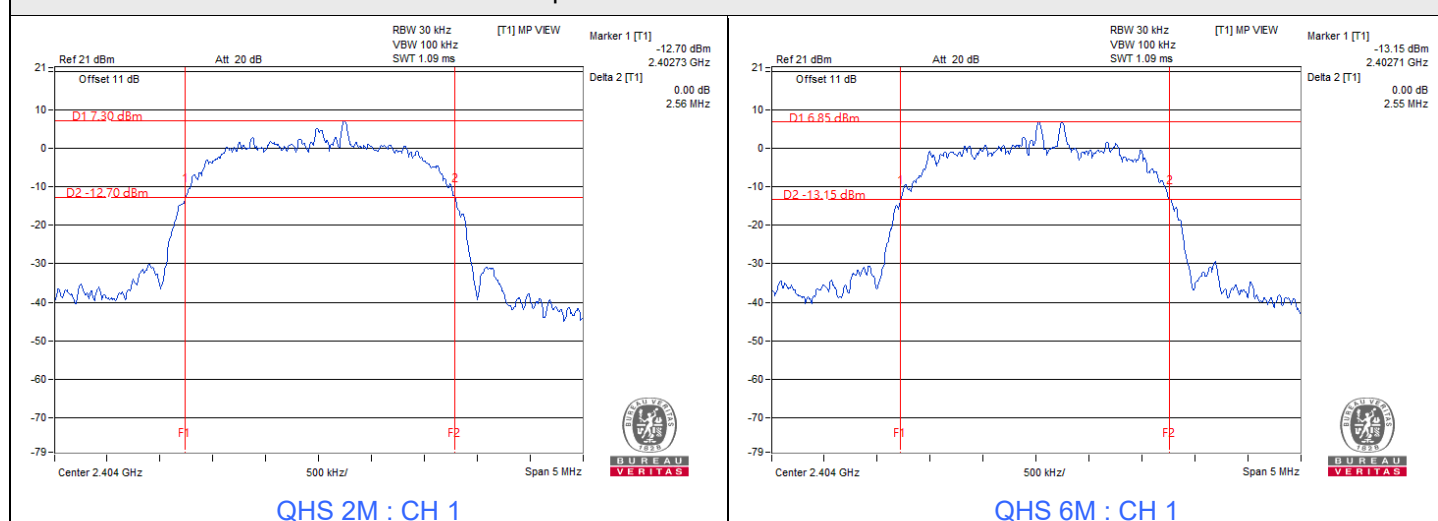
QHS 2M

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
1	2404	2.56
19	2440	2.56
38	2478	2.56

QHS 6M

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
1	2404	2.55
19	2440	2.55
38	2478	2.56

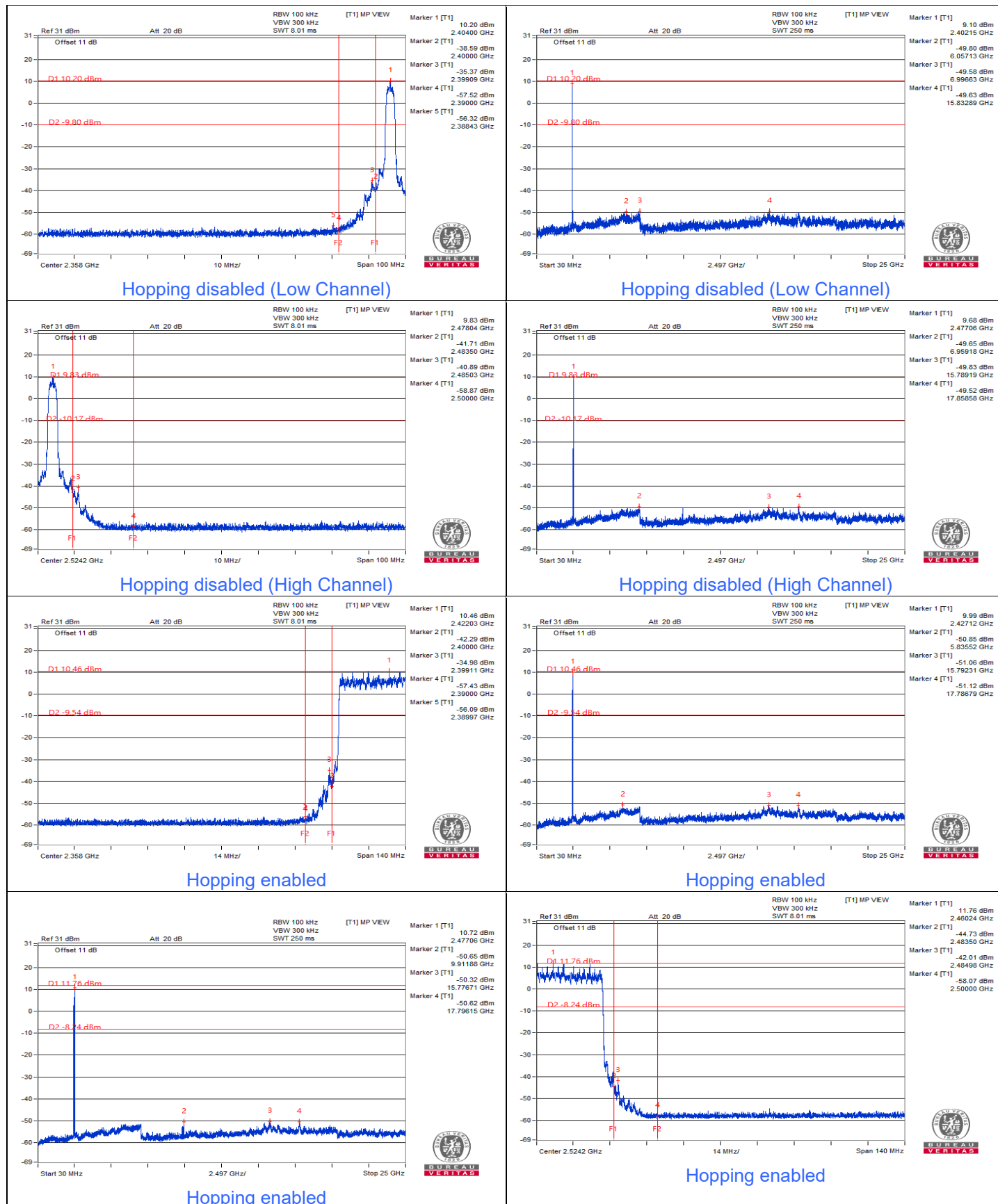
Spectrum Plot of Minimum Value



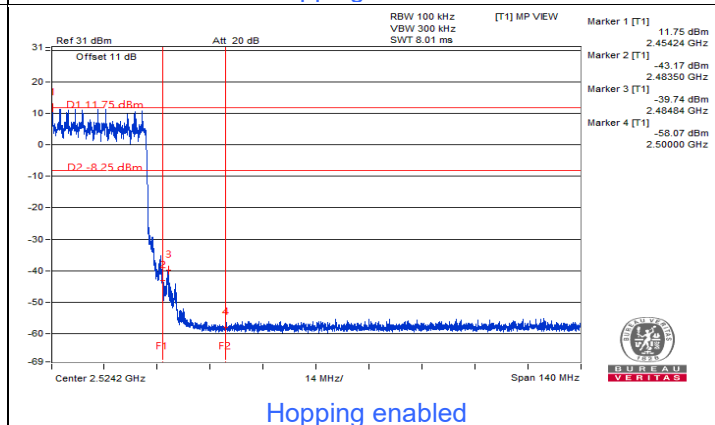
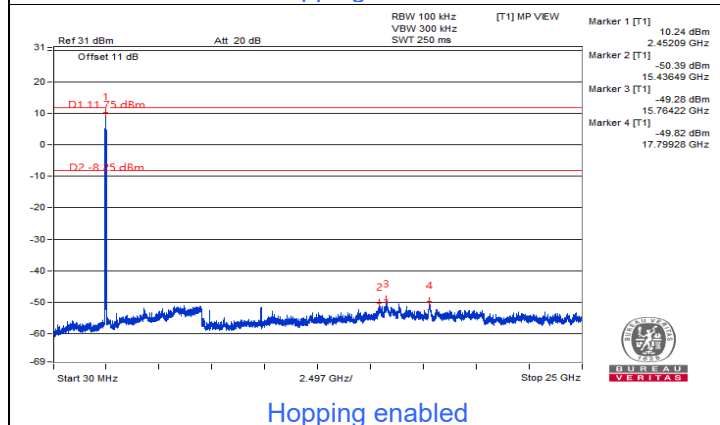
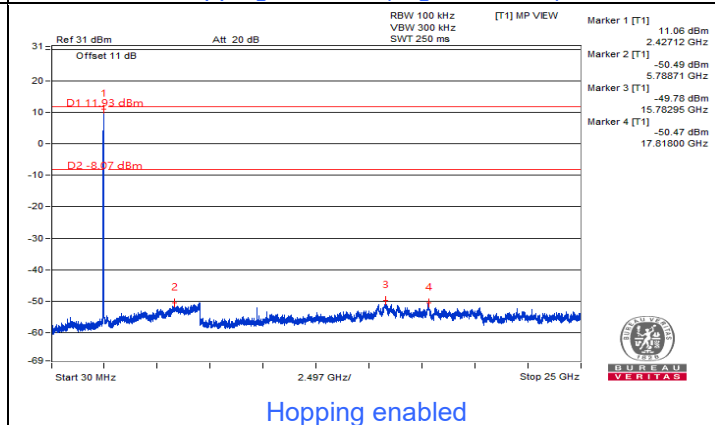
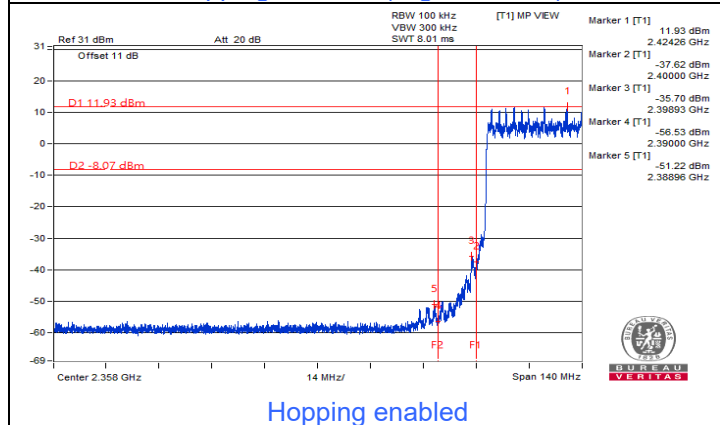
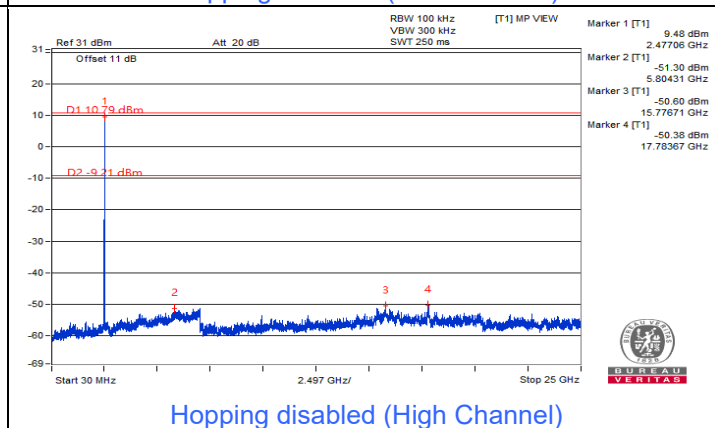
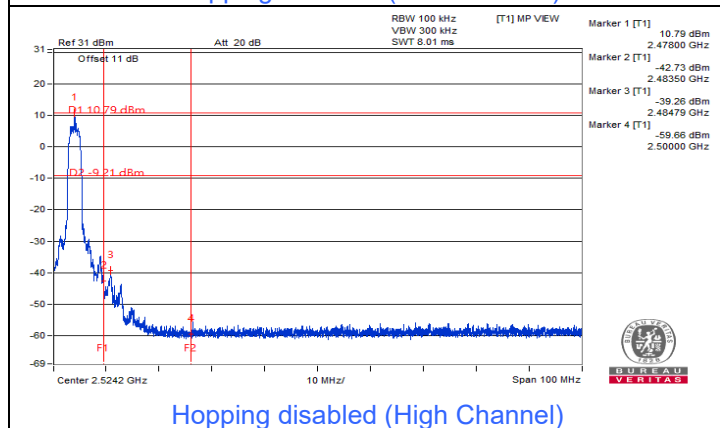
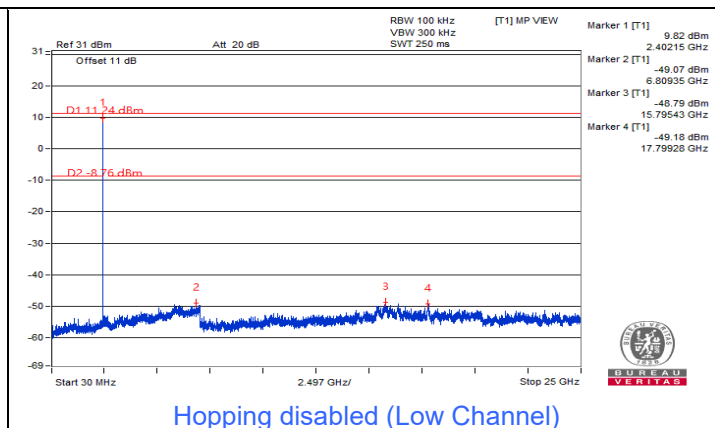
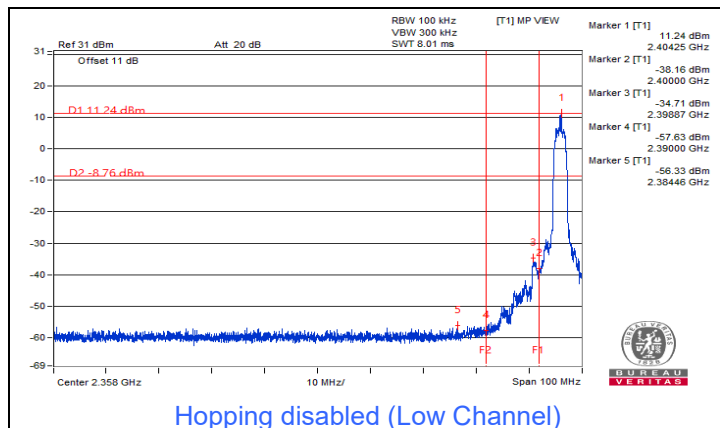
7.6 Conducted Out of Band Emissions

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Waydi Tuan
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QHS 2M



QHS 6M



7.7 AC Power Conducted Emissions

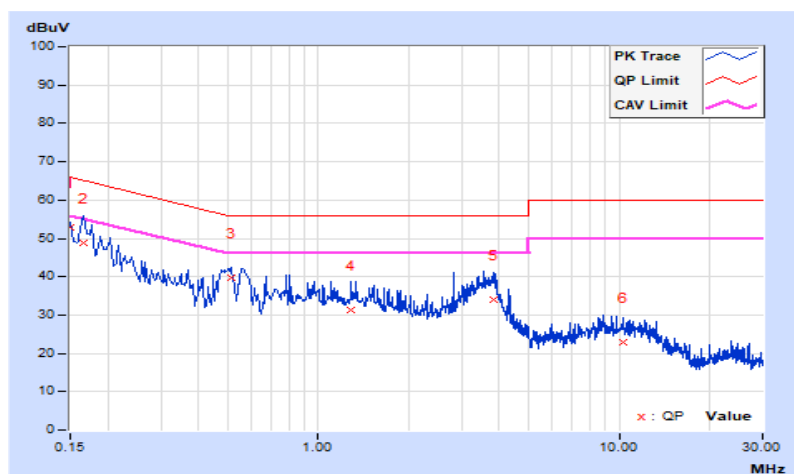
Mode A

RF Mode	QHS 6M	Channel	CH 19 : 2440 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25 °C, 75 % RH
Tested By	Dalen Dei		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.03	42.76	26.90	52.79	36.93	66.00	56.00	-13.21	-19.07
2	0.16564	10.04	38.70	19.52	48.74	29.56	65.18	55.18	-16.44	-25.62
3	0.51173	10.14	29.68	19.88	39.82	30.02	56.00	46.00	-16.18	-15.98
4	1.29002	10.23	21.13	14.49	31.36	24.72	56.00	46.00	-24.64	-21.28
5	3.84390	10.36	23.48	12.41	33.84	22.77	56.00	46.00	-22.16	-23.23
6	10.27985	10.59	12.36	6.32	22.95	16.91	60.00	50.00	-37.05	-33.09

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

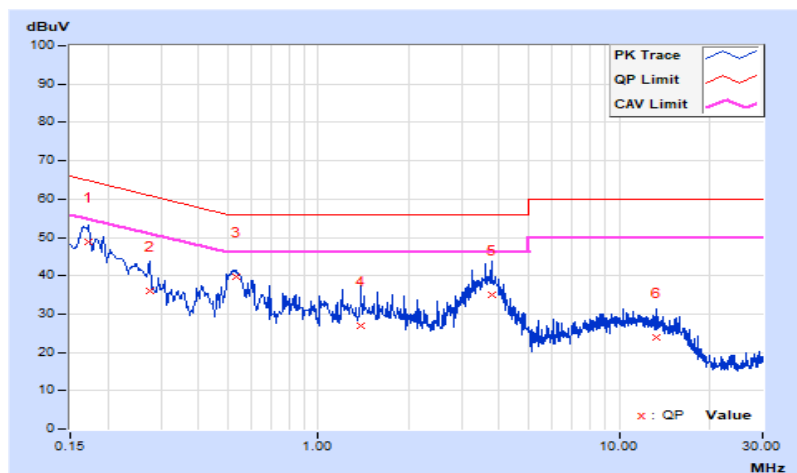


RF Mode	QHS 6M	Channel	CH 19 : 2440 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25 °C, 75 % RH
Tested By	Dalen Dei		

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17283	10.04	38.72	20.30	48.76	30.34	64.82	54.82	-16.06	-24.48
2	0.27515	10.04	26.07	14.52	36.11	24.56	60.96	50.96	-24.85	-26.40
3	0.53129	10.06	29.71	22.23	39.77	32.29	56.00	46.00	-16.23	-13.71
4	1.38389	10.11	16.90	9.75	27.01	19.86	56.00	46.00	-28.99	-26.14
5	3.77742	10.23	24.86	12.57	35.09	22.80	56.00	46.00	-20.91	-23.20
6	13.35390	10.54	13.37	8.01	23.91	18.55	60.00	50.00	-36.09	-31.45

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



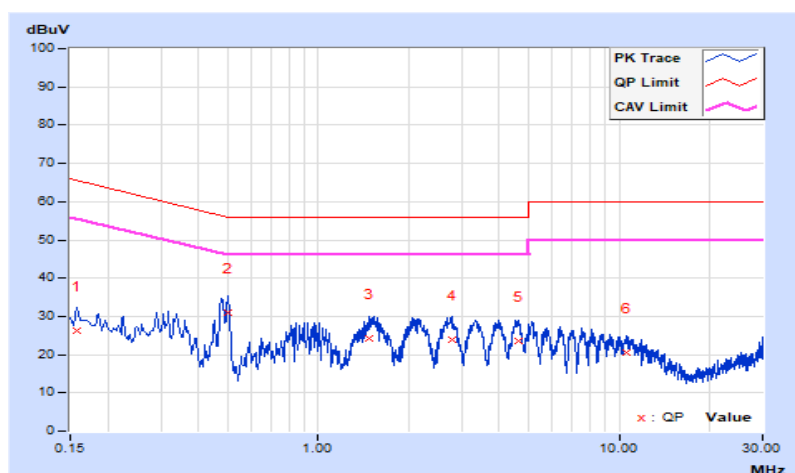
Mode B

RF Mode	QHS 6M	Channel	CH 19 : 2440 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25 °C, 75 % RH
Tested By	Dalen Dei		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15782	10.03	16.19	5.60	26.22	15.63	65.58	55.58	-39.36	-39.95
2	0.49980	10.14	20.73	8.52	30.87	18.66	56.00	46.00	-25.13	-27.34
3	1.48166	10.24	13.89	4.23	24.13	14.47	56.00	46.00	-31.87	-31.53
4	2.79576	10.31	13.59	4.29	23.90	14.60	56.00	46.00	-32.10	-31.40
5	4.64175	10.39	13.33	2.89	23.72	13.28	56.00	46.00	-32.28	-32.72
6	10.59273	10.60	9.85	1.98	20.45	12.58	60.00	50.00	-39.55	-37.42

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

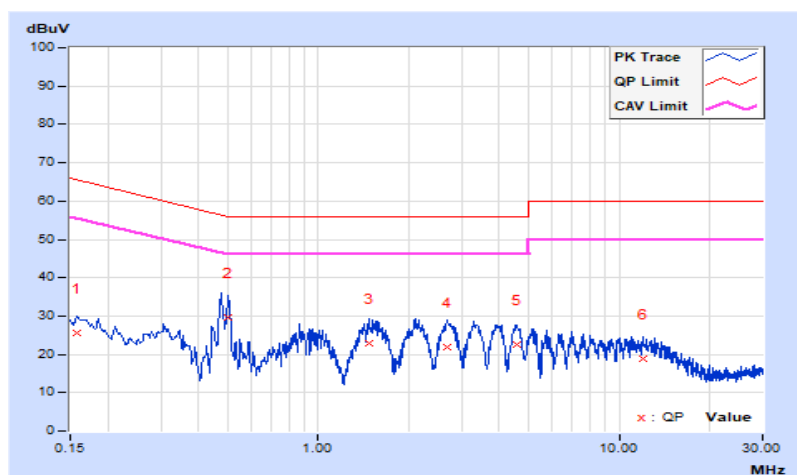


RF Mode	QHS 6M	Channel	CH 19 : 2440 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25 °C, 75 % RH
Tested By	Dalen Dei		

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15760	10.04	15.56	4.80	25.60	14.84	65.59	55.59	-39.99	-40.75
2	0.50376	10.06	19.41	7.81	29.47	17.87	56.00	46.00	-26.53	-28.13
3	1.48166	10.11	12.74	2.78	22.85	12.89	56.00	46.00	-33.15	-33.11
4	2.67843	10.17	11.74	1.04	21.91	11.21	56.00	46.00	-34.09	-34.79
5	4.55571	10.27	12.23	2.81	22.50	13.08	56.00	46.00	-33.50	-32.92
6	11.98505	10.53	8.24	1.65	18.77	12.18	60.00	50.00	-41.23	-37.82

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



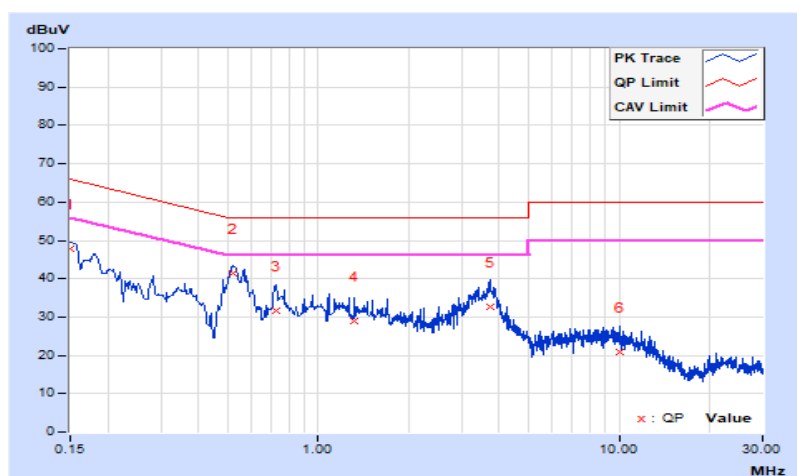
Mode C

Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25 °C, 75 % RH
Tested By	Dalen Dei		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.03	37.73	22.79	47.76	32.82	66.00	56.00	-18.24	-23.18
2	0.51858	10.15	31.13	22.55	41.28	32.70	56.00	46.00	-14.72	-13.30
3	0.72277	10.17	21.46	13.66	31.63	23.83	56.00	46.00	-24.37	-22.17
4	1.32522	10.23	18.72	12.47	28.95	22.70	56.00	46.00	-27.05	-23.30
5	3.71093	10.36	22.36	11.70	32.72	22.06	56.00	46.00	-23.28	-23.94
6	10.02955	10.59	10.36	4.49	20.95	15.08	60.00	50.00	-39.05	-34.92

Remarks:

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

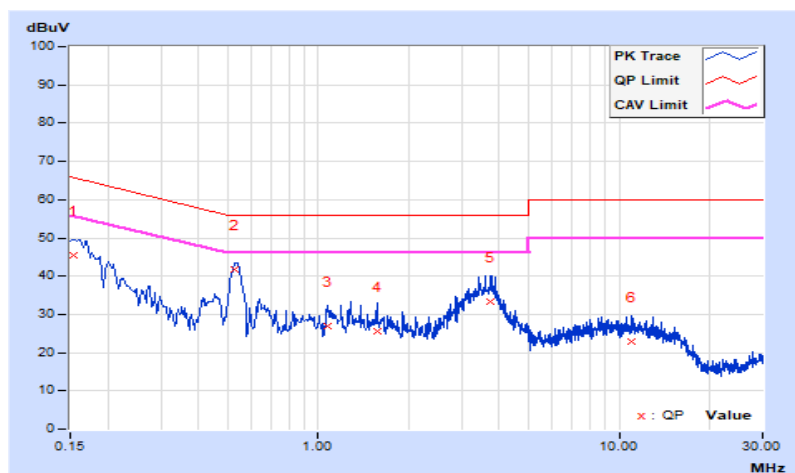


Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25 °C, 75 % RH
Tested By	Dalen Dei		

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	10.04	35.29	15.78	45.33	25.82	65.79	55.79	-20.46	-29.97
2	0.52963	10.06	31.81	24.42	41.87	34.48	56.00	46.00	-14.13	-11.52
3	1.07880	10.09	16.92	10.96	27.01	21.05	56.00	46.00	-28.99	-24.95
4	1.56379	10.12	15.56	10.16	25.68	20.28	56.00	46.00	-30.32	-25.72
5	3.74613	10.23	23.23	11.43	33.46	21.66	56.00	46.00	-22.54	-24.34
6	11.06205	10.52	12.27	6.66	22.79	17.18	60.00	50.00	-37.21	-32.82

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



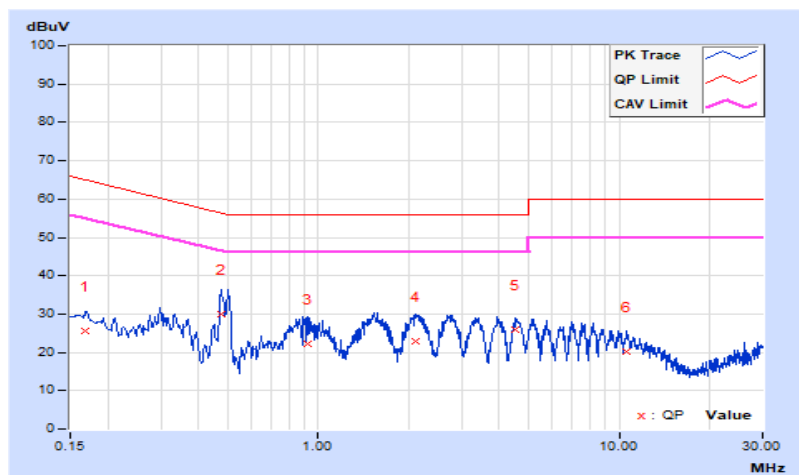
Mode D

Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25 °C, 75 % RH
Tested By	Dalen Dei		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16923	10.04	15.45	2.17	25.49	12.21	65.00	55.00	-39.51	-42.79
2	0.47461	10.14	19.98	5.24	30.12	15.38	56.43	46.43	-26.31	-31.05
3	0.92239	10.20	12.14	2.66	22.34	12.86	56.00	46.00	-33.66	-33.14
4	2.11133	10.28	12.49	3.04	22.77	13.32	56.00	46.00	-33.23	-32.68
5	4.53224	10.39	15.57	5.47	25.96	15.86	56.00	46.00	-30.04	-30.14
6	10.55362	10.60	9.76	1.65	20.36	12.25	60.00	50.00	-39.64	-37.75

Remarks:

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

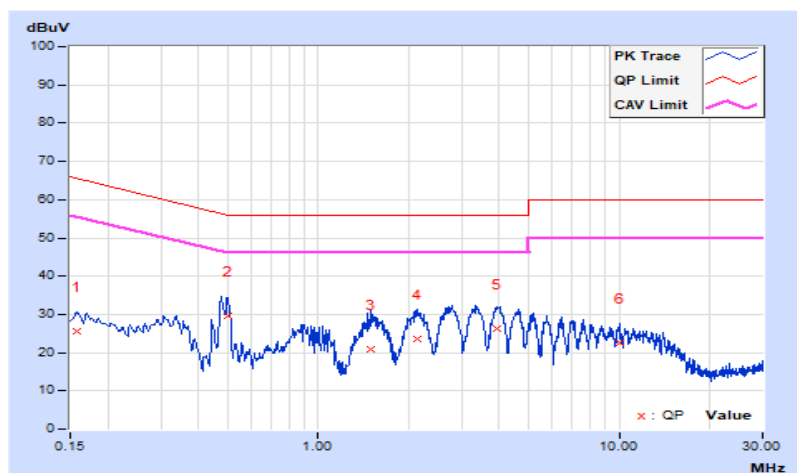


Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25 °C, 75 % RH
Tested By	Dalen Dei		

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15760	10.04	15.68	6.70	25.72	16.74	65.59	55.59	-39.87	-38.85
2	0.50000	10.06	19.47	8.79	29.53	18.85	56.00	46.00	-26.47	-27.15
3	1.50122	10.12	10.79	2.51	20.91	12.63	56.00	46.00	-35.09	-33.37
4	2.12698	10.15	13.50	4.23	23.65	14.38	56.00	46.00	-32.35	-31.62
5	3.91430	10.24	15.97	10.71	26.21	20.95	56.00	46.00	-29.79	-25.05
6	10.07257	10.51	11.94	7.10	22.45	17.61	60.00	50.00	-37.55	-32.39

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



7.8 Unwanted Emissions below 1 GHz

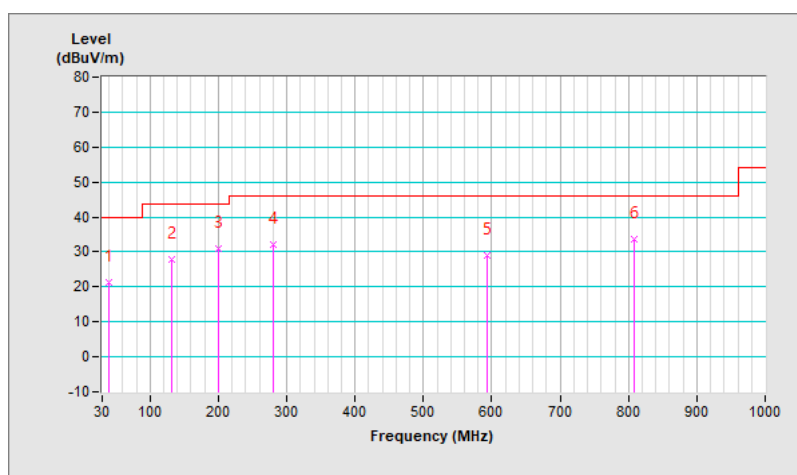
Mode A

RF Mode	QHS 6M	Channel	CH 19 : 2440 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 71 % RH
Tested By	Dalen Dai		

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	40.67	21.4 QP	40.0	-18.6	1.34 H	309	30.6	-9.2
2	131.85	27.8 QP	43.5	-15.7	1.64 H	133	36.9	-9.1
3	199.75	30.8 QP	43.5	-12.7	1.28 H	348	41.0	-10.2
4	280.26	32.0 QP	46.0	-14.0	1.89 H	112	38.0	-6.0
5	593.57	29.1 QP	46.0	-16.9	2.17 H	111	28.0	1.1
6	808.91	33.5 QP	46.0	-12.5	1.61 H	236	28.0	5.5

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 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

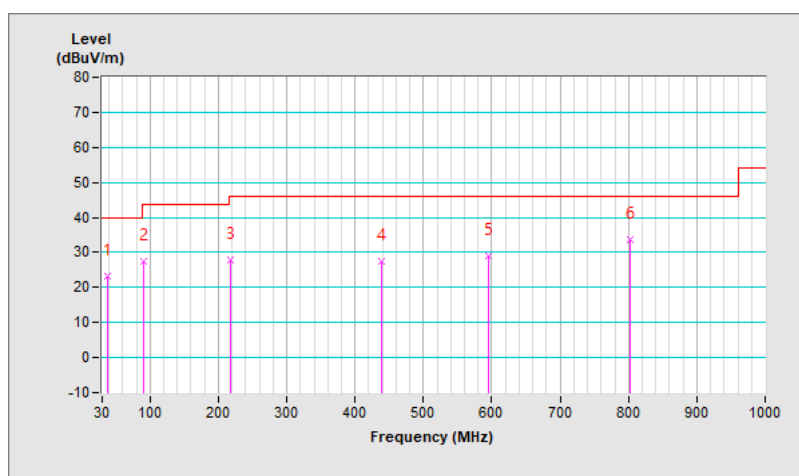


RF Mode	QHS 6M	Channel	CH 19 : 2440 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 71 % RH
Tested By	Dalen Dai		

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	38.73	23.3 QP	40.0	-16.7	1.72 V	320	32.9	-9.6
2	91.11	27.5 QP	43.5	-16.0	1.53 V	38	41.3	-13.8
3	218.18	27.7 QP	46.0	-18.3	1.08 V	129	37.6	-9.9
4	438.37	27.4 QP	46.0	-18.6	1.85 V	214	29.7	-2.3
5	594.54	29.1 QP	46.0	-16.9	2.04 V	44	28.0	1.1
6	802.12	33.8 QP	46.0	-12.2	1.97 V	180	28.4	5.4

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 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



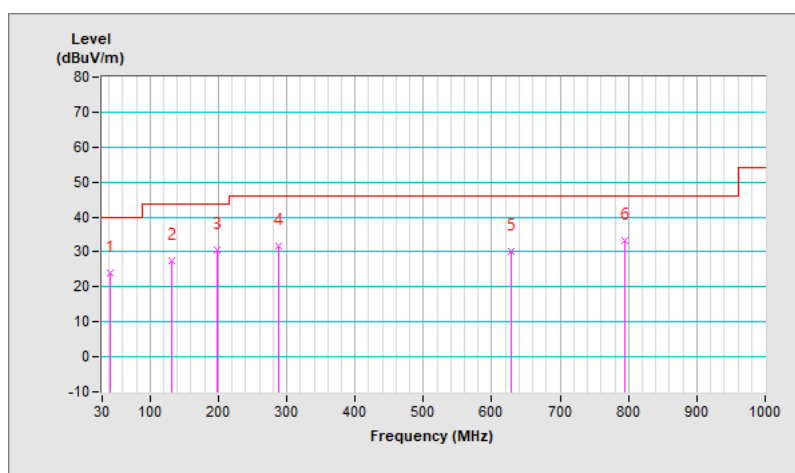
Mode C

Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 71 % RH
Tested By	Dalen Dai		

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	41.64	23.8 QP	40.0	-16.2	1.61 H	124	32.9	-9.1
2	131.85	27.5 QP	43.5	-16.0	1.25 H	141	36.6	-9.1
3	197.81	30.7 QP	43.5	-12.8	1.70 H	283	40.9	-10.2
4	288.02	31.7 QP	46.0	-14.3	2.17 H	135	37.5	-5.8
5	627.52	30.3 QP	46.0	-15.7	1.93 H	201	28.1	2.2
6	794.36	33.1 QP	46.0	-12.9	1.18 H	128	27.8	5.3

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 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

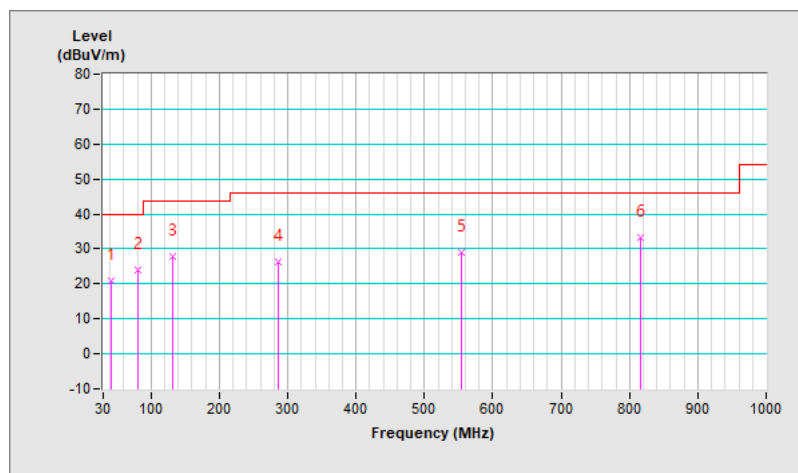


Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 71 % RH
Tested By	Dalen Dai		

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	42.61	21.0 QP	40.0	-19.0	1.52 V	224	30.0	-9.0
2	80.44	23.9 QP	40.0	-16.1	1.33 V	86	36.7	-12.8
3	131.85	28.0 QP	43.5	-15.5	1.59 V	337	37.1	-9.1
4	286.08	26.3 QP	46.0	-19.7	1.96 V	164	32.1	-5.8
5	554.77	29.0 QP	46.0	-17.0	2.12 V	178	29.4	-0.4
6	816.67	33.3 QP	46.0	-12.7	1.67 V	249	27.7	5.6

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



7.9 Unwanted Emissions above 1 GHz

RF Mode	QHS 2M	Channel	CH 1 : 2404 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 71 % RH
Tested By	Dalen Dai		

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	52.7 PK	74.0	-21.3	1.05 H	314	53.9	-1.2
2	2390.00	40.8 AV	54.0	-13.2	1.05 H	314	42.0	-1.2
3	*2404.00	104.8 PK			1.05 H	314	105.9	-1.1
4	*2404.00	74.2 AV			1.05 H	314	75.3	-1.1
5	4808.00	47.5 PK	74.0	-26.5	1.44 H	37	40.3	7.2
6	4808.00	16.9 AV	54.0	-37.1	1.44 H	37	9.7	7.2
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	51.8 PK	74.0	-22.2	1.26 V	36	53.0	-1.2
2	2390.00	40.1 AV	54.0	-13.9	1.26 V	36	41.3	-1.2
3	*2404.00	97.9 PK			1.26 V	36	99.0	-1.1
4	*2404.00	67.3 AV			1.26 V	36	68.4	-1.1
5	4808.00	46.6 PK	74.0	-27.4	1.31 V	227	39.4	7.2
6	4808.00	16.0 AV	54.0	-38.0	1.31 V	227	8.8	7.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:

$$20 \log(\text{Duty cycle}) = 20 \log(2.96 \text{ ms} / 100 \text{ ms}) = -30.6 \text{ dB}$$

RF Mode	QHS 2M	Channel	CH 19 : 2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 71 % RH
Tested By	Dalen Dai		

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	*2440.00	105.5 PK			1.04 H	313	106.4	-0.9
2	*2440.00	74.9 AV			1.04 H	313	75.8	-0.9
3	4880.00	47.9 PK	74.0	-26.1	1.52 H	39	40.2	7.7
4	4880.00	17.3 AV	54.0	-36.7	1.52 H	39	9.6	7.7
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	*2440.00	98.9 PK			1.29 V	33	99.8	-0.9
2	*2440.00	68.3 AV			1.29 V	33	69.2	-0.9
3	4880.00	46.9 PK	74.0	-27.1	1.33 V	231	39.2	7.7
4	4880.00	16.3 AV	54.0	-37.7	1.33 V	231	8.6	7.7

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, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:

$$20 \log(\text{Duty cycle}) = 20 \log(2.96 \text{ ms} / 100 \text{ ms}) = -30.6 \text{ dB}$$

RF Mode	QHS 2M	Channel	CH 38 : 2478 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 71 % RH
Tested By	Dalen Dai		

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	*2478.00	104.4 PK			1.01 H	315	105.1	-0.7
2	*2478.00	73.8 AV			1.01 H	315	74.5	-0.7
3	2483.50	61.9 PK	74.0	-12.1	1.01 H	315	62.4	-0.5
4	2483.50	31.3 AV	54.0	-22.7	1.01 H	315	31.8	-0.5
5	4956.00	47.2 PK	74.0	-26.8	1.56 H	44	39.4	7.8
6	4956.00	16.6 AV	54.0	-37.4	1.56 H	44	8.8	7.8
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	*2478.00	97.6 PK			1.23 V	34	98.3	-0.7
2	*2478.00	67.0 AV			1.23 V	34	67.7	-0.7
3	2483.50	57.0 PK	74.0	-17.0	1.23 V	34	57.5	-0.5
4	2483.50	26.4 AV	54.0	-27.6	1.23 V	34	26.9	-0.5
5	4956.00	46.4 PK	74.0	-27.6	1.32 V	224	38.6	7.8
6	4956.00	15.8 AV	54.0	-38.2	1.32 V	224	8.0	7.8

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, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:

$$20 \log(\text{Duty cycle}) = 20 \log(2.96 \text{ ms} / 100 \text{ ms}) = -30.6 \text{ dB}$$

RF Mode	QHS 6M	Channel	CH 1 : 2404 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 71 % RH
Tested By	Dalen Dai		

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	53.6 PK	74.0	-20.4	1.04 H	315	54.8	-1.2
2	2390.00	41.2 AV	54.0	-12.8	1.04 H	315	42.4	-1.2
3	*2404.00	104.7 PK			1.04 H	315	105.8	-1.1
4	*2404.00	71.9 AV			1.04 H	315	73.0	-1.1
5	4808.00	47.4 PK	74.0	-26.6	1.45 H	39	40.2	7.2
6	4808.00	14.6 AV	54.0	-39.4	1.45 H	39	7.4	7.2
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	51.7 PK	74.0	-22.3	1.24 V	35	52.9	-1.2
2	2390.00	40.0 AV	54.0	-14.0	1.24 V	35	41.2	-1.2
3	*2404.00	97.6 PK			1.24 V	35	98.7	-1.1
4	*2404.00	64.8 AV			1.24 V	35	65.9	-1.1
5	4808.00	46.5 PK	74.0	-27.5	1.36 V	233	39.3	7.2
6	4808.00	13.7 AV	54.0	-40.3	1.36 V	233	6.5	7.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:

$$20 \log(\text{Duty cycle}) = 20 \log(2.28 \text{ ms} / 100 \text{ ms}) = -32.8 \text{ dB}$$

RF Mode	QHS 6M	Channel	CH 19 : 2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 71 % RH
Tested By	Dalen Dai		

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	*2440.00	105.3 PK			1.06 H	311	106.2	-0.9
2	*2440.00	72.5 AV			1.06 H	311	73.4	-0.9
3	4880.00	47.8 PK	74.0	-26.2	1.48 H	36	40.1	7.7
4	4880.00	15.0 AV	54.0	-39.0	1.48 H	36	7.3	7.7
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	*2440.00	98.2 PK			1.22 V	33	99.1	-0.9
2	*2440.00	65.4 AV			1.22 V	33	66.3	-0.9
3	4880.00	46.8 PK	74.0	-27.2	1.37 V	227	39.1	7.7
4	4880.00	14.0 AV	54.0	-40.0	1.37 V	227	6.3	7.7

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, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:

$$20 \log(\text{Duty cycle}) = 20 \log(2.28 \text{ ms} / 100 \text{ ms}) = -32.8 \text{ dB}$$

RF Mode	QHS 6M	Channel	CH 38 : 2478 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 71 % RH
Tested By	Dalen Dai		

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	*2478.00	104.3 PK			1.00 H	314	105.0	-0.7
2	*2478.00	71.5 AV			1.00 H	314	72.2	-0.7
3	2483.50	63.1 PK	74.0	-10.9	1.00 H	314	63.6	-0.5
4	2483.50	30.3 AV	54.0	-23.7	1.00 H	314	30.8	-0.5
5	4956.00	47.2 PK	74.0	-26.8	1.50 H	41	39.4	7.8
6	4956.00	14.4 AV	54.0	-39.6	1.50 H	41	6.6	7.8
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	*2478.00	97.4 PK			1.28 V	37	98.1	-0.7
2	*2478.00	64.6 AV			1.28 V	37	65.3	-0.7
3	2483.50	58.4 PK	74.0	-15.6	1.28 V	37	58.9	-0.5
4	2483.50	25.6 AV	54.0	-28.4	1.28 V	37	26.1	-0.5
5	4956.00	46.4 PK	74.0	-27.6	1.37 V	229	38.6	7.8
6	4956.00	13.6 AV	54.0	-40.4	1.37 V	229	5.8	7.8

Remarks:

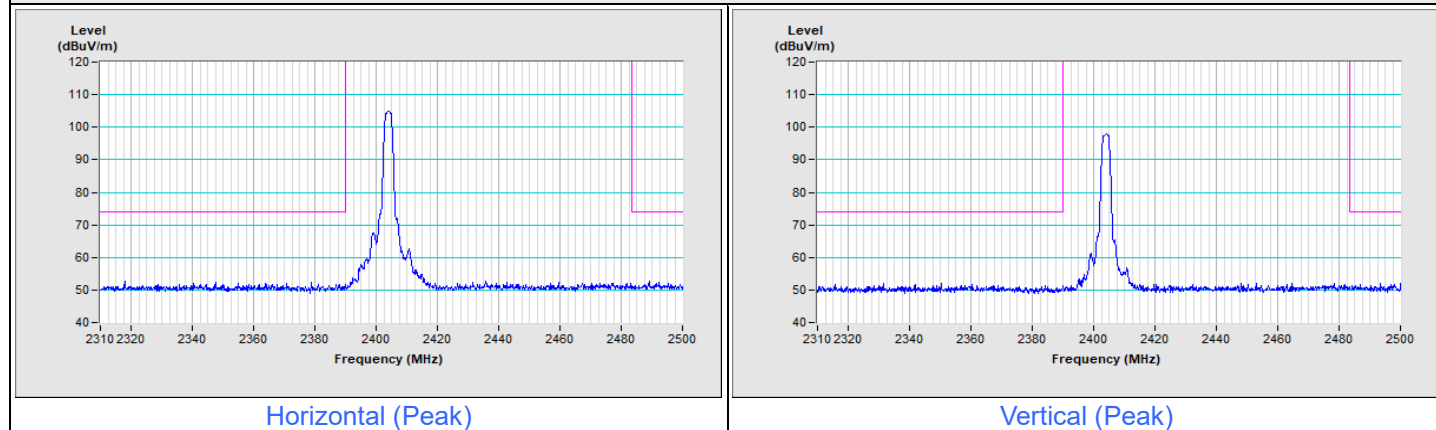
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:

$$20 \log(\text{Duty cycle}) = 20 \log(2.28 \text{ ms} / 100 \text{ ms}) = -32.8 \text{ dB}$$

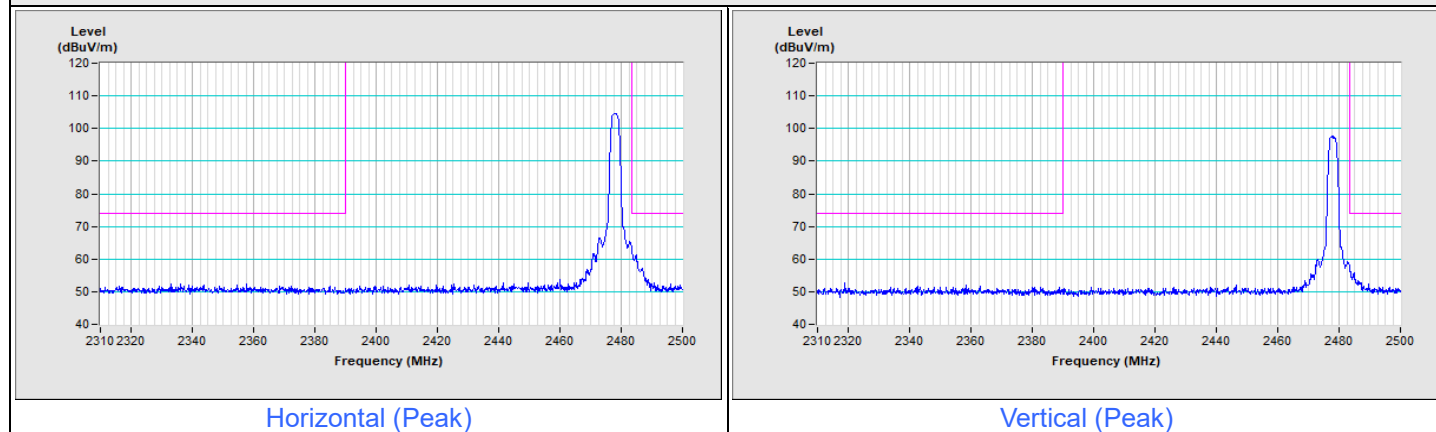
Plot of Band Edge

Frequency Range	2.31 GHz ~ 2.5 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak
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QHS 2M Channel 1

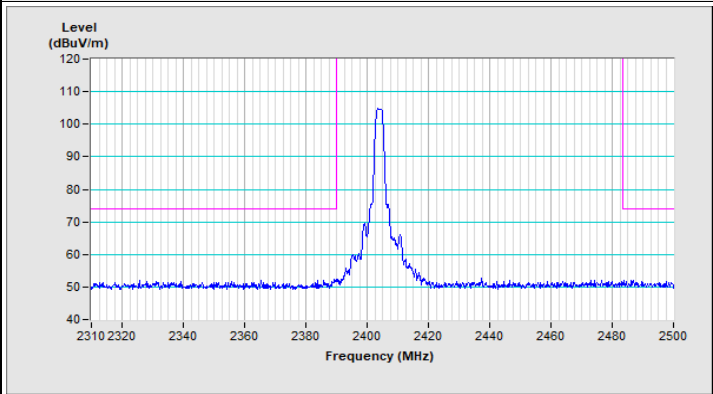


QHS 2M Channel 38

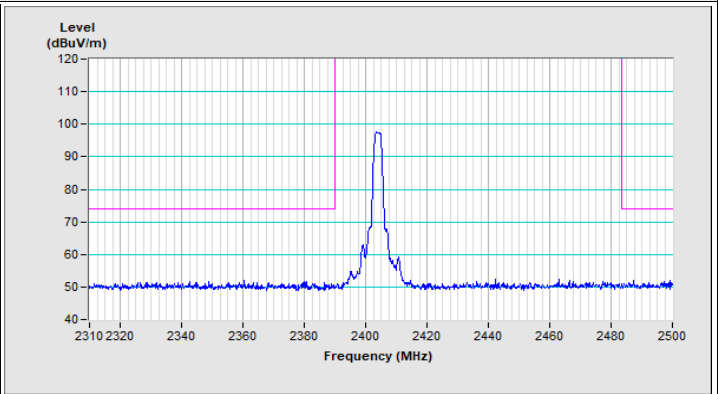


Frequency Range	2.31 GHz ~ 2.5 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak
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QHS 6M Channel 1

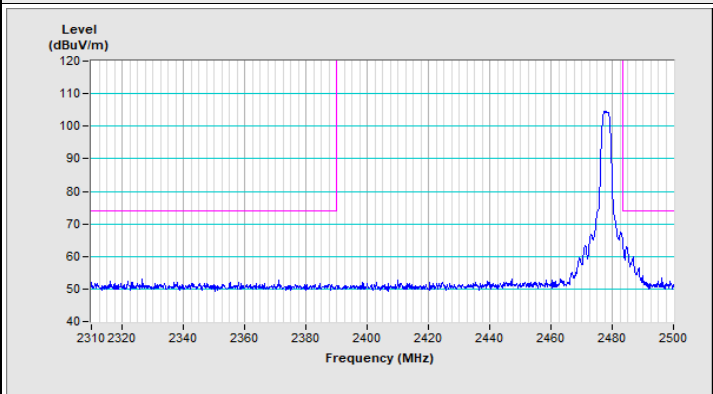


Horizontal (Peak)

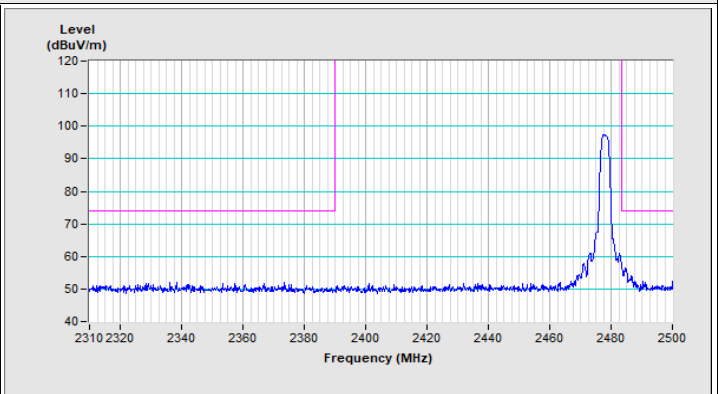


Vertical (Peak)

QHS 6M Channel 38



Horizontal (Peak)



Vertical (Peak)

8 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo)

9 Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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

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

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