TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**47 CFR FCC Part 15, Subpart C (Section 15.247)**
Report No.:	RFBDKG-WTW-P25120601
FCC ID:	JNZAR0212
Product:	Wireless Receiver
Brand:	Logitech G, logitech G, G
Model No.:	AR0212
Received Date:	2026/1/22
Test Date:	2026/2/18 ~ 2026/3/13
Issued Date:	2026/4/16
Applicant:	Logitech Far East Ltd
Address:	#2 Creation Rd. 4, Science-Based Ind. Park Hsinchu Taiwan, R.O.C.
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / Designation Number:	723255 / TW2022

Approved by: _____ , **Date:** 2026/4/16

May Chen / Manager

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Prepared by : Claire Kuan / Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFBDKG-WTW-P25120601	Original release.	2026/4/16

1 Certificate

Product:	Wireless Receiver
Brand:	Logitech G, logitech G, G
Test Model:	AR0212
Sample Status:	Engineering sample
Applicant:	Logitech Far East Ltd
Test Date:	2026/2/18 ~ 2026/3/13
Standard:	47 CFR FCC Part 15, Subpart C (Section 15.247)
Measurement procedure:	ANSI C63.10-2020 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 -9.59 dB at 0.45078 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -4.3 dB at 36.01 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -7.9 dB at 2390.00 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
Number of Hopping Frequency Used	-	1050.00 Hz
Dwell Time on Each Channel	-	2.2 ms
Hopping Channel Separation	-	1050.00 Hz
20 dB Bandwidth	-	1050.00 Hz
Conducted Out of Band Emissions	9 kHz ~ 40 GHz	2.6 dB
AC Power Conducted Emissions	150 kHz ~ 30 MHz	1.9 dB
Unwanted Emissions below 1 GHz	9 kHz ~ 30 MHz	3.1 dB
	30 MHz ~ 1 GHz	5.1 dB
Unwanted Emissions above 1 GHz	1 GHz ~ 18 GHz	5.1 dB
	18 GHz ~ 40 GHz	5.3 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 Receiver
Brand	Logitech G, logitech G, G
Test Model	AR0212
Status of EUT	Engineering sample
Power Supply Rating	5 Vdc from USB interface
Modulation Type	GFSK
Modulation Technology	FHSS
Transfer Rate	Up to 2 Mbps (*Note 1)
Operating Frequency	2.402 GHz ~ 2.48 GHz (*Note 1)
Number of Channel	40 (*Note 1)
Output Power	**LIGHTSPEED LS-1M:** 14.454 mW (11.6 dBm) **LIGHTSPEED LS-2M:** 14.388 mW (11.58 dBm)

Note:

1. LIGHTSPEED technique supports 1 Mbps and 2 Mbps data rates, both have been evaluated in this test report. Refer to **"section 3.3 Channel List"** for more detail specification.
2. The EUT may have a lot of colors for marketing requirement.
3. 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.

Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type
0.55	2.4 ~ 2.4835	PIFA	None

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

3.3 Channel List

40 channels are provided for LIGHTSPEED:

RF Channel	RF Center Frequency	LIGHTSPEED	
		LS-1M	LS-2M
0	2402 MHz	●	
1	2404 MHz	●	●
2	2406 MHz	●	●
3	2408 MHz	●	●
4	2410 MHz	●	●
5	2412 MHz	●	●
6	2414 MHz	●	●
7	2416 MHz	●	●
8	2418 MHz	●	●
9	2420 MHz	●	●
10	2422 MHz	●	●
11	2424 MHz	●	●
12	2426 MHz	●	
13	2428 MHz	●	●
14	2430 MHz	●	●
15	2432 MHz	●	●
16	2434 MHz	●	●
17	2436 MHz	●	●
18	2438 MHz	●	●
19	2440 MHz	●	●
20	2442 MHz	●	●
21	2444 MHz	●	●
22	2446 MHz	●	●
23	2448 MHz	●	●
24	2450 MHz	●	●
25	2452 MHz	●	●
26	2454 MHz	●	●
27	2456 MHz	●	●
28	2458 MHz	●	●
29	2460 MHz	●	●
30	2462 MHz	●	●
31	2464 MHz	●	●
32	2466 MHz	●	●
33	2468 MHz	●	●
34	2470 MHz	●	●
35	2472 MHz	●	●
36	2474 MHz	●	●
37	2476 MHz	●	●
38	2478 MHz	●	●
39	2480 MHz	●	

3.4 Test Mode Applicability and Tested Channel Detail

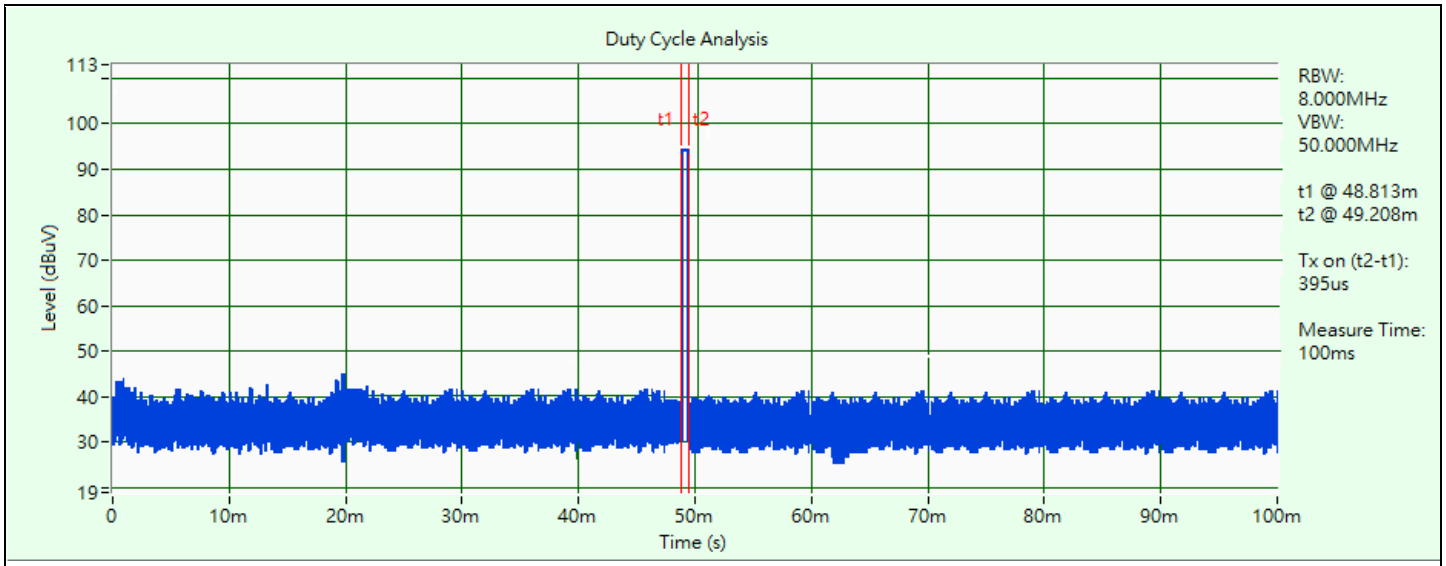
Pre-Scan:	1. EUT can be used in the following ways: X-axis/ Y-axis/ Z-axis. Pre-scan these ways and find the worst case as a representative test condition. 2. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
Worst Case:	1. EUT Worst Condition of placement: X-axis

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

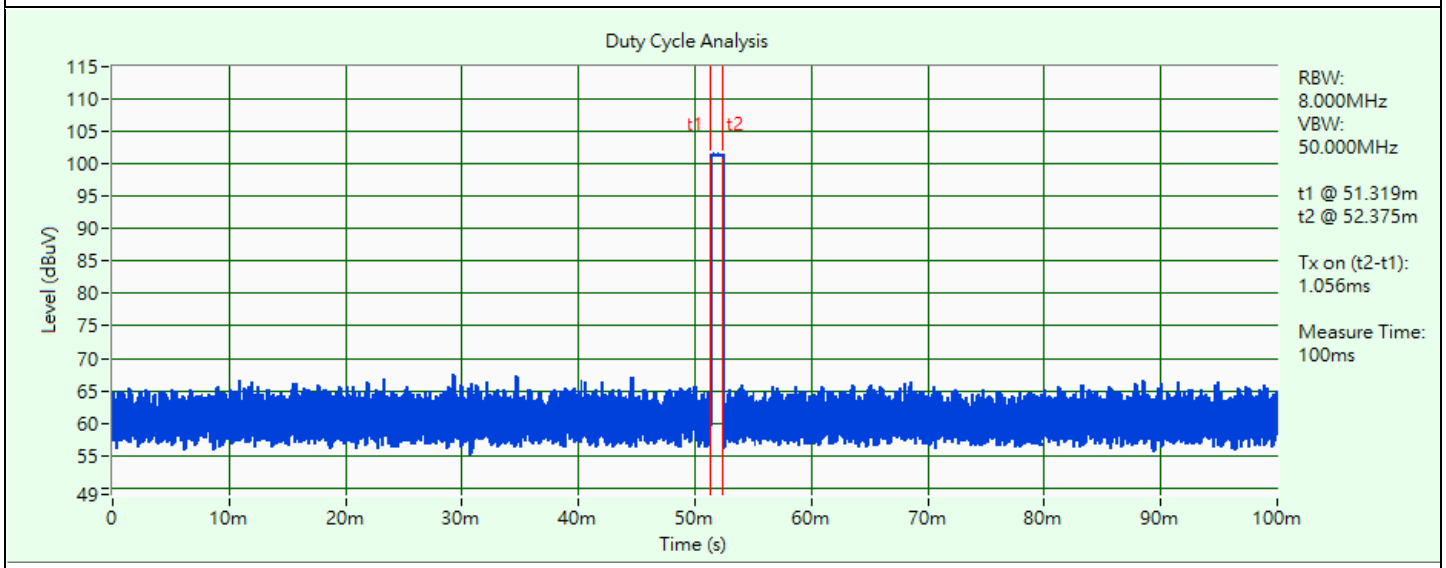
Test Item	LS Type	Tested Channel	Modulation
RF Output Power	LS-1M	0, 19, 39	GFSK
	LS-2M	1, 19, 38	GFSK
Number of Hopping Frequency Used	LS-1M	Hopping	GFSK
	LS-2M	Hopping	GFSK
Dwell Time on Each Channel	LS-1M	Hopping	GFSK
	LS-2M	Hopping	GFSK
Hopping Channel Separation / 20 dB Bandwidth	LS-1M	0, 19, 39	GFSK
	LS-2M	1, 19, 38	GFSK
Conducted Out of Band Emissions	LS-1M	Hopping 0, 39	GFSK
	LS-2M	Hopping 1, 38	GFSK
AC Power Conducted Emissions	LS-1M	0	GFSK
Unwanted Emissions below 1 GHz	LS-1M	0	GFSK
Unwanted Emissions above 1 GHz	LS-1M	0, 19, 39	GFSK
	LS-2M	1, 19, 38	GFSK

3.5 Duty Cycle of Test Signal

LIGHTSPEED LS-1M: Duty cycle = 0.395 ms / 100 ms x 100% = 0.4%
LIGHTSPEED LS-2M: Duty cycle = 1.056 ms / 100 ms x 100% = 1.1%



LIGHTSPEED LS-1M



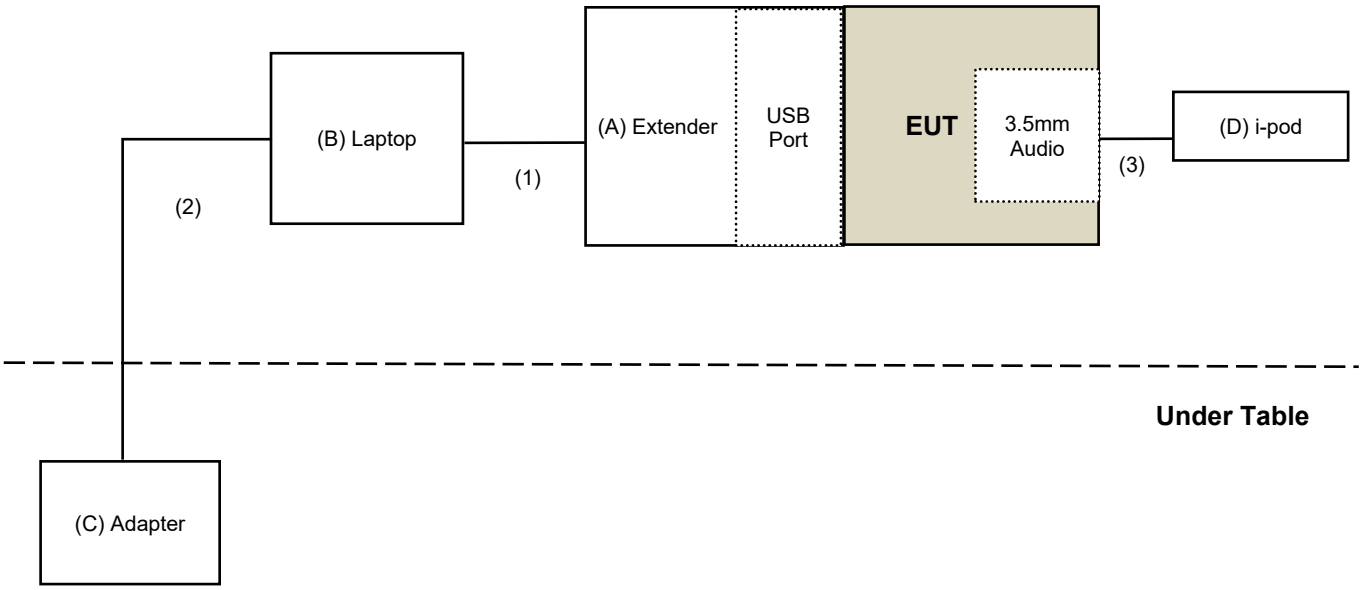
LIGHTSPEED LS-2M

3.6 Test Program Used and Operation Descriptions

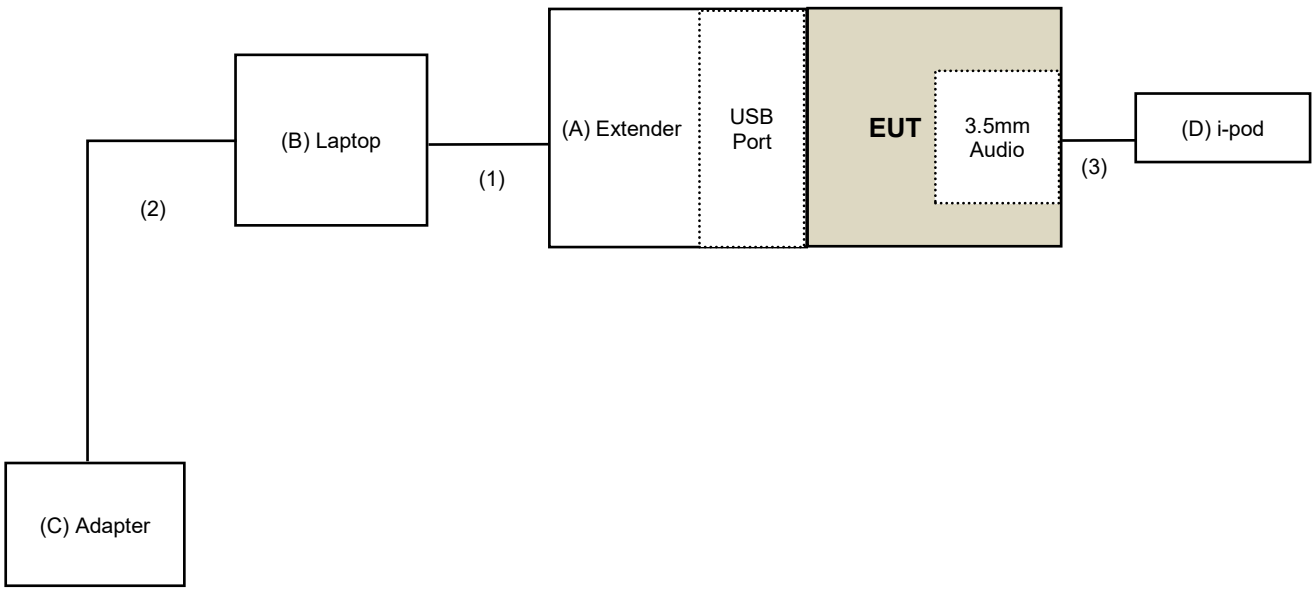
Controlling software (Airoha.Tool.(AB157 x Lab Test Tool-5.1.0.2)) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.7 Connection Diagram of EUT and Peripheral Devices

For Unwanted Emissions test:



For AC Power Conducted Emission test:



3.8 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Extender	Pico Technology	146-MI121	N/A	N/A	Provided by Lab
B	Laptop	Lenovo	81A4	YD02YN7P	PD93165NGU	Provided by Lab
C	Adapter	Lenovo	PA-1450-55LL	N/A	N/A	Provided by Lab
D	i-pod	Apple	MD778TA/A	CC4JMH7LF4T1	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	USB cable	1	1	Yes	0	Provided by Lab
2	DC Cable	1	2	No	0	Provided by Lab
3	Audio Cable	1	1.9	No	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
Fixed Attenuator Woken	00800A1K01A-20	00800A1K01A-20-02	2025/5/23	2026/5/22
Pulse Power Sensor Anritsu	MA2411B	1726434	2025/6/3	2026/6/2
RF Power Meter Anritsu	ML2495A	1529002	2025/6/3	2026/6/2

Notes:

1. The test was performed in HC - Oven room 2(Hsinchu).
2. Tested Date: 2026/2/18

4.2 Number of Hopping Frequency Used

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Fixed Attenuator Woken	00800A1K01A-10	00800A1K01A-10-01	2025/5/23	2026/5/22
PXA Signal Analyzer Keysight	N9030A	MY55330160	2026/1/20	2027/1/19
Software	ADT_RF Test Software V8	N/A	N/A	N/A

Notes:

1. The test was performed in HC - Oven room 2(Hsinchu).
2. Tested Date: 2026/2/18

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 Telegartner	50 ohm	3	2025/10/29	2026/10/28
EMI Test Receiver R&S	ESCS 30	100375	2025/5/21	2026/5/20
Fixed Attenuator STI	STI02-2200-10	005	2026/2/9	2027/2/8
LISN R&S	ESH3-Z5	835239/001	2025/3/27	2026/3/26
		848773/004	2025/10/3	2026/10/2
RF Coaxial Cable JYEBAO	5D-FB	COCCAB-001	2026/2/9	2027/2/8
Software BVADT	BVADT_Cond_V7.3.7.4	N/A	N/A	N/A

Notes:
1. The test was performed in HC - Conduction 1(Hsinchu).
2. Tested Date: 2026/3/4

4.8 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-0842	2025/9/16	2026/9/15
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
EMI Test Receiver R&S	ESR7	102026	2025/3/25	2026/3/24
Fixed Attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-02	2025/3/29	2026/3/28
Loop Antenna TESEQ	HLA 6121	63620	2025/10/20	2026/10/19
Preamplifier EMCI	EMC330N	980538	2025/3/29	2026/3/28
PXA Signal Analyzer Keysight	N9030B	MY57141948	2025/5/20	2026/5/19
RF Coaxial Cable PEWC	8D	966-5-1	2025/3/29	2026/3/28
		966-5-2	2025/3/29	2026/3/28
		966-5-3	2025/3/29	2026/3/28
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A

Notes:
1. The test was performed in HC - 966 Chamber No. 5(Hsinchu).
2. Tested Date: 2026/3/3

4.9 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
EMI Test Receiver R&S	ESR7	102026	2025/3/25	2026/3/24
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-1819	2025/11/9	2026/11/8
	BBHA 9170	9170-739	2025/11/9	2026/11/8
Preamplifier EMCI	EMC12630SE	980509	2026/1/17	2027/1/16
	EMC184045SE	980387	2025/8/7	2026/8/6
PXA Signal Analyzer Keysight	N9030B	MY57141948	2025/5/20	2026/5/19
RF Coaxial Cable EMCI	EMC102-KM-KM-1200	160924	2026/1/15	2027/1/14
	EMC102-KM-KM-4000	200214	2026/1/15	2027/1/14
	EMC104-SM-SM-1500	180503	2025/3/8 2026/3/7	2026/3/7 2027/3/6
	EMC104-SM-SM-2000	180501	2025/3/8 2026/3/7	2026/3/7 2027/3/6
	EMC104-SM-SM-6000	180506	2025/3/8 2026/3/7	2026/3/7 2027/3/6
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A

Notes:

1. The test was performed in HC - 966 Chamber No. 5(Hsinchu).
2. Tested Date: 2026/3/2 ~ 2026/3/13

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

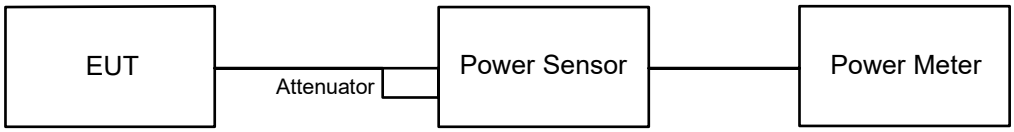
Notes:

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



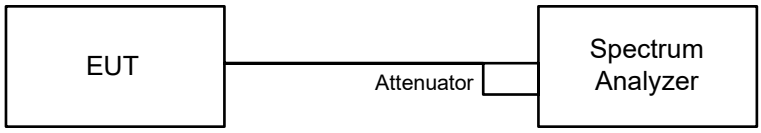
6.1.2 Test Procedure

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.
The power meter video bandwidth is greater than or equal to the DTS bandwidth and use a fast responding diode detector.

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



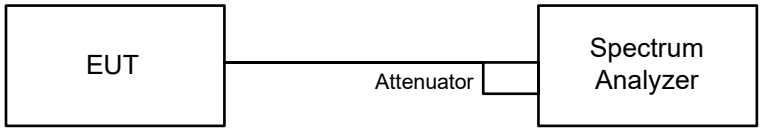
6.2.2 Test Procedure

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. 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.
c. Span: The frequency band of operation. Depending on the number of channels the device supports, it could be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
d. RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
e. Video (or average) bandwidth (VBW) ≥ RBW.
f. Sweep: No faster than coupled (auto) time.
g. Detector function: Peak.
h. Trace: Max-hold.
i. Allow the trace to stabilize

Note: Where the device shares the same channel plan (carrier frequencies and number of channels) across multiple data rates or modulation schemes then the number of channels need only be measured for one of those modulation schemes or data rates.

6.3 Dwell Time on Each Channel

6.3.1 Test Setup



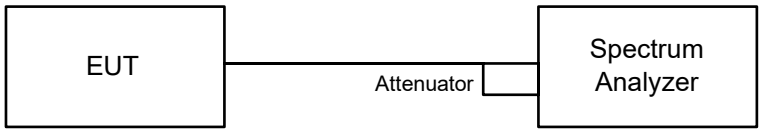
6.3.2 Test Procedure

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. 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.
c. Span: Zero span, centered on a hopping channel.
d. RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected transmission time per hop.
e. Sweep time: Set so that the start of the first transmission and end of the last transmission for the hop are clearly captured. Setting the sweep time to be slightly longer than the hopping period per channel (hopping period = 1/hopping rate) should achieve this.
f. Use a video trigger, where possible with a trigger delay, so that the start of the transmission is clearly observed. The trigger level might need adjustment to reduce the chance of triggering when the system hops on an adjacent channel.
g. Detector function: Peak.
h. Trace: Clear-write, single sweep.
i. Place markers at the start of the first transmission on the channel and at the end of the last transmission. The dwell time per hop is the time between these two markers.

Note: Where the device shares the same hopping algorithms (dwell time, channel selection) across multiple data rates or modulation schemes then the time of occupancy need only be measured for one of those modulation schemes or data rates. If the dwell time value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in dwell time.

6.4 Hopping Channel Separation

6.4.1 Test Setup



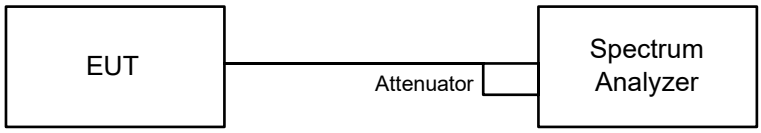
6.4.2 Test Procedure

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
c. Span: Wide enough to capture the peaks of two adjacent channels.
d. RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
e. Video (or average) bandwidth (VBW) ≥ RBW.
f. Sweep: No faster than coupled (auto) time.
g. Detector function: Peak.
h. Trace: Max-hold.
i. Allow the trace to stabilize.

Note: Where the device shares the same channel plan (carrier frequencies and number of channels) across multiple data rates or modulation schemes then the carrier separation need only be measured for one of those modulation schemes or data rates.

6.5 20 dB Bandwidth

6.5.1 Test Setup



6.5.2 Test Procedure

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

b. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.

c. The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be at least three times RBW, unless otherwise specified by the applicable requirement.

d. Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level.

e. Steps a) through c) might require iteration to adjust within the specified tolerances.

f. The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target “−xx dB down” requirement; that is, if the requirement calls for measuring the −20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value.

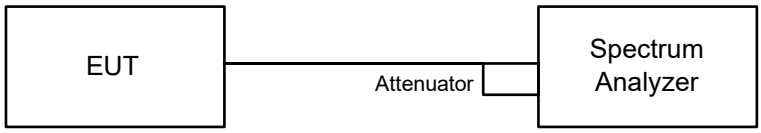
g. Set detection mode to peak and trace mode to max-hold.

h. Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).

i. Determine the “−xx dB down amplitude” using [(reference value) - xx]. Alternatively, this calculation may be made by using the marker-delta function of the instrument.

6.6 Conducted Out of Band Emissions

6.6.1 Test Setup



6.6.2 Test Procedure

MEASUREMENT PROCEDURE REF

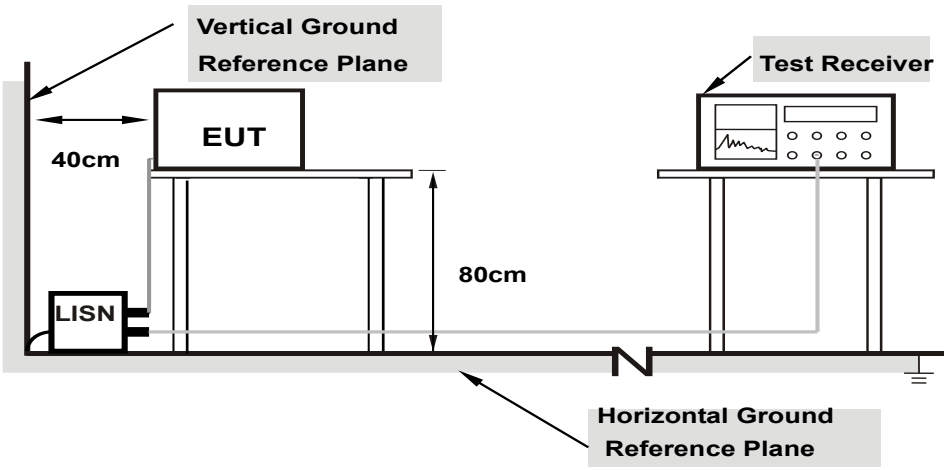
a. Set instrument center frequency to DTS channel center frequency.
b. Set the span to ≥ 1.5 times the DTS bandwidth.
c. Set the RBW = 100 kHz.
d. Set the VBW ≥ 300 kHz.
e. Detector = peak.
f. Sweep time = No faster than coupled (auto) time.
g. Trace mode = max hold.
h. Allow trace to fully stabilize.
i. Use the peak marker function to determine the maximum PSD level.

MEASUREMENT PROCEDURE OOBE

a. Set the center frequency and span to encompass frequency range to be measured. Note that the frequency range might need to be divided into multiple frequency ranges to retain frequency resolution.
b. Set RBW = 100 kHz.
c. Set VBW ≥ 300 kHz.
d. Detector = peak.
e. Sweep = No faster than coupled (auto) time.
f. Trace Mode = max hold.
g. Allow trace to fully stabilize.
h. 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

a. Exploratory ac power-line conducted emission measurements: The EUT shall be operated on the mid channel and in the mode with highest output power unless the fundamental operates in the AC power-line emission test range then the EUT shall be operated in the range of typical modes of operation.

b. 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.

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

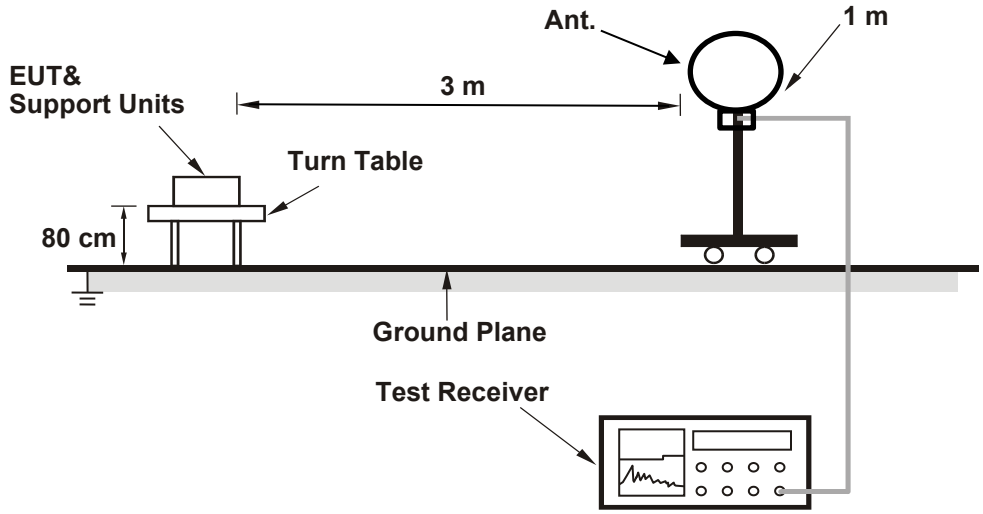
d. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

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.

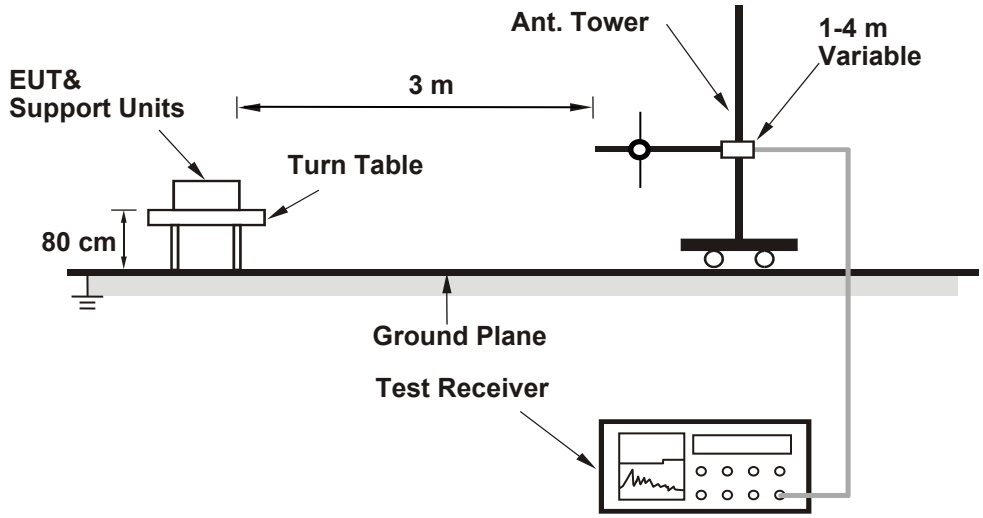
6.8 Unwanted Emissions below 1 GHz

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 (however, peak detector measurements may be used to determine compliance with QP requirements), 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.

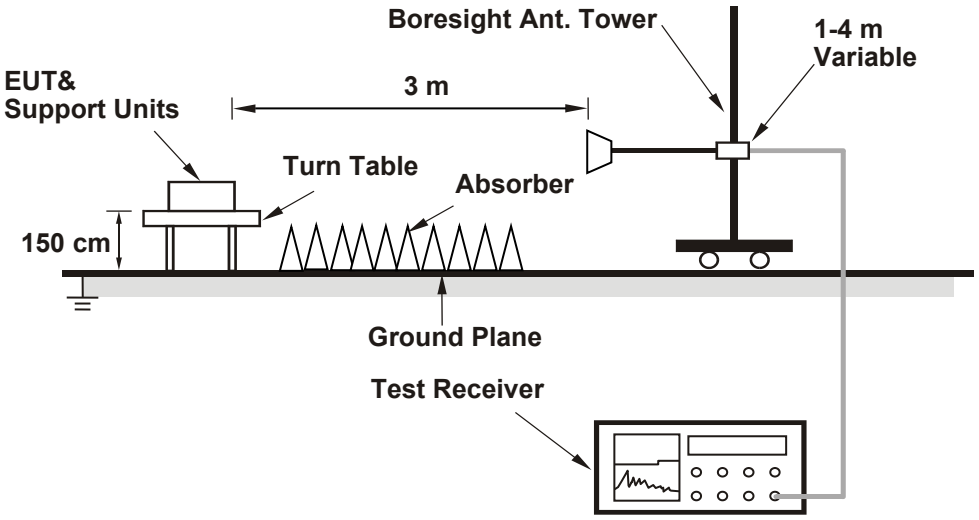
e. The test-receiver system was set to Quasi-peak(QP) detect function, Average(AV) detect function, Peak(PK) detect function and specified bandwidth with maximum hold mode when the test frequencies less than or equal to 1 GHz.

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 (however, peak detector measurements may be used to determine compliance with QP requirements).
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

a. 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.

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 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:

1. 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.
2. The maximum dwell time per 1 MHz is determined as follows:
   Maximum dwell time per 1 MHz = dwell time per 100 ms per channel × (channel separation correction + overlapping channel correction) where:
   i. Channel separation correction = [1 / channel separation (MHz)] for channel separation < 1 MHz, and = 1 for channel separation ≥ 1 MHz, as determined using the procedures ANSI C63.10 of 7.8.2. If the average measurements are performed on the Nth harmonic, the channel separation value is N times the separation at the fundamental frequency.
   ii. Overlapping channel correction = 0 when the 20 dB channel bandwidth < channel separation and = 1 for when the 20 dB channel bandwidth > channel separation.
3. The average value may be determined as follows:
   From the peak value of the emission: The measured peak value in dBuV/m is corrected by 20log(maximum dwell time in 100 ms / 100).
4. 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:	5 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Bella Yeh

For Peak Power

LIGHTSPEED LS-1M

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Test Result
0	2402	14.454	11.60	21	Pass
19	2440	14.388	11.58	21	Pass
39	2480	13.996	11.46	21	Pass

Note: The antenna gain is 0.55 dBi <= 6 dBi, so the output power limit shall not be reduced.

LIGHTSPEED LS-2M

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Test Result
1	2404	14.388	11.58	21	Pass
19	2440	14.289	11.55	21	Pass
38	2478	14.06	11.48	21	Pass

Note: The antenna gain is 0.55 dBi <= 6 dBi, so the output power limit shall not be reduced.

For Average Power

LIGHTSPEED LS-1M

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
0	2402	13.9	11.43
19	2440	13.836	11.41
39	2480	13.677	11.36

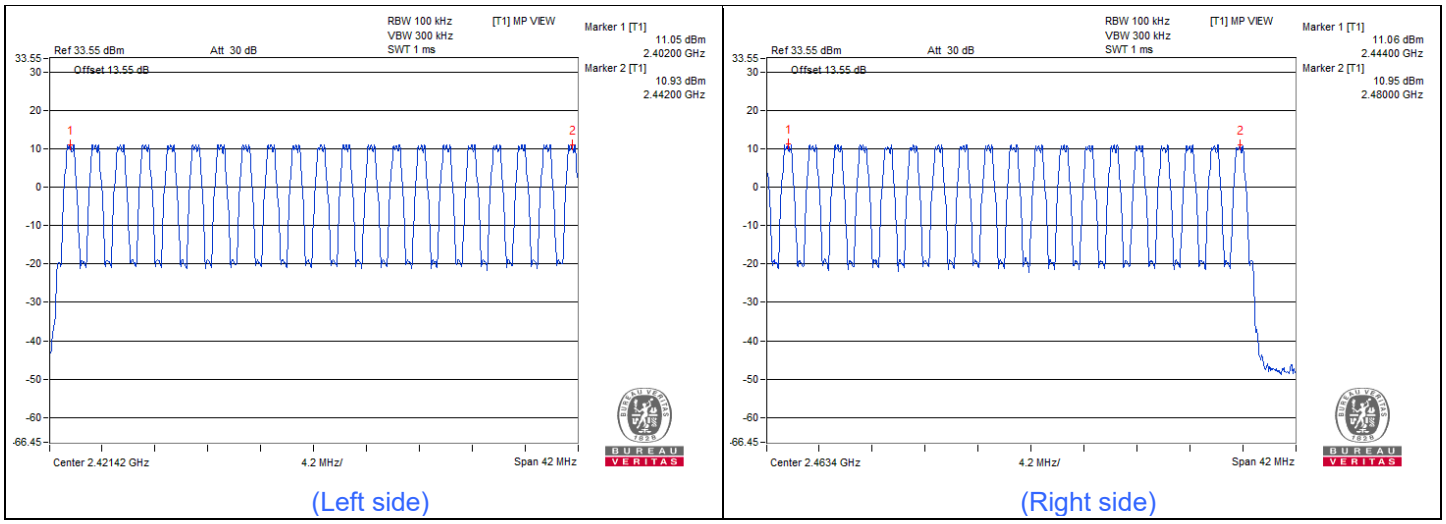
LIGHTSPEED LS-2M

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2404	13.868	11.42
19	2440	13.868	11.42
38	2478	13.709	11.37

7.2 Number of Hopping Frequency Used

Input Power:	5 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Bella Yeh

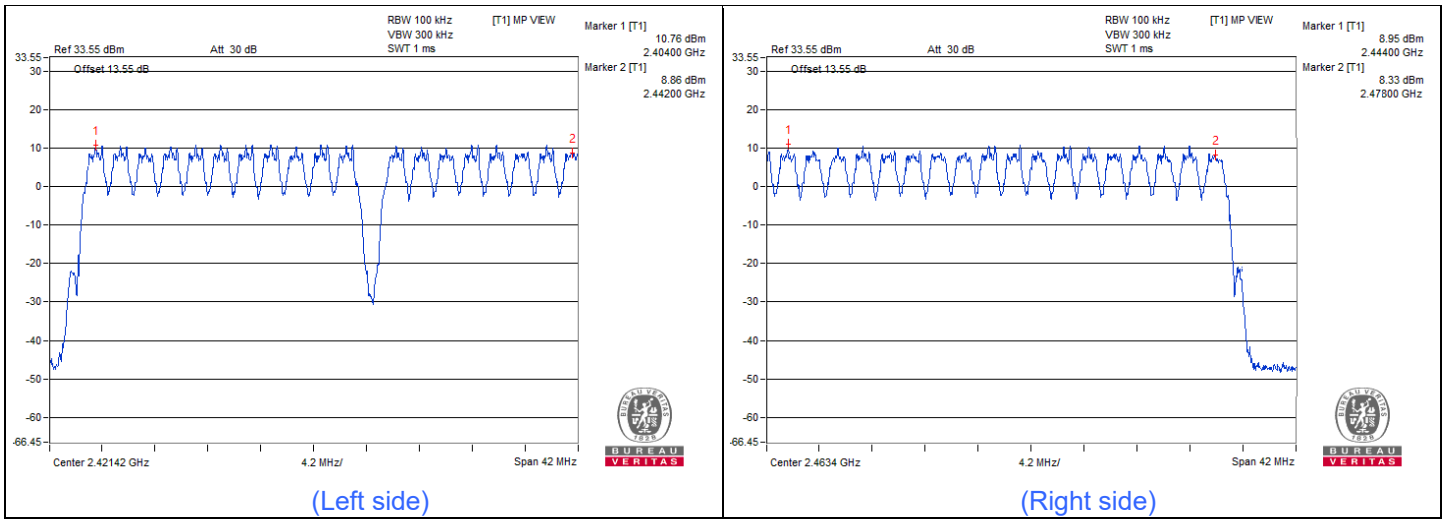
LIGHTSPEED LS-1M



(Left side) (Right side)

Note: There are 40 hopping frequencies in the hopping mode. On the plots, it shows that the hopping frequencies are equally spaced.

LIGHTSPEED LS-2M



(Left side) (Right side)

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

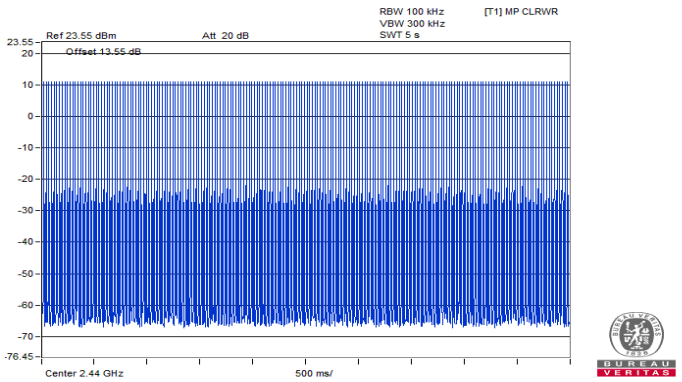
7.3 Dwell Time on Each Channel

Input Power:	5 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Bella Yeh

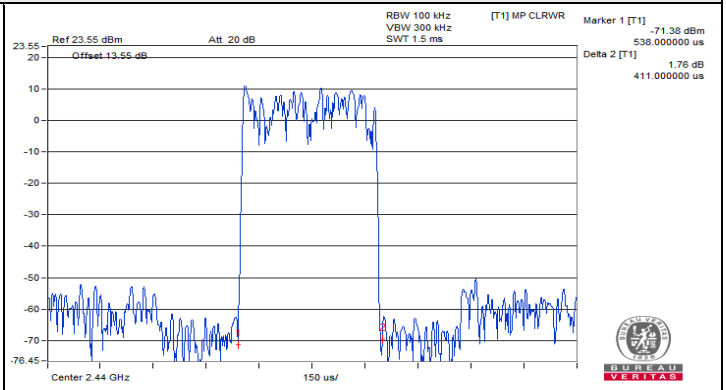
LIGHTSPEED LS-1M

Mode	Number of transmission in 16 sec	Length of transmission time (msec)	Dwell Time (msec)	Limit (msec)	Test Result
FHSS	200 (times / 5 sec) * 3.2 = 640 times	0.411	263	400	Pass

Spectrum plots of Dwell Time



LIGHTSPEED LS-1M FHSS

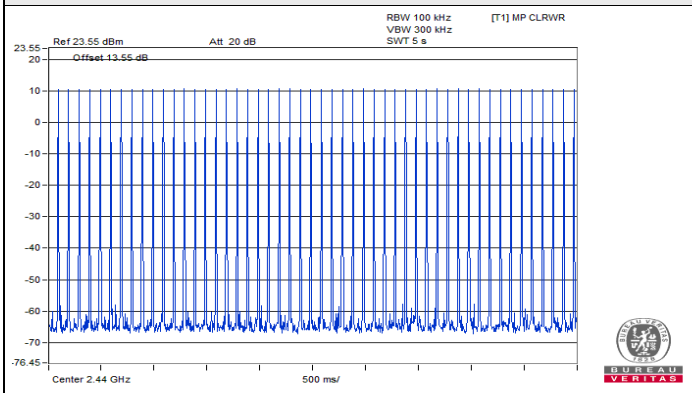


LIGHTSPEED LS-1M FHSS

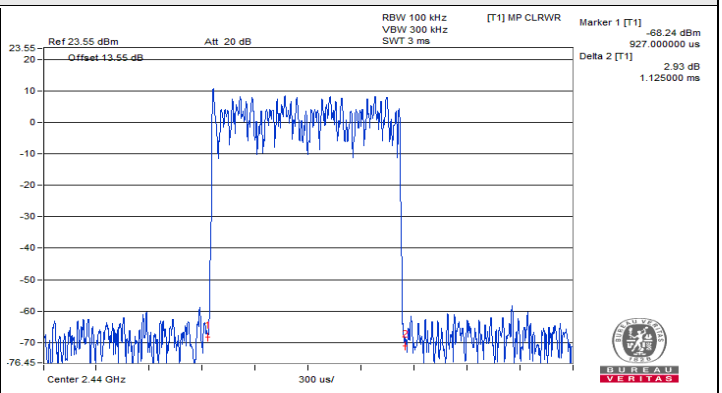
LIGHTSPEED LS-2M

Mode	Number of transmission in 14.8 sec	Length of transmission time (msec)	Dwell Time (msec)	Limit (msec)	Test Result
FHSS	50 (times / 5 sec) * 2.96 = 148 times	1.125	166.5	400	Pass

Spectrum plots of Dwell Time



LIGHTSPEED LS-2M FHSS



LIGHTSPEED LS-2M FHSS

7.4 Hopping Channel Separation

Input Power:	5 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Bella Yeh

LIGHTSPEED LS-1M

Channel	Frequency (MHz)	Hopping Channel Separation (MHz)	Minimum Limit (MHz)	Test Result
0	2402	2.01	0.76	Pass
19	2440	2.00	0.76	Pass
39	2480	2.00	0.76	Pass

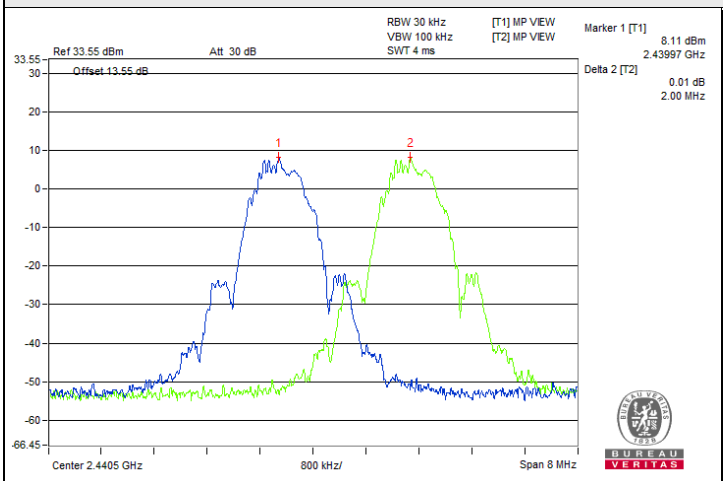
Note: The minimum limit is two-third 20dB bandwidth.

LIGHTSPEED LS-2M

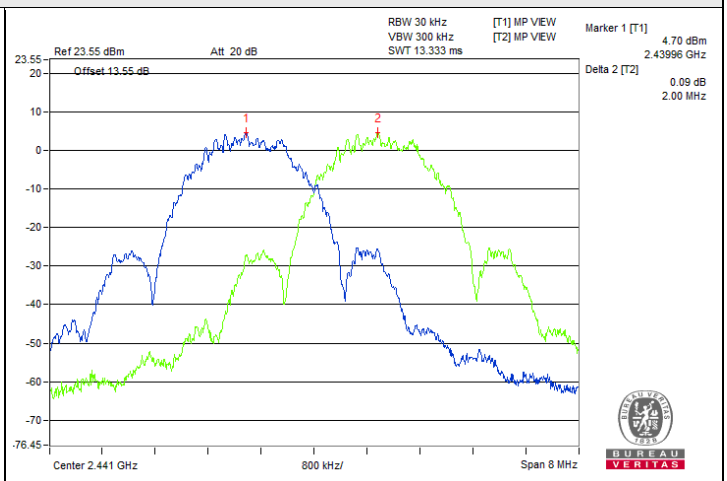
Channel	Frequency (MHz)	Hopping Channel Separation (MHz)	Minimum Limit (MHz)	Test Result
1	2404	2.01	1.54	Pass
19	2440	2.00	1.54	Pass
38	2478	2.00	1.54	Pass

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

Spectrum Plot of Minimum Value



LightSpeed 1Mbps: CH 19



LightSpeed 2Mbps: CH 19

7.5 20 dB Bandwidth

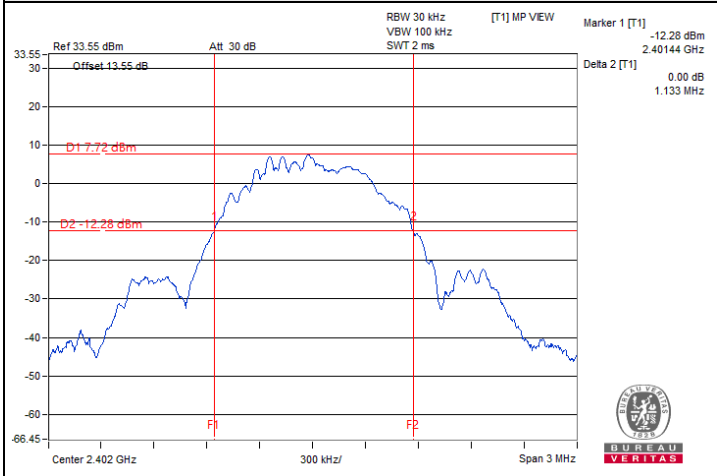
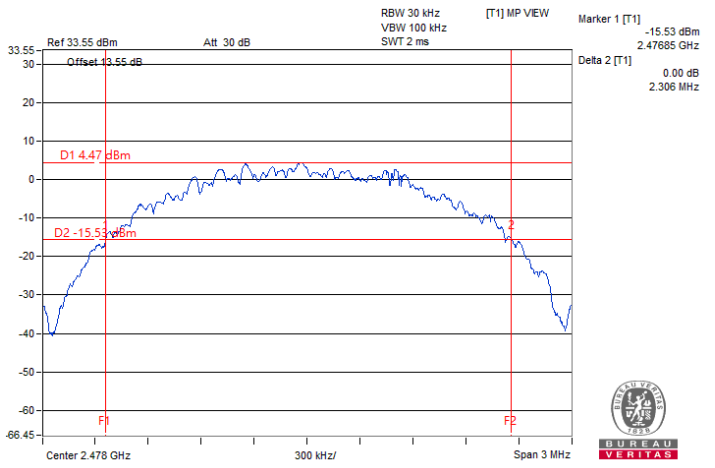
Input Power:	5 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Bella Yeh

LIGHTSPEED LS-1M

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
0	2402	1.13
19	2440	1.13
39	2480	1.13

LIGHTSPEED LS-2M

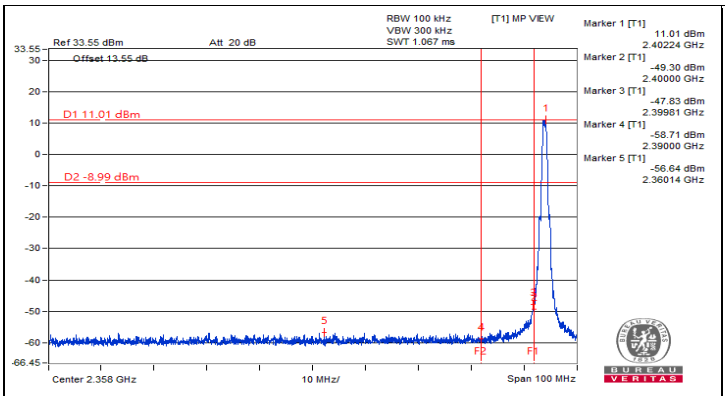
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
1	2404	2.31
19	2440	2.31
38	2478	2.3

Spectrum Plot of Minimum Value	
	
LIGHTSPEED LS-1M: CH 0	LIGHTSPEED LS-2M: CH 38

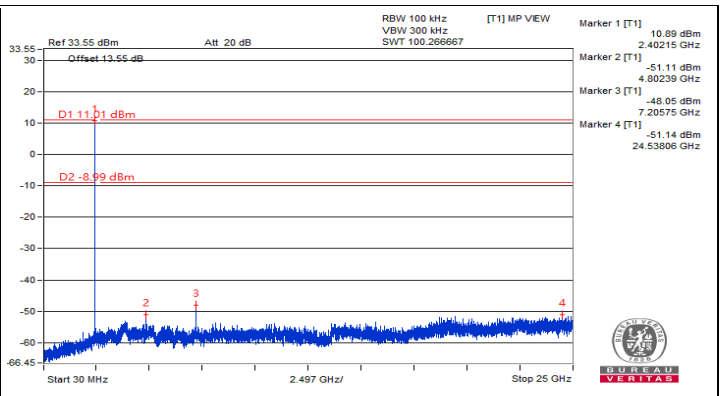
7.6 Conducted Out of Band Emissions

Input Power:	5 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Bella Yeh

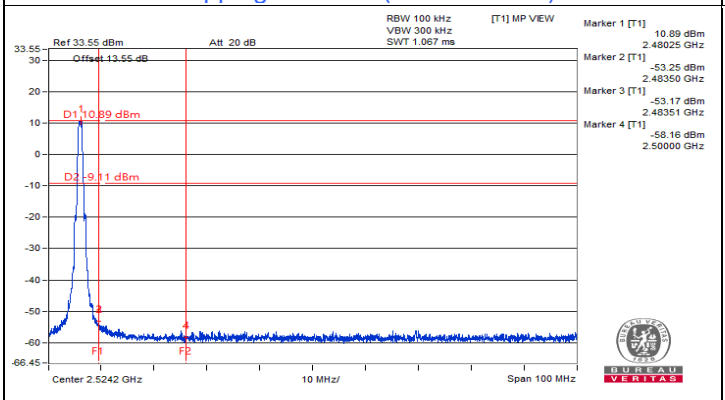
LIGHTSPEED LS-1M



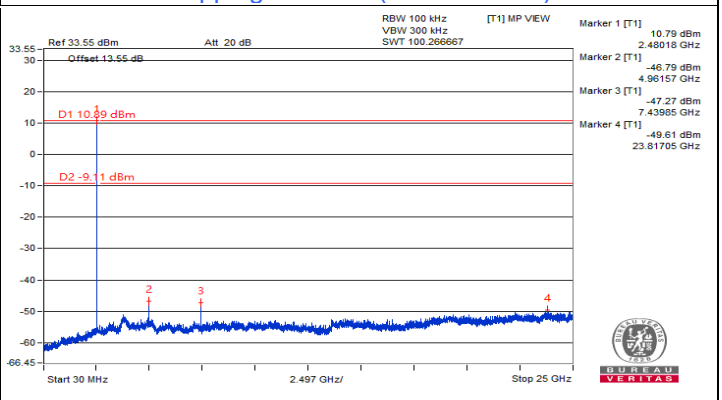
Hopping disabled (Low Channel)



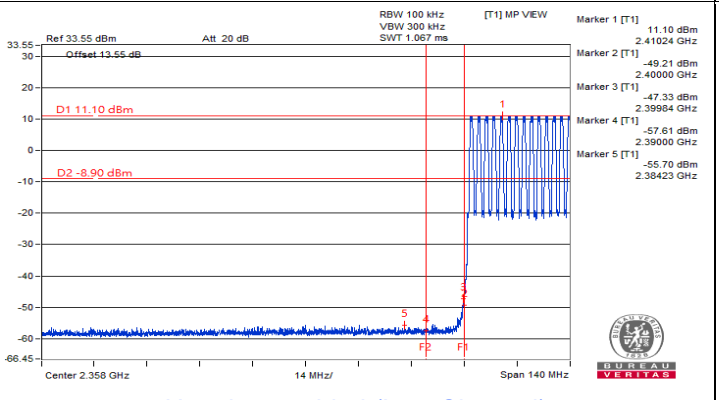
Hopping disabled (Low Channel)



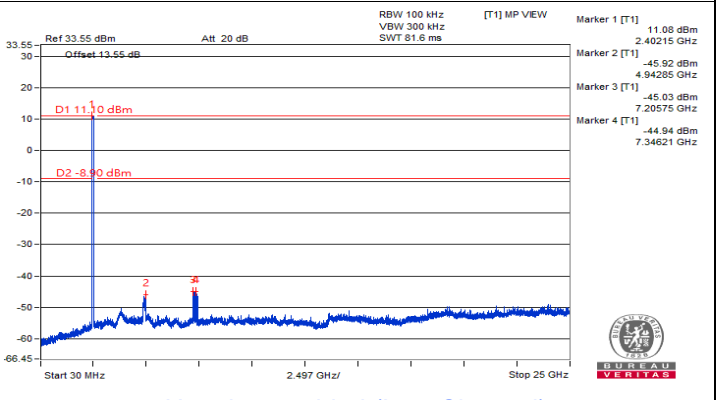
Hopping disabled (High Channel)



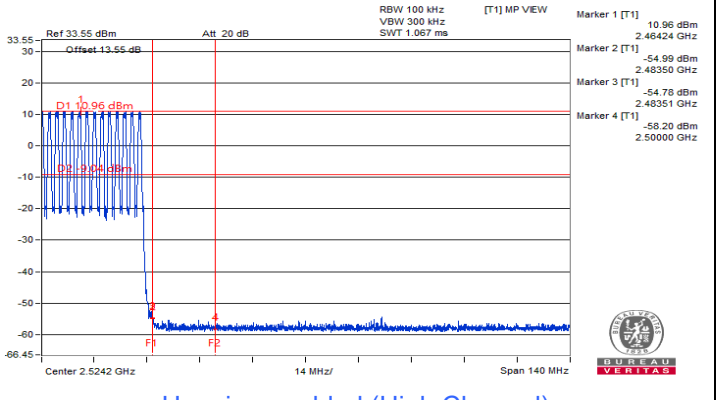
Hopping disabled (High Channel)



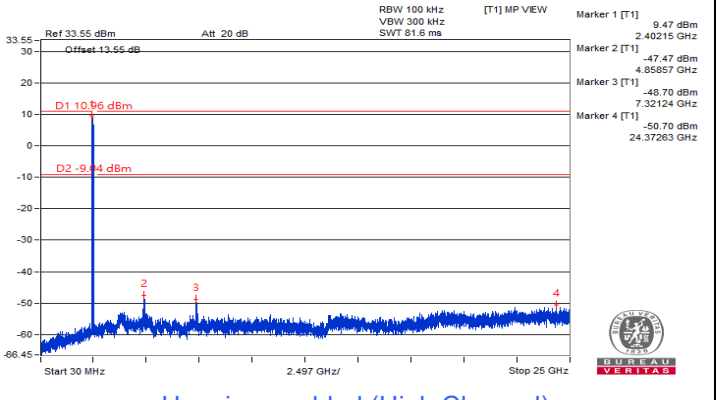
Hopping enabled (Low Channel)



Hopping enabled (Low Channel)

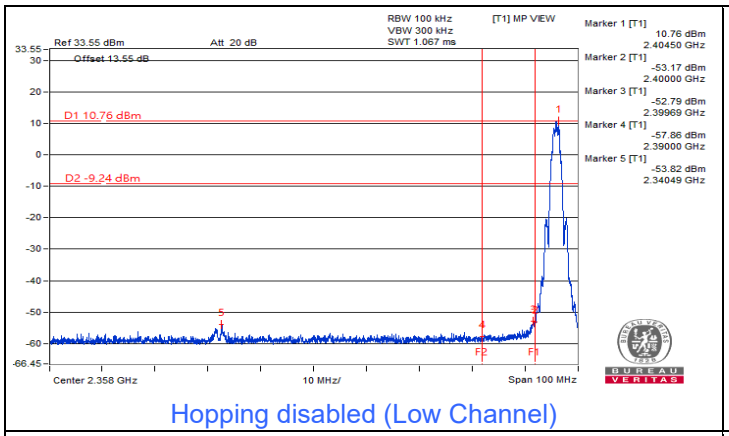


Hopping enabled (High Channel)

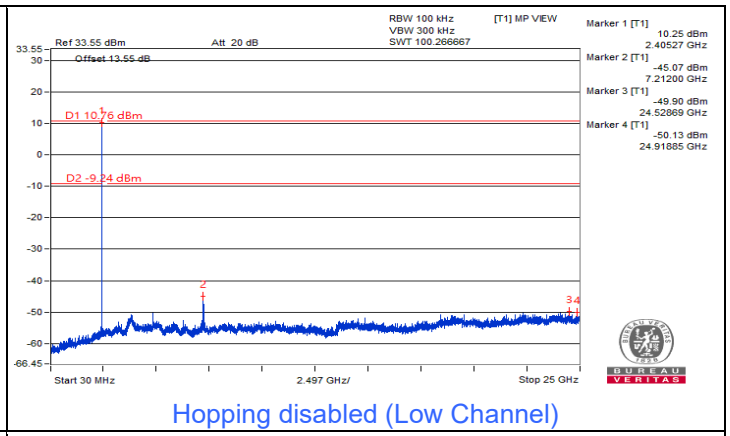


Hopping enabled (High Channel)

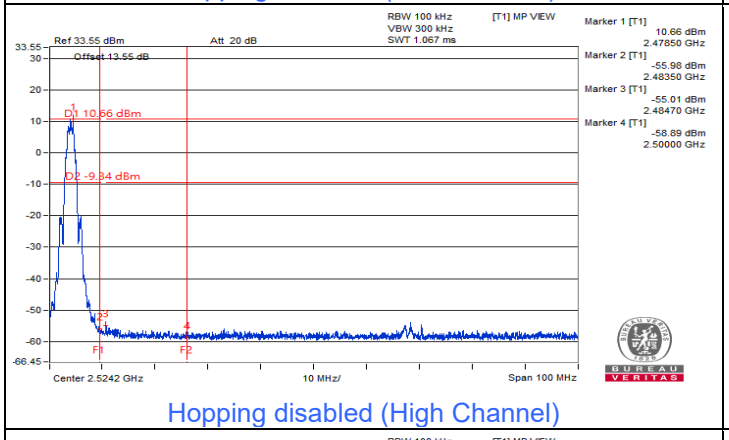
LIGHTSPEED LS-2M



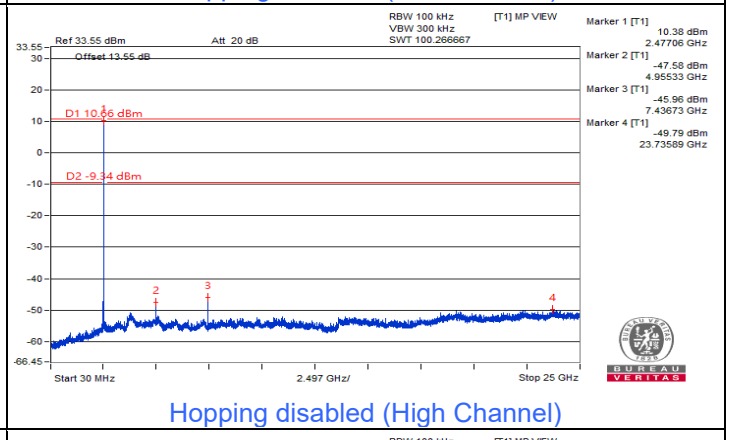
Hopping disabled (Low Channel)



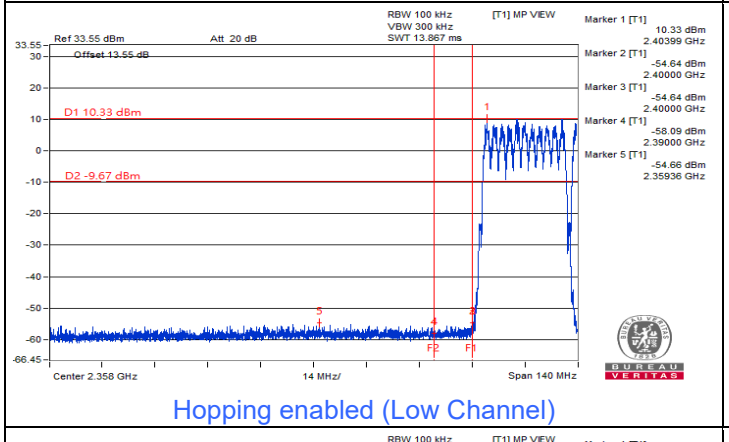
Hopping disabled (Low Channel)



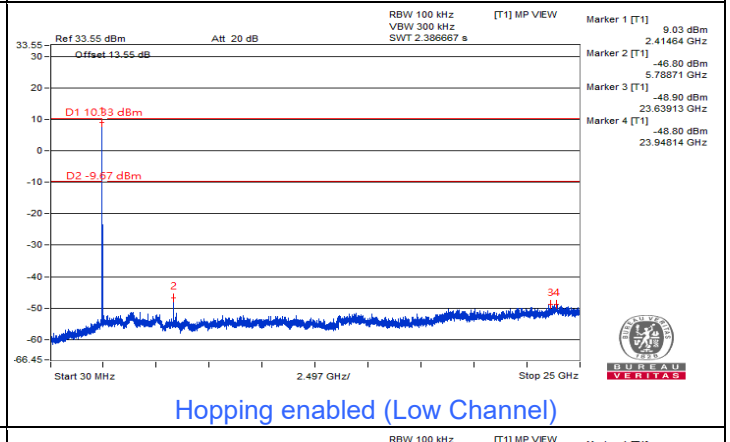
Hopping disabled (High Channel)



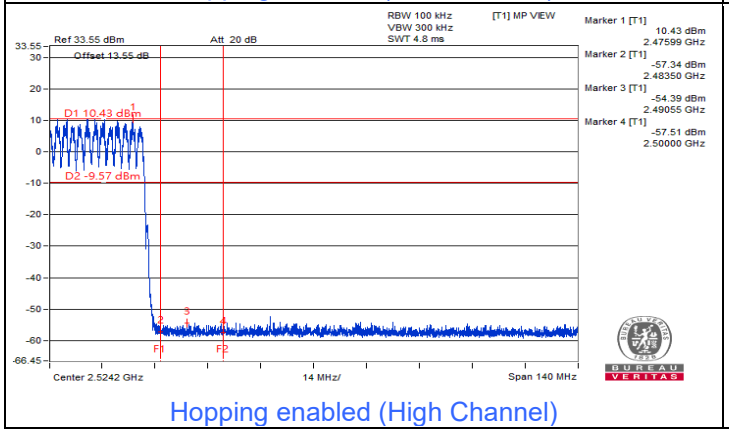
Hopping disabled (High Channel)



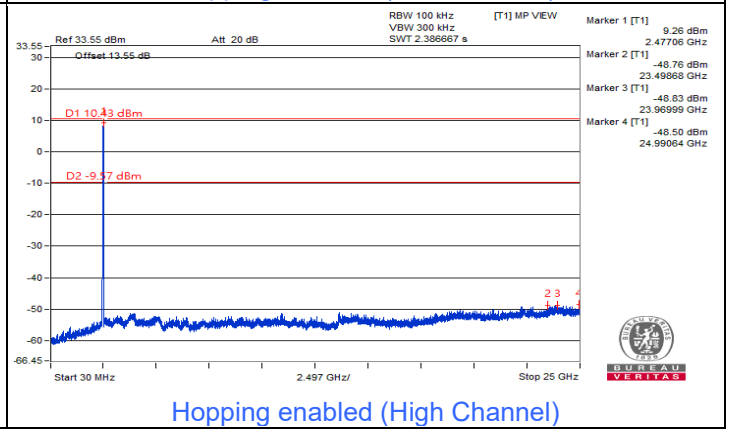
Hopping enabled (Low Channel)



Hopping enabled (Low Channel)



Hopping enabled (High Channel)



Hopping enabled (High Channel)

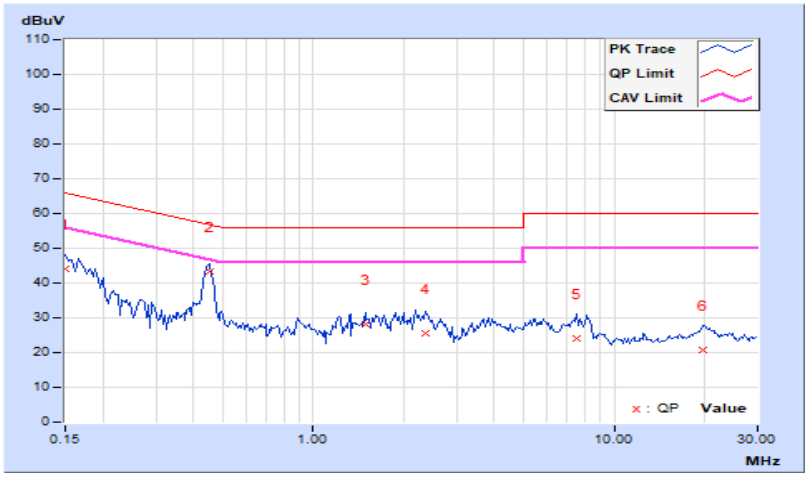
7.7 AC Power Conducted Emissions

RF Mode	LIGHTSPEED LS-1M	**Channel**	CH 0：2402 MHz
Frequency Range	150 kHz ~ 30 MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power (System)	120 Vac, 60 Hz	**Environmental Conditions**	32 °C, 57% RH
Tested By	Roy Mai		

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	9.96	33.96	19.23	43.92	29.19	66.00	56.00	-22.08	-26.81
2	**0.45078**	**10.00**	**33.39**	**27.27**	**43.39**	**37.27**	**56.86**	**46.86**	**-13.47**	**-9.59**
3	1.50000	10.07	18.13	12.17	28.20	22.24	56.00	46.00	-27.80	-23.76
4	2.37109	10.12	15.32	7.99	25.44	18.11	56.00	46.00	-30.56	-27.89
5	7.51172	10.47	13.61	7.60	24.08	18.07	60.00	50.00	-35.92	-31.93
6	19.61719	11.25	9.48	4.20	20.73	15.45	60.00	50.00	-39.27	-34.55

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

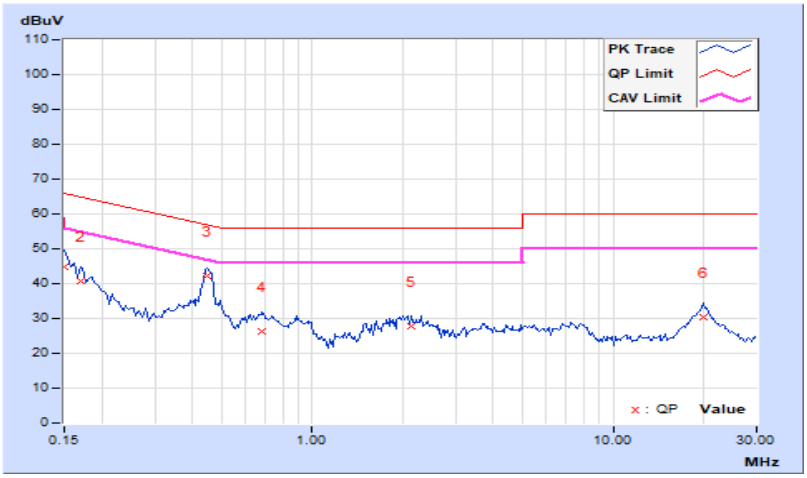


RF Mode	LIGHTSPEED LS-1M	Channel	CH 0：2402 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	32 °C, 57% RH
Tested By	Roy Mai		

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	0.15000	9.98	34.66	19.61	44.64	29.59	66.00	56.00	-21.36	-26.41
2	0.16953	9.98	30.72	18.84	40.70	28.82	64.98	54.98	-24.28	-26.16
3	0.44688	9.93	32.14	25.94	42.07	35.87	56.93	46.93	-14.86	-11.06
4	0.68125	9.96	16.49	8.58	26.45	18.54	56.00	46.00	-29.55	-27.46
5	2.14063	10.08	17.74	11.01	27.82	21.09	56.00	46.00	-28.18	-24.91
6	19.94922	10.96	19.52	13.81	30.48	24.77	60.00	50.00	-29.52	-25.23

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



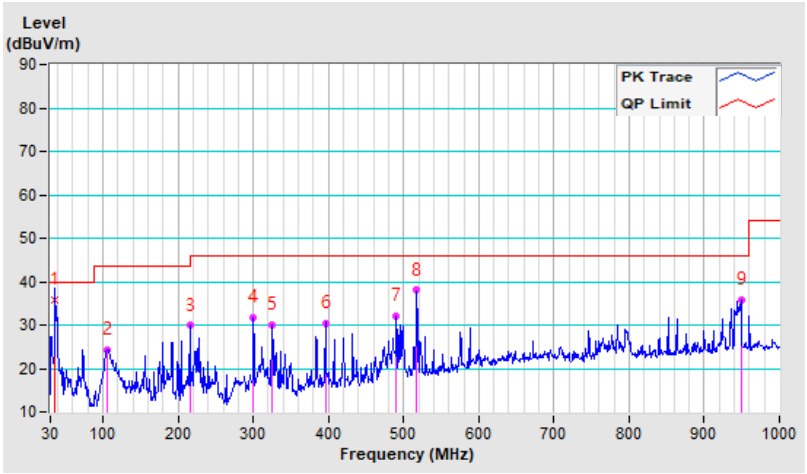
7.8 Unwanted Emissions below 1 GHz

RF Mode	LIGHTSPEED LS-1M	**Channel**	CH 0：2402 MHz
Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Bandwidth**	PK: RB=120 kHz, DET=Peak QP: RB=120 kHz, DET=Quasi-Peak
Input Power (System)	120 Vac, 60 Hz	**Environmental Conditions**	21.6 °C, 61% RH
Tested By	Roy Mai		

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	**36.01**	**35.7 QP**	**40.0**	**-4.3**	**1.00 H**	**1**	**54.1**	**-18.4**
2	105.05	24.3 PK	43.5	-19.2	1.50 H	91	45.5	-21.2
3	216.00	29.9 PK	43.5	-13.6	1.50 H	40	50.6	-20.7
4	299.90	31.8 PK	46.0	-14.2	2.00 H	100	48.6	-16.8
5	324.39	30.2 PK	46.0	-15.8	1.00 H	93	46.1	-15.9
6	395.98	30.5 PK	46.0	-15.5	1.50 H	360	44.7	-14.2
7	490.26	32.0 PK	46.0	-14.0	1.00 H	45	44.1	-12.1
8	517.06	38.0 PK	46.0	-8.0	3.00 H	149	49.5	-11.5
9	948.98	35.9 PK	46.0	-10.1	2.00 H	360	40.3	-4.4

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.

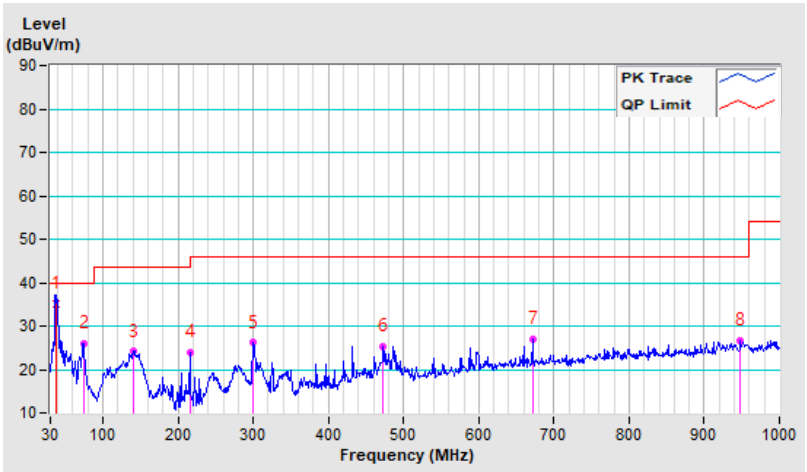


RF Mode	LIGHTSPEED LS-1M	**Channel**	CH 0：2402 MHz
Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Bandwidth**	PK: RB=120 kHz, DET=Peak QP: RB=120 kHz, DET=Quasi-Peak
Input Power (System)	120 Vac, 60 Hz	**Environmental Conditions**	21.6 °C, 61% RH
Tested By	Roy Mai		

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	38.29	35.2 QP	40.0	-4.8	1.00 V	360	53.2	-18.0
2	74.33	26.0 PK	40.0	-14.0	1.00 V	359	46.7	-20.7
3	140.41	24.1 PK	43.5	-19.4	1.00 V	203	41.8	-17.7
4	216.02	24.0 PK	46.0	-22.0	1.50 V	119	44.7	-20.7
5	299.54	26.1 PK	46.0	-19.9	1.00 V	181	43.0	-16.9
6	473.22	25.3 PK	46.0	-20.7	2.00 V	136	37.6	-12.3
7	671.92	26.9 PK	46.0	-19.1	3.00 V	245	35.5	-8.6
8	948.06	26.6 PK	46.0	-19.4	1.50 V	179	31.0	-4.4

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.



7.9 Unwanted Emissions above 1 GHz

RF Mode	LIGHTSPEED LS-1M	**Channel**	CH 0：2402 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 (System)	120 Vac, 60 Hz	**Environmental Conditions**	24 °C, 65% RH
Tested By	Roy Mai		

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	56.8 PK	74.0	-17.2	1.03 H	190	60.3	-3.5
2	2390.00	45.9 AV	54.0	-8.1	1.03 H	190	49.4	-3.5
3	*2402.00	107.8 PK			1.03 H	190	111.2	-3.4
4	*2402.00	59.7 AV			1.03 H	190	63.1	-3.4
5	4804.00	58.9 PK	74.0	-15.1	1.06 H	263	57.8	1.1
6	4804.00	10.8 AV	54.0	-43.2	1.06 H	263	9.7	1.1
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	55.4 PK	74.0	-18.6	3.78 V	158	58.9	-3.5
2	2390.00	44.3 AV	54.0	-9.7	3.78 V	158	47.8	-3.5
3	*2402.00	103.6 PK			3.78 V	158	107.0	-3.4
4	*2402.00	55.5 AV			3.78 V	158	58.9	-3.4
5	4804.00	57.4 PK	74.0	-16.6	3.53 V	255	56.3	1.1
6	4804.00	9.3 AV	54.0	-44.7	3.53 V	255	8.2	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.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. For fundamental and related emissions signals (e.g., harmonic frequencies), the average value of frequency is:: Average = Peak value + 20 log(dwell time per 100 ms per channel * (channel separation correction + overlapping channel correction)) Where the duty cycle correction factor is calculated from following formula: 20 log(dwell time per 100 ms per channel × (channel separation correction + overlapping channel correction)) = 20 log(0.395 ms * (1+0) / 100 ms) = -48.1 dB

RF Mode	LIGHTSPEED LS-1M	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 (System)	120 Vac, 60 Hz	Environmental Conditions	24 °C, 65% RH
Tested By	Roy Mai		

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	108.2 PK			1.54 H	184	111.7	-3.5
2	*2440.00	60.1 AV			1.54 H	184	63.6	-3.5
3	4880.00	60.4 PK	74.0	-13.6	2.44 H	251	59.4	1.0
4	4880.00	12.3 AV	54.0	-41.7	2.44 H	251	11.3	1.0
5	7320.00	55.7 PK	74.0	-18.3	3.02 H	326	48.2	7.5
6	7320.00	7.6 AV	54.0	-46.4	3.02 H	326	0.1	7.5
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	*2440.00	105.0 PK			3.80 V	155	108.5	-3.5
2	*2440.00	56.9 AV			3.80 V	155	60.4	-3.5
3	4880.00	59.2 PK	74.0	-14.8	1.90 V	247	58.2	1.0
4	4880.00	11.1 AV	54.0	-42.9	1.90 V	247	10.1	1.0
5	7320.00	54.3 PK	74.0	-19.7	1.44 V	325	46.8	7.5
6	7320.00	6.2 AV	54.0	-47.8	1.44 V	325	-1.3	7.5

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, the limit was restricted at the RF Output Power.
6. For fundamental and related emissions signals (e.g., harmonic frequencies), the average value of frequency is:: Average = Peak value + 20 log(dwell time per 100 ms per channel * (channel separation correction + overlapping channel correction)) Where the duty cycle correction factor is calculated from following formula: 20 log(dwell time per 100 ms per channel × (channel separation correction + overlapping channel correction)) = 20 log(0.395 ms * (1+0) / 100 ms) = -48.1 dB

RF Mode	LIGHTSPEED LS-1M	Channel	CH 39：2480 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 (System)	120 Vac, 60 Hz	Environmental Conditions	24 °C, 65% RH
Tested By	Roy Mai		

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	*2480.00	107.5 PK			1.62 H	179	111.0	-3.5
2	*2480.00	59.4 AV			1.62 H	179	62.9	-3.5
3	2483.50	56.0 PK	74.0	-18.0	1.62 H	179	59.5	-3.5
4	2483.50	45.6 AV	54.0	-8.4	1.62 H	179	49.1	-3.5
5	4960.00	59.7 PK	74.0	-14.3	1.53 H	267	58.5	1.2
6	4960.00	11.6 AV	54.0	-42.4	1.53 H	267	10.4	1.2
7	7440.00	54.6 PK	74.0	-19.4	1.20 H	242	47.1	7.5
8	7440.00	6.5 AV	54.0	-47.5	1.20 H	242	-1.0	7.5
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	*2480.00	104.6 PK			3.99 V	171	108.1	-3.5
2	*2480.00	56.5 AV			3.99 V	171	60.0	-3.5
3	2483.50	54.8 PK	74.0	-19.2	3.99 V	171	58.3	-3.5
4	2483.50	44.0 AV	54.0	-10.0	3.99 V	171	47.5	-3.5
5	4960.00	54.3 PK	74.0	-19.7	2.15 V	156	53.1	1.2
6	4960.00	6.2 AV	54.0	-47.8	2.15 V	156	5.0	1.2
7	7440.00	52.7 PK	74.0	-21.3	1.46 V	222	45.2	7.5
8	7440.00	4.6 AV	54.0	-49.4	1.46 V	222	-2.9	7.5

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, the limit was restricted at the RF Output Power.
6. For fundamental and related emissions signals (e.g., harmonic frequencies), the average value of frequency is:: Average = Peak value + 20 log(dwell time per 100 ms per channel * (channel separation correction + overlapping channel correction)) Where the duty cycle correction factor is calculated from following formula: 20 log(dwell time per 100 ms per channel × (channel separation correction + overlapping channel correction)) = 20 log(0.395 ms * (1+0) / 100 ms) = -48.1 dB

RF Mode	LIGHTSPEED LS-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 (System)	120 Vac, 60 Hz	Environmental Conditions	25 °C, 62% RH
Tested By	Roy Mai		

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	1.35 H	162	60.5	-3.5
2	**2390.00**	**46.1 AV**	**54.0**	**-7.9**	**1.35 H**	**162**	**49.6**	**-3.5**
3	*2404.00	108.5 PK			1.35 H	162	111.9	-3.4
4	*2404.00	75.0 AV			1.35 H	162	78.4	-3.4
5	4808.00	56.2 PK	74.0	-17.8	1.44 H	178	55.1	1.1
6	4808.00	22.7 AV	54.0	-31.3	1.44 H	178	21.6	1.1
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	56.3 PK	74.0	-17.7	1.16 V	158	59.8	-3.5
2	2390.00	45.2 AV	54.0	-8.8	1.16 V	158	48.7	-3.5
3	*2404.00	103.5 PK			1.16 V	158	106.9	-3.4
4	*2404.00	70.0 AV			1.16 V	158	73.4	-3.4
5	4808.00	55.0 PK	74.0	-19.0	1.20 V	126	53.9	1.1
6	4808.00	21.5 AV	54.0	-32.5	1.20 V	126	20.4	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.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. For fundamental and related emissions signals (e.g., harmonic frequencies), the average value of frequency is:: Average = Peak value + 20 log(dwell time per 100 ms per channel * (channel separation correction + overlapping channel correction)) Where the duty cycle correction factor is calculated from following formula: 20 log(dwell time per 100 ms per channel × (channel separation correction + overlapping channel correction)) = 20 log(1.056 ms * (1+1) / 100 ms) = -33.5 dB

RF Mode	LIGHTSPEED LS-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 (System)	120 Vac, 60 Hz	Environmental Conditions	25 °C, 62% RH
Tested By	Roy Mai		

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	109.0 PK			1.26 H	177	112.5	-3.5
2	*2440.00	75.5 AV			1.26 H	177	79.0	-3.5
3	4880.00	58.3 PK	74.0	-15.7	1.50 H	236	57.3	1.0
4	4880.00	24.8 AV	54.0	-29.2	1.50 H	236	23.8	1.0
5	7320.00	53.7 PK	74.0	-20.3	1.90 H	106	46.2	7.5
6	7320.00	20.2 AV	54.0	-33.8	1.90 H	106	12.7	7.5
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	*2440.00	105.2 PK			1.16 V	198	108.7	-3.5
2	*2440.00	71.7 AV			1.16 V	198	75.2	-3.5
3	4880.00	57.5 PK	74.0	-16.5	1.89 V	222	56.5	1.0
4	4880.00	24.0 AV	54.0	-30.0	1.89 V	222	23.0	1.0
5	7320.00	53.0 PK	74.0	-21.0	1.25 V	300	45.5	7.5
6	7320.00	19.5 AV	54.0	-34.5	1.25 V	300	12.0	7.5

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, the limit was restricted at the RF Output Power.
6. For fundamental and related emissions signals (e.g., harmonic frequencies), the average value of frequency is:: Average = Peak value + 20 log(dwell time per 100 ms per channel * (channel separation correction + overlapping channel correction)) Where the duty cycle correction factor is calculated from following formula: 20 log(dwell time per 100 ms per channel × (channel separation correction + overlapping channel correction)) = 20 log(1.056 ms * (1+1) / 100 ms) = -33.5 dB

RF Mode	LIGHTSPEED LS-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 (System)	120 Vac, 60 Hz	Environmental Conditions	25 °C, 62% RH
Tested By	Roy Mai		

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	107.9 PK			1.58 H	159	111.4	-3.5
2	*2478.00	74.4 AV			1.58 H	159	77.9	-3.5
3	2483.50	56.5 PK	74.0	-17.5	1.58 H	159	60.0	-3.5
4	2483.50	45.8 AV	54.0	-8.2	1.58 H	159	49.3	-3.5
5	4956.00	57.4 PK	74.0	-16.6	1.60 H	288	56.2	1.2
6	4956.00	23.9 AV	54.0	-30.1	1.60 H	288	22.7	1.2
7	7434.00	53.4 PK	74.0	-20.6	1.96 H	347	45.9	7.5
8	7434.00	19.9 AV	54.0	-34.1	1.96 H	347	12.4	7.5
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	*2478.00	104.6 PK			1.07 V	173	108.1	-3.5
2	*2478.00	71.1 AV			1.07 V	173	74.6	-3.5
3	2483.50	55.7 PK	74.0	-18.3	1.07 V	173	59.2	-3.5
4	2483.50	45.7 AV	54.0	-8.3	1.07 V	173	49.2	-3.5
5	4956.00	56.0 PK	74.0	-18.0	1.51 V	188	54.8	1.2
6	4956.00	22.5 AV	54.0	-31.5	1.51 V	188	21.3	1.2
7	7434.00	52.6 PK	74.0	-21.4	1.38 V	285	45.1	7.5
8	7434.00	19.1 AV	54.0	-34.9	1.38 V	285	11.6	7.5

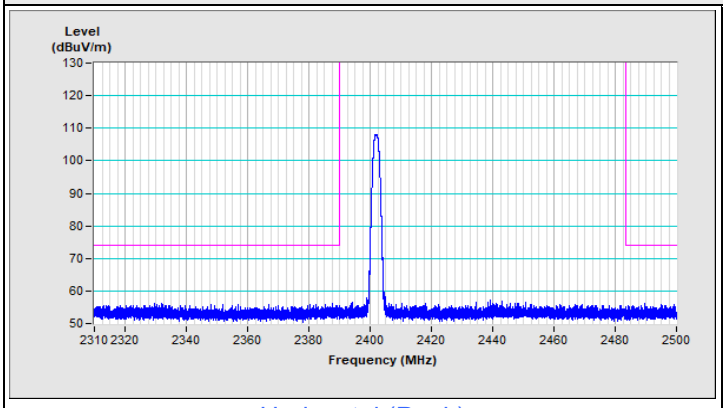
Remarks:

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, the limit was restricted at the RF Output Power.
6. For fundamental and related emissions signals (e.g., harmonic frequencies), the average value of frequency is:: Average = Peak value + 20 log(dwell time per 100 ms per channel * (channel separation correction + overlapping channel correction)) Where the duty cycle correction factor is calculated from following formula: 20 log(dwell time per 100 ms per channel × (channel separation correction + overlapping channel correction)) = 20 log(1.056 ms * (1+1) / 100 ms) = -33.5 dB

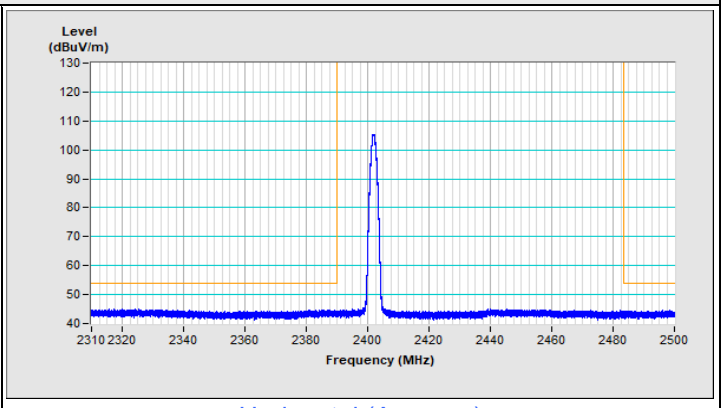
Plot of Band Edge

Frequency Range	2.31 GHz ~ 2.5 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS

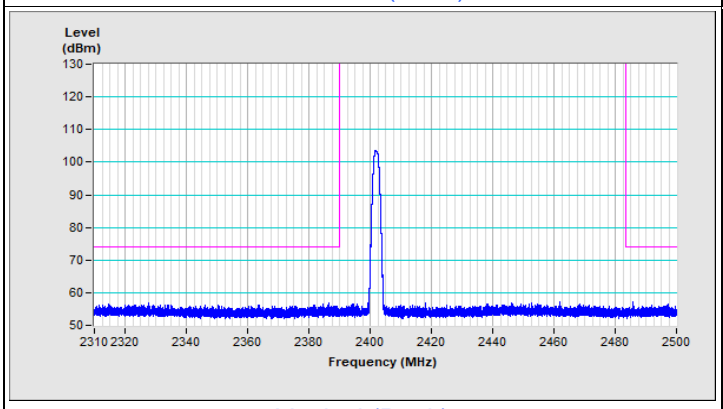
LIGHTSPEED LS-1M Channel 0



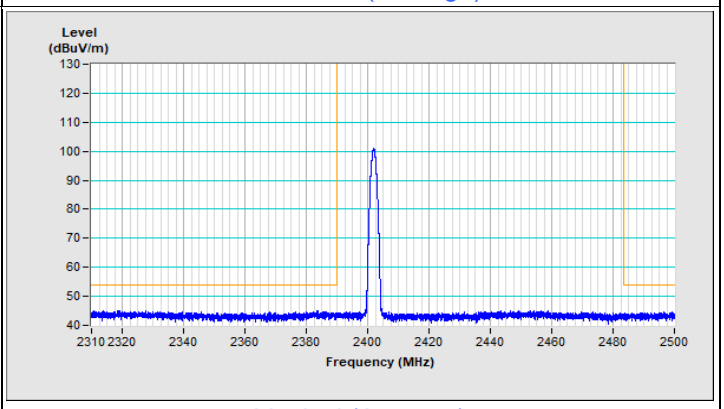
Horizontal (Peak)



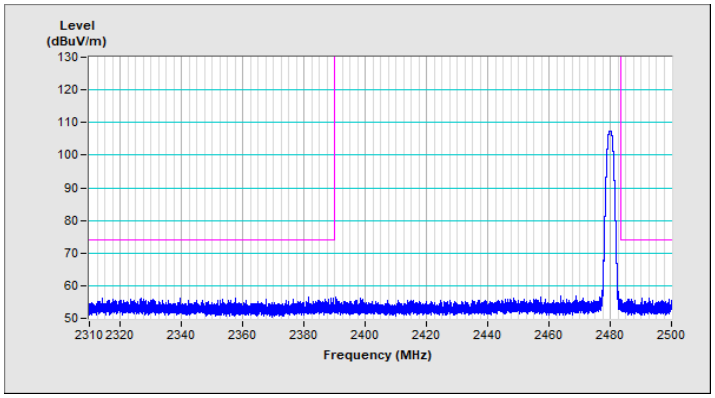
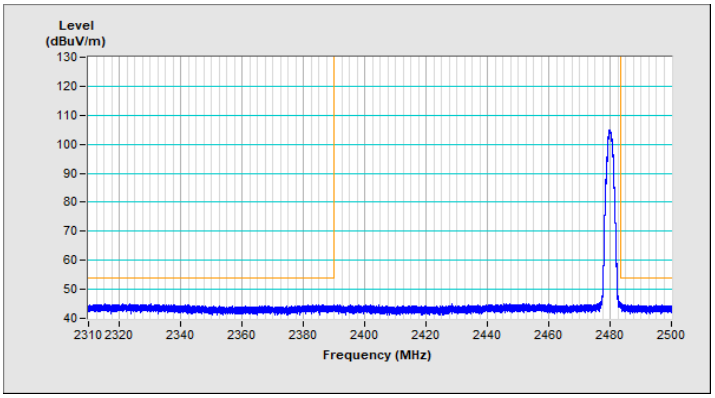
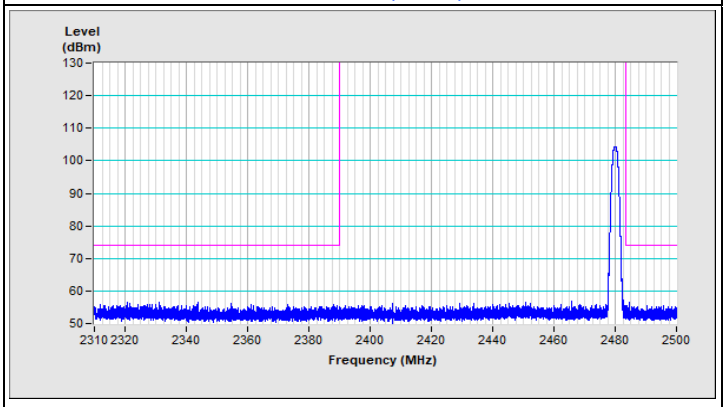
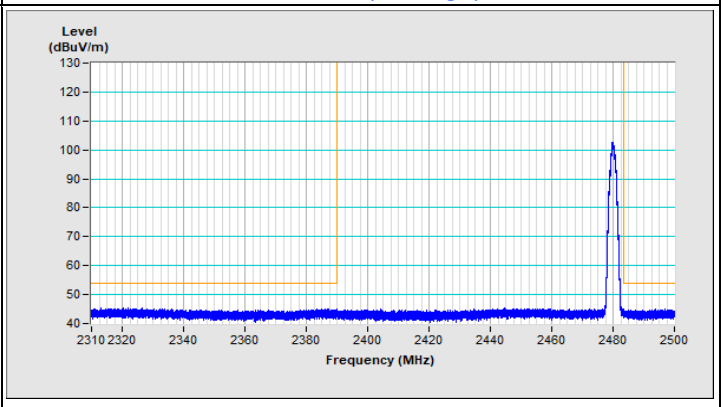
Horizontal (Average)



Vertical (Peak)

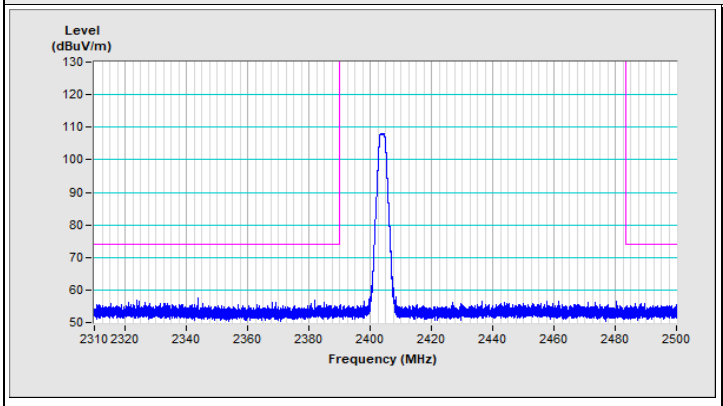


Vertical (Average)

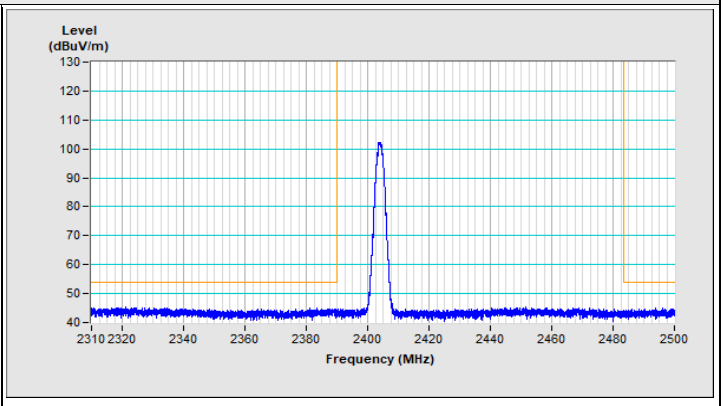
LIGHTSPEED LS-1M Channel 39	
	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)

Frequency Range	2.31 GHz ~ 2.5 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS

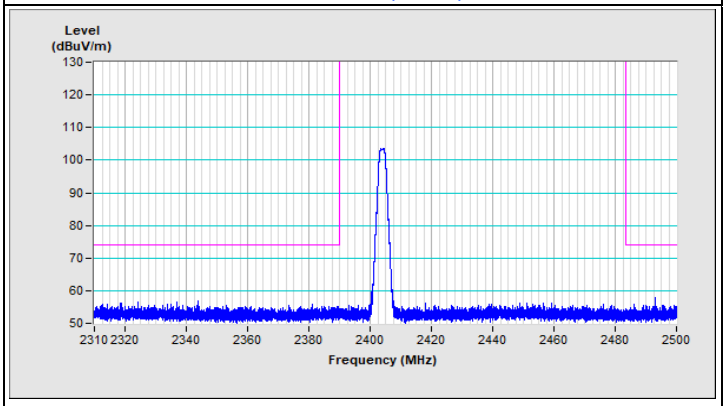
LIGHTSPEED LS-2M Channel 1



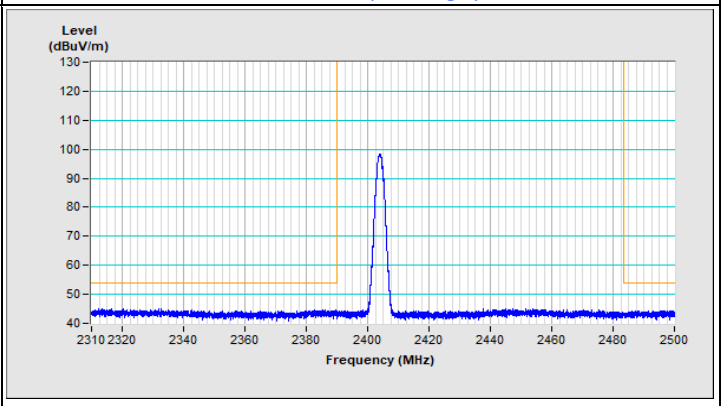
Horizontal (Peak)



Horizontal (Average)

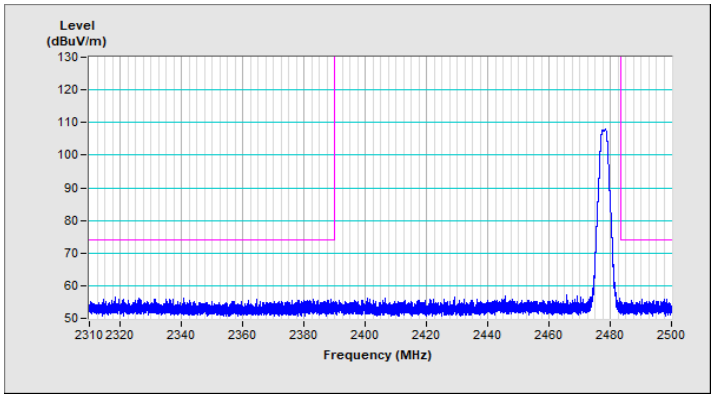


Vertical (Peak)

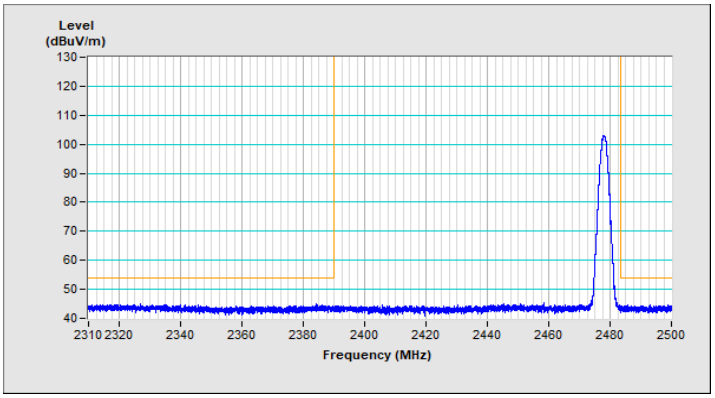


Vertical (Average)

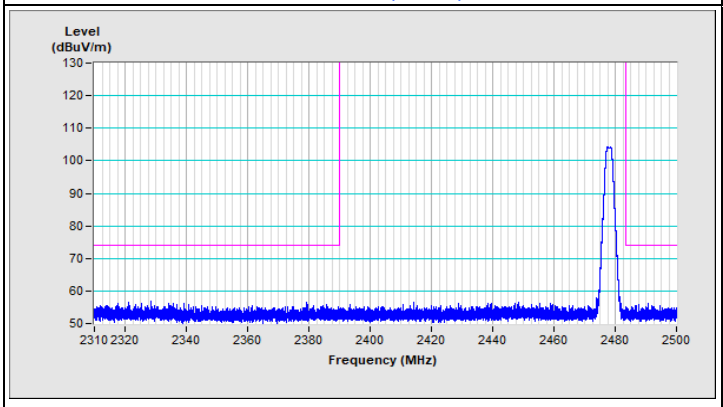
LIGHTSPEED LS-2M Channel 38



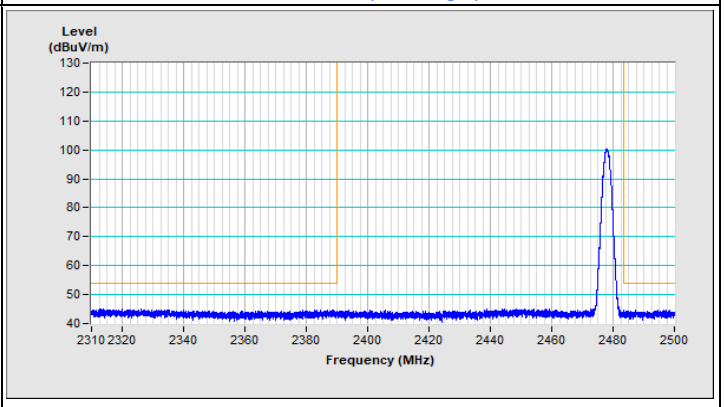
Horizontal (Peak)



Horizontal (Average)



Vertical (Peak)

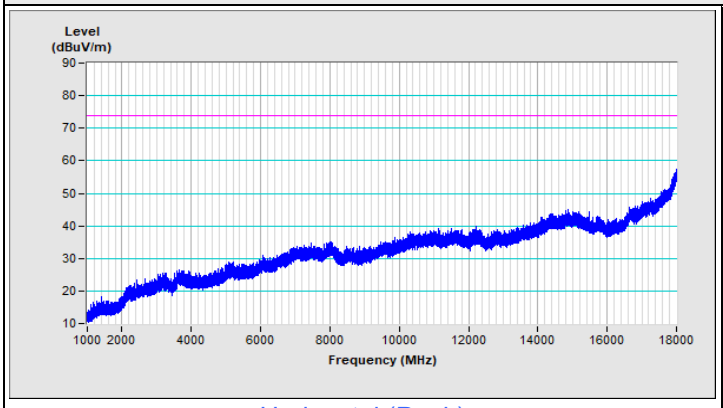


Vertical (Average)

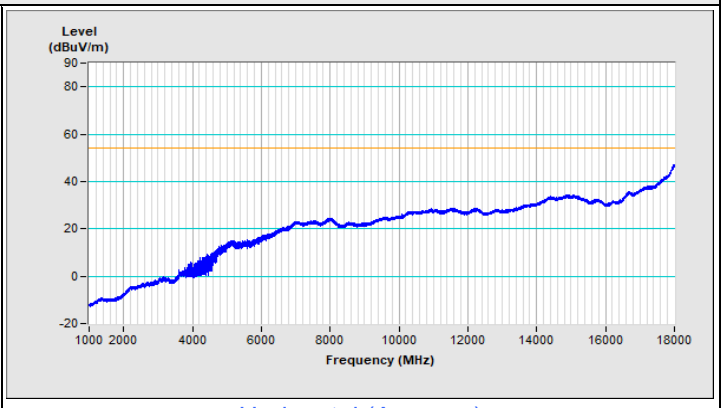
Plot of Other Emission

Frequency Range	1 GHz ~ 18 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS

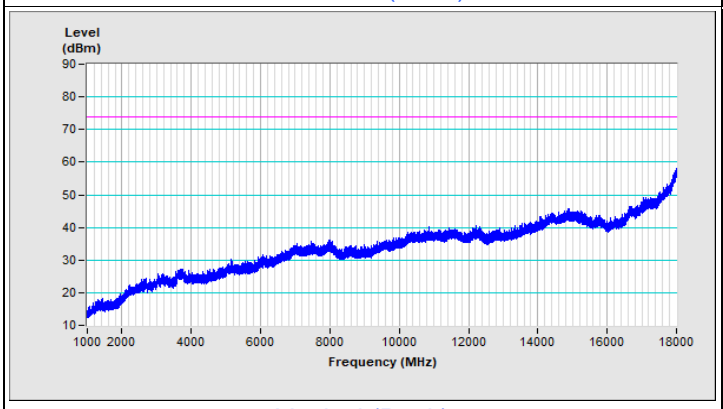
LIGHTSPEED LS-1M Channel 19



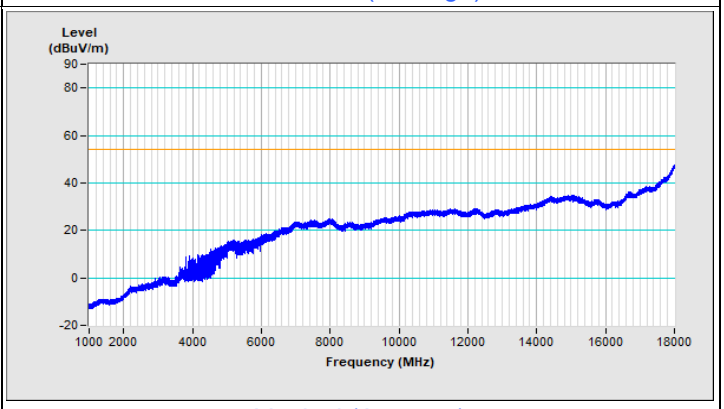
Horizontal (Peak)



Horizontal (Average)



Vertical (Peak)



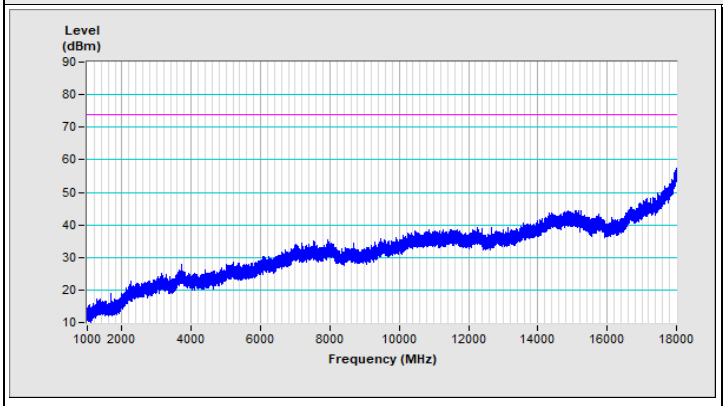
Vertical (Average)

Notes:

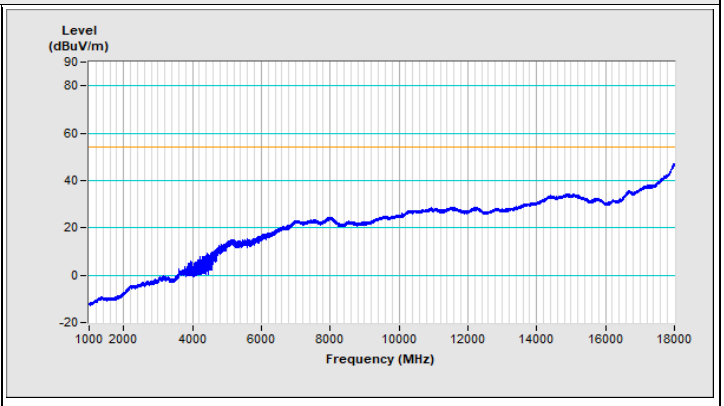
1. For radiated emission test data, complete spectral plots shall be presented in the report only for the worst-case scenarios of each mode within each operating frequency band.
2. The frequency range 18 GHz ~ 25 GHz: After investigation, no any emissions were found to exist, therefore they are not recorded in this report.

Frequency Range	1 GHz ~ 18 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS

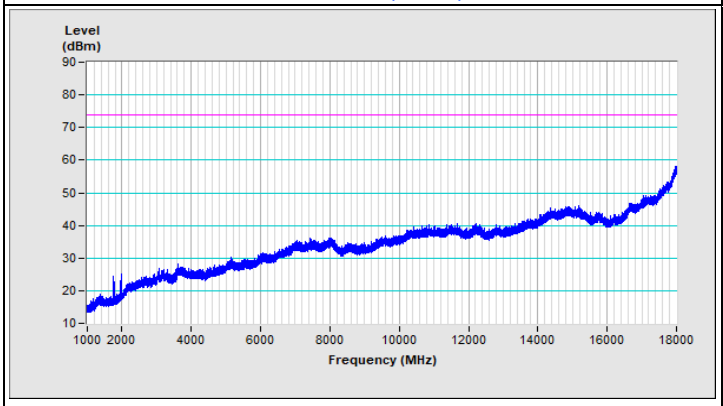
LIGHTSPEED LS-2M Channel 38



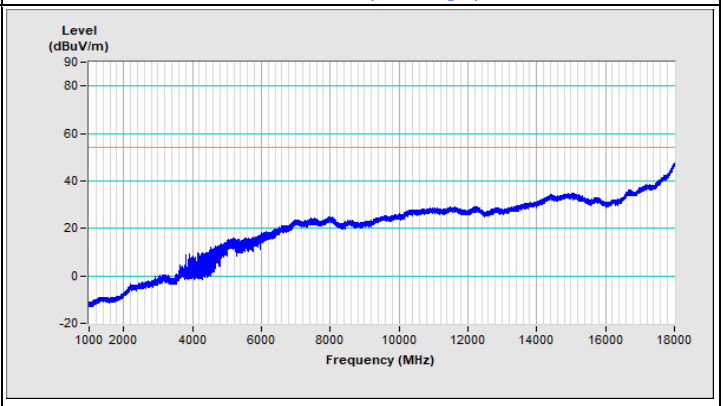
Horizontal (Peak)



Horizontal (Average)



Vertical (Peak)



Vertical (Average)

Notes:

1. For radiated emission test data, complete spectral plots shall be presented in the report only for the worst-case scenarios of each mode within each operating frequency band.
2. The frequency range 18 GHz ~ 25 GHz: After investigation, no any emissions were found to exist, therefore they are not recorded in this report.

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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