

FCC Test Report (Bluetooth Low Energy – FHSS mode)

Report No.: RFCDBM-WTW-P22030865

FCC ID: QOQ-GM240P

Test Model: MGM240P32A, MGM240P32N

Series Model: BGM240P32A, BGM240P32N (refer to item 3.1 for more details)

Received Date: Mar. 22, 2022

Test Date: Apr. 08 ~ May 23, 2022

Issued Date: Aug. 12, 2022

Applicant: Silicon Laboratories Finland Oy

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

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**FCC Registration /
Designation Number (1):** 788550 / TW0003

**FCC Registration /
Designation Number (2):** 281270 / TW0032



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Table of Contents

Release Control Record	4
1 Certificate of Conformity	5
2 Summary of Test Results.....	6
2.1 Measurement Uncertainty.....	7
2.2 Modification Record	7
3 General Information	8
3.1 General Description of EUT	8
3.2 Description of Test Modes.....	10
3.2.1 Test Mode Applicability and Tested Channel Detail.....	11
3.3 Duty Cycle of Test Signal	14
3.4 Description of Support Units	15
3.4.1 Configuration of System under Test	15
3.5 General Description of Applied Standards and References	16
4 Test Types and Results	17
4.1 Radiated Emission and Bandedge Measurement	17
4.1.1 Limits of Radiated Emission and Bandedge Measurement	17
4.1.2 Test Instruments	18
4.1.3 Test Procedures.....	20
4.1.4 Deviation from Test Standard	20
4.1.5 Test Set Up	21
4.1.6 EUT Operating Conditions.....	22
4.1.7 Test Results	23
4.2 Conducted Emission Measurement.....	53
4.2.1 Limits of Conducted Emission Measurement	53
4.2.2 Test Instruments	53
4.2.3 Test Procedures.....	53
4.2.4 Deviation from Test Standard	54
4.2.5 Test Setup.....	54
4.2.6 EUT Operating Conditions.....	54
4.2.7 Test Results	55
4.3 Number of Hopping Frequency Used	59
4.3.1 Limits of Hopping Frequency Used Measurement	59
4.3.2 Test Setup.....	59
4.3.3 Test Instruments	59
4.3.4 Test Procedure	59
4.3.5 Deviation from Test Standard	59
4.3.6 Test Results	60
4.4 Dwell Time on Each Channel.....	62
4.4.1 Limits of Dwell Time on Each Channel Measurement.....	62
4.4.2 Test Setup.....	62
4.4.3 Test Instruments	62
4.4.4 Test Procedures.....	62
4.4.5 Deviation from Test Standard	62
4.4.6 Test Results	63
4.5 Channel Bandwidth.....	65
4.5.1 Limits of Channel Bandwidth Measurement.....	65
4.5.2 Test Setup.....	65
4.5.3 Test Instruments	65
4.5.4 Test Procedure	65
4.5.5 Deviation from Test Standard	65
4.5.6 EUT Operating Condition	65
4.5.7 Test Results	66
4.6 Hopping Channel Separation.....	70

4.6.1	Limits of Hopping Channel Separation Measurement.....	70
4.6.2	Test Setup.....	70
4.6.3	Test Instruments	70
4.6.4	Test Procedure	70
4.6.5	Deviation from Test Standard	70
4.6.6	Test Results	71
4.7	Maximum Output Power	75
4.7.1	Limits of Maximum Output Power Measurement	75
4.7.2	Test Setup.....	75
4.7.3	Test Instruments	75
4.7.4	Test Procedures.....	75
4.7.5	Deviation from Test Standard	75
4.7.6	EUT Operating Conditions.....	75
4.7.7	Test Results	76
4.8	Conducted Out of Band Emission Measurement	78
4.8.1	Limits Of Conducted Out of Band Emission Measurement.....	78
4.8.2	Test Instruments	78
4.8.3	Test Procedure	78
4.8.4	Deviation from Test Standard	78
4.8.5	EUT Operating Condition	78
4.8.6	Test Results	78
Annex A- Band Edge Measurement.....		85
5 Pictures of Test Arrangements.....		95
Appendix – Information of the Testing Laboratories		96

Release Control Record

Issue No.	Description	Date Issued
RFCDBM-WTW-P22030865	Original Release	Aug. 12, 2022

1 Certificate of Conformity

Product: Bluetooth Low Energy and 802.15.4 wireless radio module

Brand: Silicon Labs

Test Model: MGM240P32A, MGM240P32N

Series Model: BGM240P32A, BGM240P32N (refer to item 3.1 for more details)

Sample Status: Engineering samples fully representing the production modules

Applicant: Silicon Laboratories Finland Oy

Test Date: Apr. 08 ~ May 23, 2022

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by :

Gina Liu

Date: Aug. 12, 2022

Gina Liu / Specialist

Approved by :

Jeremy Lin

Date: Aug. 12, 2022

Jeremy Lin / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -18.77 dB at 0.16200 MHz.
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)	1. Hopping Channel Separation 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	Pass	Meet the requirement of limit.
15.247(b)(1)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	Pass	Reference only
15.205 & 209	Radiated Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -0.4 dB at 2483.50 MHz.
15.247(d)	Band Edge Measurement	Pass	Meet the requirement of limit.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	MGM240P32A: these modules use an integral antenna, therefore comply with the requirement of 15.203 (see section 1.4 for details) / MGM240P32N: this module comes with a RF pin only, no own RF connector, and no external antenna is sold with it.

Note:

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. For 2.4G band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
3. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.79 dB
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.00 dB
	30 MHz ~ 200 MHz	2.91 dB
	200 MHz ~ 1000 MHz	2.92 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.76 dB
	18 GHz ~ 40 GHz	1.77 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Bluetooth Low Energy and 802.15.4 wireless radio module
Brand	Silicon Labs
Test Model	MGM240P32A, MGM240P32N
Series Model	BGM240P32A, BGM240P32N
Model Difference	Refer to Note as below
Status of EUT	Engineering samples fully representing the production modules
Power Supply Rating	5.0 Vdc from host equipment 1.8 ~ 3.8 Vdc from DC power supply
Modulation Type	GFSK
Modulation Technology	FHSS
Transfer Rate	1MBaud with 1Mbps transfer rate 1MBaud with Coded 125kbps transfer rate 1MBaud with Coded 500kbps 2MBaud with 2Mbps transfer rate
Operating Frequency	2402 ~ 2480 MHz
Number of Channel	1MBaud: 40 2MBaud: 37
Output Power	Mode A (MGM240P32A) 1MBaud: 96.383 mW 2MBaud: 96.605 mW Mode B (MGM240P32N) 1MBaud: 94.842 mW 2MBaud: 94.406 mW
Antenna Type	Refer to Note as below
Antenna Connector	MGM240P32A: N/A (have integral antenna) / MGM240P32N: N/A (has RF pin)
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. All models are listed as below. Model MGM240P32A and MGM240P32N are the representative for final test.

Product Spec.	Model	
	MGM240P32A (covers BGM240P32A)	MGM240P32N (covers BGM240P32N)
	High-Power/ Bluetooth Low Energy and 802.15.4 (802.15.4 being disabled for BGM240P32A)	High-Power/ Bluetooth Low Energy and 802.15.4 (802.15.4 being disabled for BGM240P32N)
Max nominal RF TX power, as declared by manufacturer	20dBm	20dBm
Antenna type	integral antenna	RF pin
Hardware	MGM240P32A (and BGM240P32A) --> hardware variants with integral antenna and 20dBm max power, to be tested as DTS for 802.15.4 and FHSS for Bluetooth Low Energy MGM240P32N (and BGM240P32N) --> hardware variants with RF pin and 20dBm max power, to be	

tested as DTS for 802.15.4 and FHSS for Bluetooth Low Energy

These three hardware variants should be RF tested separately, because PAs are configured differently and also antenna matching components are different between them, meaning for example that conducted RF measurements cannot be assumed to deliver the exact same results across the three samples.

MGM modules are the ones under testing as they support both 802.15.4 and Bluetooth Low Energy, whereas the BGM modules are the series models because they are exactly the same except for the 802.15.4 being disabled.

2. The antenna information is listed as below.

No.	Type	Connector	Gain (dBi)	Remark
1	Integral antenna	NA	1.82	For model: MGM240P32A, BGM240P32A
2	External reference dipole antenna**	RP-SMA	2.80	For model: MGM240P32N, BGM240P32N

* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

** The dipole antenna is not sold with the EUT, but is used during testing as a reference antenna for radiated measurements of the parts with the RF pin.

3. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

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

5. The EUT has DTS and Hopping functions.

6. BT LE (DTS/FHSS) and 802.15.4 modes technology cannot transmit at same time.

7. Power setting is as below:

1MBaud PHY with 125kbps

Test Mode A (MGM240P32A)		Test Mode B (MGM240P32N)	
Channel	Power Setting	Channel	Power Setting
0	197	0	197
1	197	1	197
19	197	19	197
38	197	38	197
39	197	39	197

1MBaud PHY with 1Mbps

Test Mode A (MGM240P32A)		Test Mode B (MGM240P32N)	
Channel	Power Setting	Channel	Power Setting
0	197	0	197
1	197	1	197
19	197	19	197
38	197	38	197
39	174	39	174

2MBaud PHY

Test Mode A (MGM240P32A)		Test Mode B (MGM240P32N)	
Channel	Power Setting	Channel	Power Setting
1	197	0	197
19	197	1	197
38	197	19	197

3.2 Description of Test Modes

1MBaud

40 channels are provided to this EUT:

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

Note: The channels which were indicated in bold type of the above channel list were selected as representative test channel. Therefore only the data of the test channels were recorded in this report.

2MBaud

37 channels are provided to this EUT:

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

Note: The channels which were indicated in bold type of the above channel list were selected as representative test channel. Therefore only the data of the test channels were recorded in this report.

3.2.1 Test Mode Applicability and Tested Channel Detail

<1MBaud PHY>

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
A	√	-	-	√	MGM240P32A / integral antenna
B	√	√	√	√	MGM240P32N / Dipole antenna

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

RE<1G: Radiated Emission below 1 GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane** for mode A and **X-plane** for mode B.
2. EUT has been pre-tested at 125 kbps and 1 Mbps data rate with Bluetooth 1MBaud PHY wireless technology. The worst case is 1 Mbps data rate. Except for the radiated emission (above 1 GHz) test items, the data rate of 1Mbps was selected for the final test of other test items.
3. “-” means no effect.

Radiated Emission Test (Above 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Data Rate
A-B	0 to 39	0, 1, 19, 38, 39	GFSK	1 Mbps
A-B	0 to 39	0, 1, 19, 38, 39	GFSK	125 kbps

Radiated Emission Test (Below 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Data Rate
B	0 to 39	1	GFSK	1 Mbps

Power Line Conducted Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Data Rate
B	0 to 39	1	GFSK	1 Mbps

Antenna Port Conducted Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Data Rate
A-B	0 to 39	0, 1, 19, 38, 39	GFSK	1 Mbps

<2MBaud PHY>

EUT Configure Mode	Applicable To				Description
	RE $\geq$ 1G	RE<1G	PLC	APCM	
A	√	√	√	√	MGM240P32A / integral antenna
B	√	-	-	√	MGM240P32N / Dipole antenna

Where **RE $\geq$ 1G**: Radiated Emission above 1 GHz **RE<1G**: Radiated Emission below 1 GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

Note:

- The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane** for mode A and **X-plane** for mode B.
- "-" means no effect.
- Radiated emission test (below 1GHz) and power line conducted emission test items chosen the worst maximum power.

Radiated Emission Test (Above 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Data Rate
A-B	1 to 38	1, 19, 38	GFSK	2 Mbps

Radiated Emission Test (Below 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Data Rate
A	1 to 38	19	GFSK	2 Mbps

Power Line Conducted Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Data Rate
A	1 to 38	19	GFSK	2 Mbps

Antenna Port Conducted Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Data Rate
A-B	1 to 38	1, 19, 38	GFSK	2 Mbps

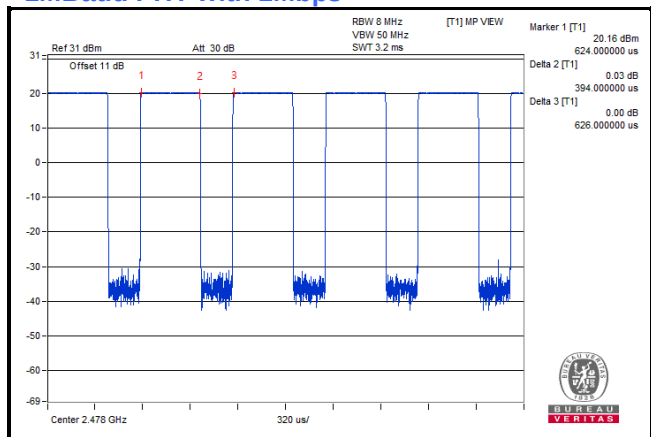
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	25 deg. C, 65 % RH	120 Vac, 60 Hz (System)	Wade Huang, Adair Peng
RE<1G	23deg. C, 66% RH	120 Vac, 60 Hz (System)	Wade Huang
PLC	25 deg. C, 69% RH	120 Vac, 60 Hz (System)	Wade Huang
APCM	25 deg. C, 60% RH	120 Vac, 60 Hz (System)	Alan Wu

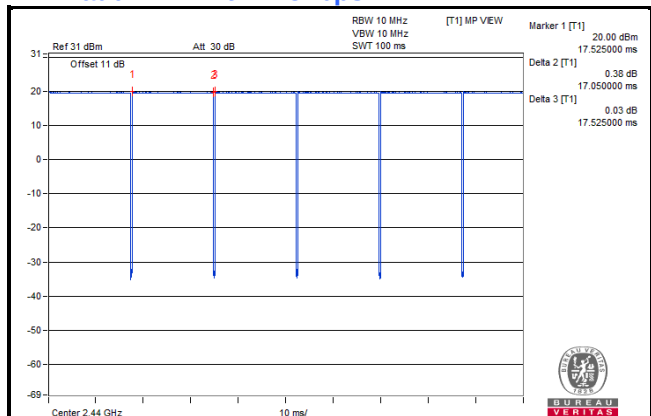
3.3 Duty Cycle of Test Signal

Duty cycle of test signal is < 98 %, duty factor shall be considered.

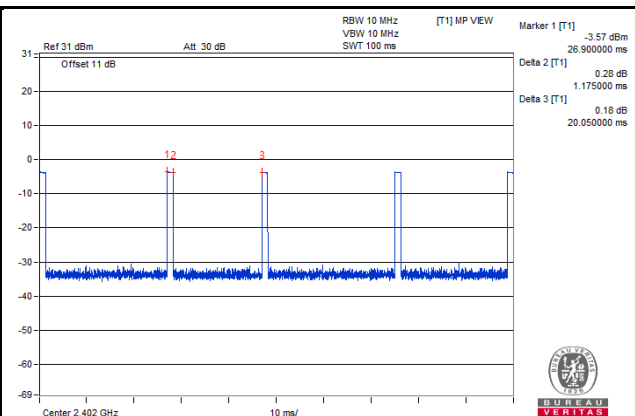
<1MBaud PHY with 1Mbps>



<1MBaud PHY with 125kbps>

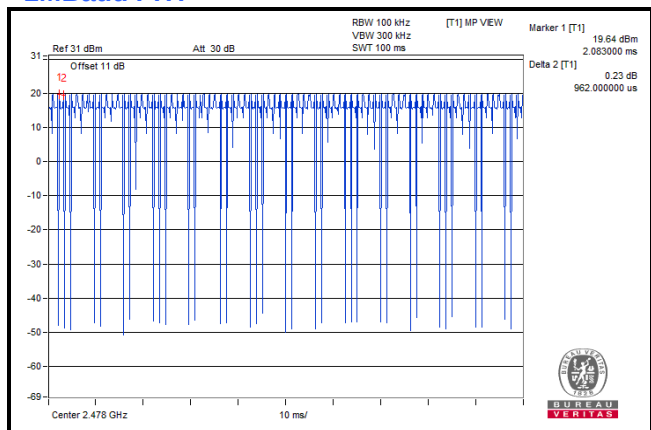


For 2404/2440/2478MHz



For 2402/2480MHz

<2MBaud PHY>



3.4 Description of Support Units

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

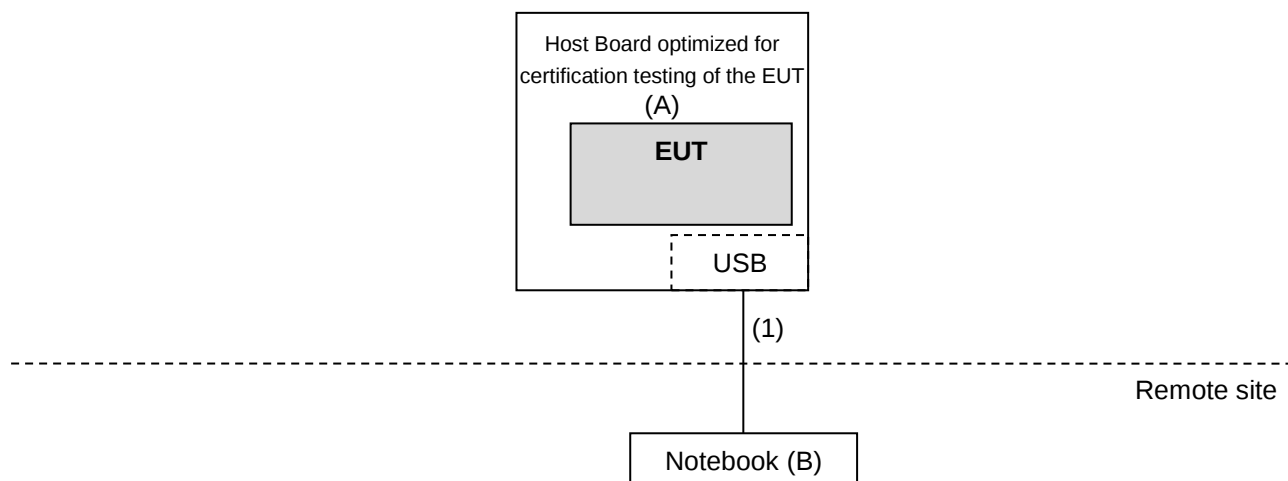
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Host Board optimized for certification testing of the EUT	Silicon Labs	NA	NA	NA	Provided by client
B.	Notebook	DELL	E5430	BPJVKV1	FCC DoC Approved	-

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item B acted as communication partners to transfer data.

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB Cable	1	1.5	Y	0	Provided by client

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards and References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

Test Standard:

FCC Part 15, Subpart C (15.247)

ANSI C63.10-2013

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

References Test Guidance:

KDB 558074 D01 15.247 Meas Guidance v05r02

All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20 dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F (kHz)	300
0.490 ~ 1.705	24000/F (kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Note:

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.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver KEYSIGHT	N9038B	MY60180018	Feb. 18, 2022	Feb. 17, 2023
Spectrum Analyzer KEYSIGHT	N9020B	MY60110462	Dec. 21, 2021	Dec. 20, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-995	Oct. 28, 2021	Oct. 27, 2022
HORN Antenna RF SPIN	DRH18-E	210104A18E	Nov. 14, 2021	Nov. 13, 2022
HORN Antenna SCHWARZBECK	BBHA 9170	9170-995	Nov. 14, 2021	Nov. 13, 2022
Loop Antenna EMCI	EM-6879	269	Sep. 16, 2021	Sep. 15, 2022
Loop Antenna TESEQ	HLA 6121	45745	Jul. 21, 2021	Jul. 20, 2022
Preamplifier EMCI	EMC330N	980783	Jan. 17, 2022	Jan. 16, 2023
Preamplifier EMCI	EMC118A45SE	980810	Dec. 30, 2021	Dec. 29, 2022
Preamplifier EMCI	EMC184045SE	980787	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMC104-SM-SM-(9 000+3000+2000+1 000)	201230+ 201242+201238+ 210101	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMCCFD400-NM-N M-(9000+3000+500 ++500)	201252+ 201250+201247+ 201245	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMC101G-KM-KM- (5000+3000+2000)	201259+201256+20125 3	Jan. 17, 2022	Jan. 16, 2023
Software BV CPS	ADT_Radiated_V7. 6.15.9.5	NA	NA	NA
Turn Table Max-Full	MFT-151SS-0.5T	NA	NA	NA
Turn Table Controller Max-Full	MF-7802BS	MF780208675	NA	NA
Antenna Tower KaiTuo	NA	NA	NA	NA
Antenna Tower Controller KaiTuo	KT-2000	NA	NA	NA
Wideband Power Sensor KEYSIGHT	N1923A	MY58020002	Jan. 17, 2022	Jan. 16, 2023
Peak Power Analyzer KEYSIGHT	8990B	MY51000485	Jan. 18, 2022	Jan. 17, 2023
Spectrum Analyzer ROHDE & SCHWARZ	FSV40	100979	Mar. 25, 2022	Mar. 24, 2023

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in WM Chamber 7.
 3. Test date: Apr. 08 ~ Apr. 20, 2022

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 27, 2022	Apr. 26, 2023
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jun. 10, 2021	Jun. 09, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Oct. 28, 2021	Oct. 27, 2022
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 14, 2021	Nov. 13, 2022
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Oct. 26, 2021	Oct. 25, 2022
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Jun. 05, 2021	Jun. 04, 2022
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 16, 2022	Feb. 15, 2023
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM80 00	CABLE-CH9-02 (248780+171006)	Jan. 15, 2022	Jan. 14, 2023
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	Jan. 15, 2022	Jan. 14, 2023
RF signal cable Woken	8D-FB	Cable-CH9-01	Jun. 05, 2021	Jun. 04, 2022
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 9.
3. Test date: May 20 ~ May 23, 2022

4.1.3 Test Procedures

For Radiated Emission below 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.

For Radiated Emission above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

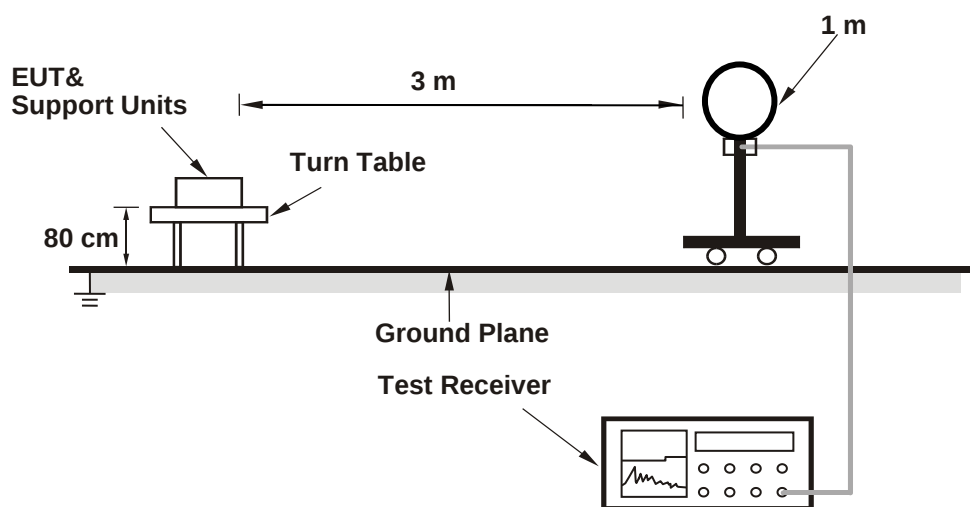
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) and Average detection (AV) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98 %) or 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz. (RBW = 1 MHz, VBW = 3 MHz(RMS))
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

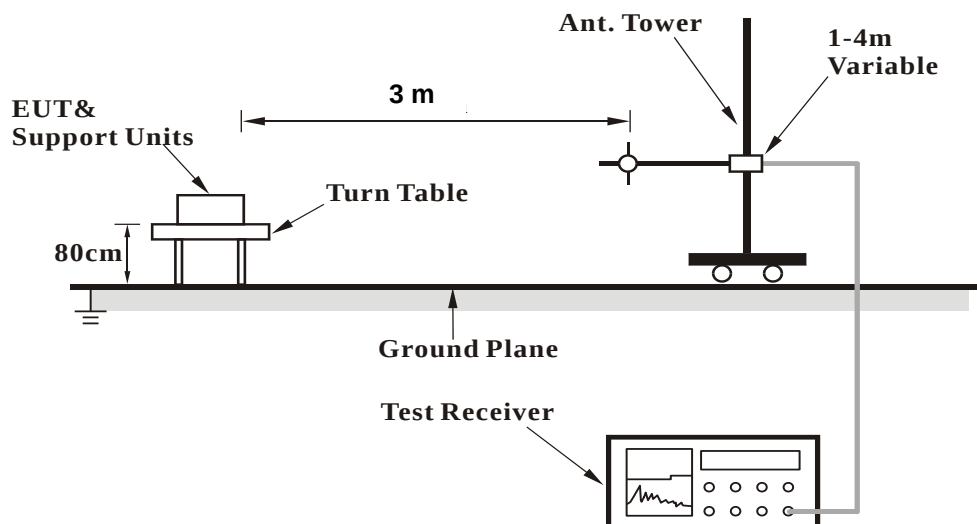
No deviation.

4.1.5 Test Set Up

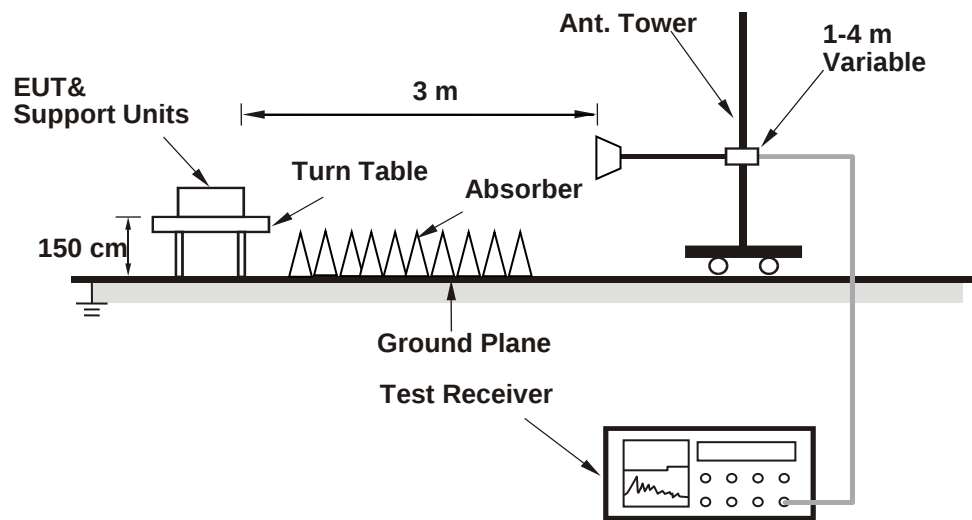
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission above 1 GHz>



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

4.1.6 EUT Operating Conditions

- Placed the EUT on the testing table.
- Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Mode A

Above 1 GHz Data:

RF Mode	TX BT-LE 1M	Channel	CH 0 : 2402 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/8

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	58.7 PK	74.0	-15.3	1.36 H	196	64.0	-5.3
2	2390.00	45.9 AV	54.0	-8.1	1.36 H	196	51.2	-5.3
3	*2402.00	117.4 PK			1.36 H	196	85.4	32.0
4	*2402.00	115.2 AV			1.36 H	196	83.2	32.0
5	4804.00	52.6 PK	74.0	-21.4	1.56 H	5	50.5	2.1
6	4804.00	42.3 AV	54.0	-11.7	1.56 H	5	40.2	2.1

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	57.1 PK	74.0	-16.9	1.65 V	282	62.4	-5.3
2	2390.00	44.4 AV	54.0	-9.6	1.65 V	282	49.7	-5.3
3	*2402.00	112.1 PK			1.65 V	282	80.1	32.0
4	*2402.00	109.8 AV			1.65 V	282	77.8	32.0
5	4804.00	52.4 PK	74.0	-21.6	1.15 V	288	50.3	2.1
6	4804.00	41.9 AV	54.0	-12.1	1.15 V	288	39.8	2.1

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.

RF Mode	TX BT-LE 1M	Channel	CH 1 : 2404 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/8

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	58.6 PK	74.0	-15.4	1.35 H	194	63.9	-5.3
2	2390.00	45.2 AV	54.0	-8.8	1.35 H	194	50.5	-5.3
3	*2404.00	117.5 PK			1.35 H	194	85.5	32.0
4	*2404.00	115.6 AV			1.35 H	194	83.6	32.0
5	4808.00	52.6 PK	74.0	-21.4	1.83 H	0	50.5	2.1
6	4808.00	42.7 AV	54.0	-11.3	1.83 H	0	40.6	2.1
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	57.6 PK	74.0	-16.4	1.66 V	281	62.9	-5.3
2	2390.00	44.4 AV	54.0	-9.6	1.66 V	281	49.7	-5.3
3	*2404.00	112.2 PK			1.66 V	281	80.2	32.0
4	*2404.00	110.1 AV			1.66 V	281	78.1	32.0
5	4808.00	52.8 PK	74.0	-21.2	1.12 V	290	50.7	2.1
6	4808.00	43.6 AV	54.0	-10.4	1.12 V	290	41.5	2.1

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.

RF Mode	TX BT-LE 1M	Channel	CH 19 : 2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/8

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	116.8 PK			1.36 H	199	85.0	31.8
2	*2440.00	115.6 AV			1.36 H	199	83.8	31.8
3	4880.00	52.9 PK	74.0	-21.1	1.65 H	13	50.7	2.2
4	4880.00	43.3 AV	54.0	-10.7	1.65 H	13	41.1	2.2
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	*2440.00	111.7 PK			1.52 V	284	79.9	31.8
2	*2440.00	63.6 AV			1.52 V	284	31.8	31.8
3	4880.00	52.5 PK	74.0	-21.5	1.11 V	307	50.3	2.2
4	4880.00	43.1 AV	54.0	-10.9	1.11 V	307	40.9	2.2

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.

RF Mode	TX BT-LE 1M	Channel	CH 38 : 2478 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/8

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	117.3 PK			1.00 H	197	85.5	31.8
2	*2478.00	115.7 AV			1.00 H	197	83.9	31.8
3	2483.50	68.7 PK	74.0	-5.3	1.00 H	197	74.0	-5.3
4	2483.50	50.7 AV	54.0	-3.3	1.00 H	197	56.0	-5.3
5	4956.00	53.2 PK	74.0	-20.8	2.10 H	18	50.9	2.3
6	4956.00	43.5 AV	54.0	-10.5	2.10 H	18	41.2	2.3
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	114.2 PK			1.27 V	283	82.4	31.8
2	*2478.00	112.4 AV			1.27 V	283	80.6	31.8
3	2483.50	66.0 PK	74.0	-8.0	1.27 V	283	71.3	-5.3
4	2483.50	48.3 AV	54.0	-5.7	1.27 V	283	53.6	-5.3
5	4956.00	52.5 PK	74.0	-21.5	1.00 V	335	50.2	2.3
6	4956.00	43.4 AV	54.0	-10.6	1.00 V	335	41.1	2.3

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.
5. " * ": Fundamental frequency.

RF Mode	TX BT-LE 1M	Channel	CH 39 : 2480 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/8

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	116.2 PK			1.00 H	193	84.4	31.8
2	*2480.00	114.4 AV			1.00 H	193	82.6	31.8
3	2483.50	73.5 PK	74.0	-0.5	1.00 H	193	78.8	-5.3
4	2483.50	52.2 AV	54.0	-1.8	1.00 H	193	57.5	-5.3
5	4960.00	53.0 PK	74.0	-21.0	2.06 H	13	50.6	2.4
6	4960.00	44.0 AV	54.0	-10.0	2.06 H	13	41.6	2.4
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	113.9 PK			1.24 V	279	82.1	31.8
2	*2480.00	112.7 AV			1.24 V	279	80.9	31.8
3	2483.50	67.8 PK	74.0	-6.2	1.24 V	279	73.1	-5.3
4	2483.50	50.3 AV	54.0	-3.7	1.24 V	279	55.6	-5.3
5	4960.00	53.0 PK	74.0	-21.0	1.00 V	343	50.6	2.4
6	4960.00	43.2 AV	54.0	-10.8	1.00 V	343	40.8	2.4

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.
5. " * ": Fundamental frequency.

RF Mode	TX BT-LE 125kbps	Channel	CH 0 : 2402 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Adair Peng	Test Date	2022/5/20

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	61.7 PK	74.0	-12.3	2.36 H	12	63.2	-1.5
2	2390.00	50.9 AV	54.0	-3.1	2.36 H	12	52.4	-1.5
3	*2402.00	117.1 PK			2.36 H	12	84.3	32.8
4	*2402.00	115.4 AV			2.36 H	12	82.6	32.8
5	4804.00	49.4 PK	74.0	-24.6	2.35 H	11	43.6	5.8
6	4804.00	41.2 AV	54.0	-12.8	2.35 H	11	35.4	5.8
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	2390.00	60.8 PK	74.0	-13.2	1.75 V	277	62.3	-1.5
2	2390.00	50.5 AV	54.0	-3.5	1.75 V	277	52.0	-1.5
3	*2402.00	111.9 PK			1.75 V	277	79.1	32.8
4	*2402.00	110.4 AV			1.75 V	277	77.6	32.8
5	4804.00	48.9 PK	74.0	-25.1	1.45 V	266	43.1	5.8
6	4804.00	40.1 AV	54.0	-13.9	1.45 V	266	34.3	5.8

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.

RF Mode	TX BT-LE 125kbps	Channel	CH 1 : 2404 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Adair Peng	Test Date	2022/5/20

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	61.1 PK	74.0	-12.9	2.32 H	12	62.6	-1.5
2	2390.00	50.9 AV	54.0	-3.1	2.32 H	12	52.4	-1.5
3	*2404.00	116.9 PK			2.32 H	12	84.1	32.8
4	*2404.00	116.4 AV			2.32 H	12	83.6	32.8
5	4808.00	49.6 PK	74.0	-24.4	2.22 H	9	43.8	5.8
6	4808.00	40.6 AV	54.0	-13.4	2.22 H	9	34.8	5.8
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	2390.00	60.2 PK	74.0	-13.8	1.79 V	274	61.7	-1.5
2	2390.00	50.3 AV	54.0	-3.7	1.79 V	274	51.8	-1.5
3	*2404.00	111.9 PK			1.79 V	274	79.1	32.8
4	*2404.00	110.7 AV			1.79 V	274	77.9	32.8
5	4808.00	49.3 PK	74.0	-24.7	1.50 V	265	43.5	5.8
6	4808.00	39.9 AV	54.0	-14.1	1.50 V	265	34.1	5.8

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.

RF Mode	TX BT-LE 125kbps	Channel	CH 19 : 2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Adair Peng	Test Date	2022/5/20

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	116.5 PK			2.35 H	13	83.7	32.8
2	*2440.00	114.8 AV			2.35 H	13	82.0	32.8
3	4880.00	49.5 PK	74.0	-24.5	2.31 H	7	44.0	5.5
4	4880.00	40.3 AV	54.0	-13.7	2.31 H	7	34.8	5.5
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	111.5 PK			1.76 V	272	78.7	32.8
2	*2440.00	109.6 AV			1.76 V	272	76.8	32.8
3	4880.00	49.2 PK	74.0	-24.8	1.50 V	269	43.7	5.5
4	4880.00	40.0 AV	54.0	-14.0	1.50 V	269	34.5	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.
5. " * ": Fundamental frequency.

RF Mode	TX BT-LE 125kbps	Channel	CH 38 : 2478 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Adair Peng	Test Date	2022/5/20

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	115.5 PK			2.20 H	15	82.6	32.9
2	*2478.00	114.1 AV			2.20 H	15	81.2	32.9
3	2483.50	65.6 PK	74.0	-8.4	2.23 H	15	67.1	-1.5
4	2483.50	53.0 AV	54.0	-1.0	2.23 H	15	54.5	-1.5
5	4956.00	49.3 PK	74.0	-24.7	2.20 H	10	43.7	5.6
6	4956.00	40.7 AV	54.0	-13.3	2.20 H	10	35.1	5.6
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	110.5 PK			1.80 V	276	77.6	32.9
2	*2478.00	108.8 AV			1.80 V	276	75.9	32.9
3	2483.50	60.6 PK	74.0	-13.4	1.80 V	276	62.1	-1.5
4	2483.50	51.0 AV	54.0	-3.0	1.80 V	276	52.5	-1.5
5	4956.00	48.8 PK	74.0	-25.2	1.47 V	265	43.2	5.6
6	4956.00	40.2 AV	54.0	-13.8	1.47 V	265	34.6	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.
5. " * ": Fundamental frequency.

RF Mode	TX BT-LE 125kbps	Channel	CH 39 : 2480 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Adair Peng	Test Date	2022/5/20

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	115.0 PK			2.21 H	12	82.1	32.9
2	*2480.00	113.7 AV			2.21 H	12	80.8	32.9
3	2483.50	73.5 PK	74.0	-0.5	2.20 H	14	75.0	-1.5
4	2483.50	53.5 AV	54.0	-0.5	2.20 H	14	55.0	-1.5
5	4960.00	49.4 PK	74.0	-24.6	2.23 H	11	43.7	5.7
6	4960.00	40.7 AV	54.0	-13.3	2.23 H	11	35.0	5.7
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	*2480.00	109.8 PK			1.76 V	278	76.9	32.9
2	*2480.00	108.7 AV			1.76 V	278	75.8	32.9
3	2483.50	67.5 PK	74.0	-6.5	1.76 V	278	69.0	-1.5
4	2483.50	53.1 AV	54.0	-0.9	1.76 V	278	54.6	-1.5
5	4960.00	49.2 PK	74.0	-24.8	1.51 V	259	43.5	5.7
6	4960.00	40.5 AV	54.0	-13.5	1.51 V	259	34.8	5.7

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.

RF Mode	TX BT-LE 2M	Channel	CH 1 : 2404 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/8

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	58.6 PK	74.0	-15.4	1.83 H	173	63.9	-5.3
2	2390.00	45.8 AV	54.0	-8.2	1.83 H	173	51.1	-5.3
3	*2404.00	117.6 PK			1.83 H	173	85.6	32.0
4	*2404.00	116.2 AV			1.83 H	173	84.2	32.0
5	4808.00	53.0 PK	74.0	-21.0	2.31 H	0	50.9	2.1
6	4808.00	43.4 AV	54.0	-10.6	2.31 H	0	41.3	2.1
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	57.5 PK	74.0	-16.5	1.49 V	268	62.8	-5.3
2	2390.00	44.5 AV	54.0	-9.5	1.49 V	268	49.8	-5.3
3	*2404.00	112.2 PK			1.49 V	268	80.2	32.0
4	*2404.00	110.7 AV			1.49 V	268	78.7	32.0
5	4808.00	52.4 PK	74.0	-21.6	1.23 V	287	50.3	2.1
6	4808.00	43.0 AV	54.0	-11.0	1.23 V	287	40.9	2.1

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.

RF Mode	TX BT-LE 2M	Channel	CH 19 : 2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/8

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	117.7 PK			1.83 H	174	85.9	31.8
2	*2440.00	116.4 AV			1.83 H	174	84.6	31.8
3	4880.00	53.1 PK	74.0	-20.9	2.30 H	1	50.9	2.2
4	4880.00	43.5 AV	54.0	-10.5	2.30 H	1	41.3	2.2
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	*2440.00	112.7 PK			1.52 V	294	80.9	31.8
2	*2440.00	110.3 AV			1.52 V	294	78.5	31.8
3	4880.00	52.4 PK	74.0	-21.6	1.23 V	326	50.2	2.2
4	4880.00	42.9 AV	54.0	-11.1	1.23 V	326	40.7	2.2

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.

RF Mode	TX BT-LE 2M	Channel	CH 38 : 2478 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/8

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	115.7 PK			1.82 H	179	83.9	31.8
2	*2478.00	113.4 AV			1.82 H	179	81.6	31.8
3	2483.50	68.5 PK	74.0	-5.5	1.82 H	179	73.8	-5.3
4	2483.50	51.1 AV	54.0	-2.9	1.82 H	179	56.4	-5.3
5	4956.00	53.0 PK	74.0	-21.0	2.31 H	0	50.7	2.3
6	4956.00	43.8 AV	54.0	-10.2	2.31 H	0	41.5	2.3
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	112.5 PK			1.57 V	296	80.7	31.8
2	*2478.00	110.4 AV			1.57 V	296	78.6	31.8
3	2483.50	65.1 PK	74.0	-8.9	1.57 V	296	70.4	-5.3
4	2483.50	49.3 AV	54.0	-4.7	1.57 V	296	54.6	-5.3
5	4956.00	52.4 PK	74.0	-21.6	1.17 V	357	50.1	2.3
6	4956.00	43.3 AV	54.0	-10.7	1.17 V	357	41.0	2.3

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.
5. " * ": Fundamental frequency.

9 kHz ~ 1 GHz Worst-Case Data:

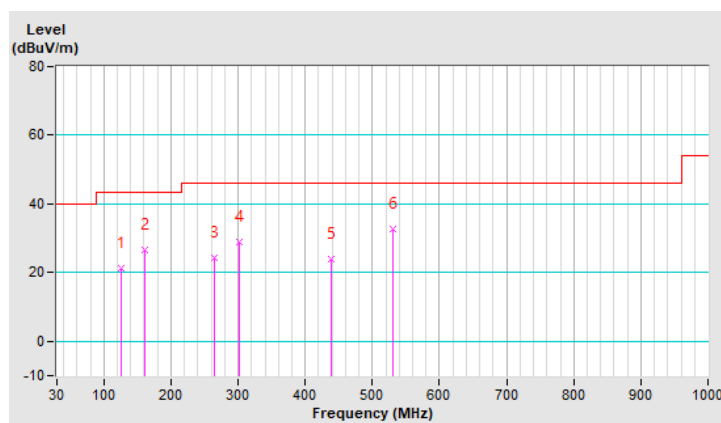
RF Mode	TX BT-LE 2M	Channel	CH 19 : 2440 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Wade Huang	Test Date	2022/4/11

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	125.06	21.20 QP	43.50	-22.30	1.99 H	218	36.18	-14.98
2	160.95	26.63 QP	43.50	-16.87	1.51 H	99	39.95	-13.32
3	263.77	24.41 QP	46.00	-21.59	1.51 H	287	38.65	-14.24
4	302.57	28.92 QP	46.00	-17.08	1.01 H	161	41.89	-12.97
5	438.37	24.01 QP	46.00	-21.99	1.99 H	110	33.24	-9.23
6	531.49	32.89 QP	46.00	-13.11	1.51 H	223	40.46	-7.57

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 emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

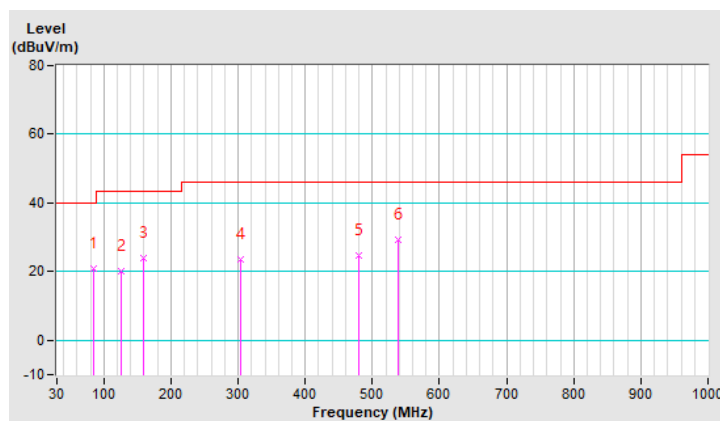


RF Mode	TX BT-LE 2M	Channel	CH 19 : 2440 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Wade Huang	Test Date	2022/4/11

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	84.32	20.88 QP	40.00	-19.12	1.00 V	158	39.92	-19.04
2	125.06	20.19 QP	43.50	-23.31	1.00 V	354	35.17	-14.98
3	159.98	23.83 QP	43.50	-19.67	2.00 V	314	37.01	-13.18
4	303.54	23.71 QP	46.00	-22.29	1.49 V	20	36.66	-12.95
5	480.08	24.87 QP	46.00	-21.13	1.00 V	152	33.50	-8.63
6	539.25	29.45 QP	46.00	-16.55	1.00 V	100	36.93	-7.48

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 emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



Mode B

Above 1 GHz Data:

RF Mode	TX BT-LE 1M	Channel	CH 0 : 2402 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/9

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	59.1 PK	74.0	-14.9	2.55 H	77	64.4	-5.3
2	2390.00	46.6 AV	54.0	-7.4	2.55 H	77	51.9	-5.3
3	*2402.00	118.8 PK			2.55 H	77	86.8	32.0
4	*2402.00	117.3 AV			2.55 H	77	85.3	32.0
5	4804.00	52.4 PK	74.0	-21.6	3.83 H	43	50.3	2.1
6	4804.00	43.5 AV	54.0	-10.5	3.83 H	43	41.4	2.1

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	57.5 PK	74.0	-16.5	3.67 V	177	62.8	-5.3
2	2390.00	44.6 AV	54.0	-9.4	3.67 V	177	49.9	-5.3
3	*2402.00	113.0 PK			3.67 V	177	81.0	32.0
4	*2402.00	111.8 AV			3.67 V	177	79.8	32.0
5	4804.00	49.7 PK	74.0	-24.3	2.36 V	78	47.6	2.1
6	4804.00	41.0 AV	54.0	-13.0	2.36 V	78	38.9	2.1

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.

RF Mode	TX BT-LE 1M	Channel	CH 1 : 2404 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/9

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	58.2 PK	74.0	-15.8	2.57 H	80	63.5	-5.3
2	2390.00	45.8 AV	54.0	-8.2	2.57 H	80	51.1	-5.3
3	*2404.00	118.9 PK			2.57 H	80	86.9	32.0
4	*2404.00	117.5 AV			2.57 H	80	85.5	32.0
5	4808.00	52.5 PK	74.0	-21.5	3.87 H	43	50.4	2.1
6	4808.00	43.3 AV	54.0	-10.7	3.87 H	43	41.2	2.1
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	57.0 PK	74.0	-17.0	3.76 V	180	62.3	-5.3
2	2390.00	44.6 AV	54.0	-9.4	3.76 V	180	49.9	-5.3
3	*2404.00	114.1 PK			3.76 V	180	82.1	32.0
4	*2404.00	113.0 AV			3.76 V	180	81.0	32.0
5	4808.00	49.9 PK	74.0	-24.1	2.37 V	77	47.8	2.1
6	4808.00	42.1 AV	54.0	-11.9	2.37 V	77	40.0	2.1

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.

RF Mode	TX BT-LE 1M	Channel	CH 19 : 2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/9

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	118.6 PK			2.47 H	81	86.8	31.8
2	*2440.00	116.7 AV			2.47 H	81	84.9	31.8
3	4880.00	52.2 PK	74.0	-21.8	3.88 H	45	50.0	2.2
4	4880.00	43.1 AV	54.0	-10.9	3.88 H	45	40.9	2.2
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	*2440.00	113.7 PK			3.61 V	175	81.9	31.8
2	*2440.00	112.0 AV			3.61 V	175	80.2	31.8
3	4880.00	48.6 PK	74.0	-25.4	2.30 V	78	46.4	2.2
4	4880.00	39.0 AV	54.0	-15.0	2.30 V	78	36.8	2.2

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.

RF Mode	TX BT-LE 1M	Channel	CH 38 : 2478 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/9

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	118.4 PK			2.43 H	79	86.6	31.8
2	*2478.00	117.3 AV			2.43 H	79	85.5	31.8
3	2483.50	67.7 PK	74.0	-6.3	2.43 H	79	73.0	-5.3
4	2483.50	50.5 AV	54.0	-3.5	2.43 H	79	55.8	-5.3
5	4956.00	51.4 PK	74.0	-22.6	3.79 H	42	49.1	2.3
6	4956.00	43.4 AV	54.0	-10.6	3.79 H	42	41.1	2.3
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	114.5 PK			4.00 V	175	82.7	31.8
2	*2478.00	113.1 AV			4.00 V	175	81.3	31.8
3	2483.50	65.5 PK	74.0	-8.5	4.00 V	175	70.8	-5.3
4	2483.50	49.0 AV	54.0	-5.0	4.00 V	175	54.3	-5.3
5	4956.00	48.9 PK	74.0	-25.1	1.11 V	276	46.6	2.3
6	4956.00	39.9 AV	54.0	-14.1	1.11 V	276	37.6	2.3

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.
5. " * " : Fundamental frequency.

RF Mode	TX BT-LE 1M	Channel	CH 39 : 2480 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/9

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	116.0 PK			2.45 H	78	84.2	31.8
2	*2480.00	114.8 AV			2.45 H	78	83.0	31.8
3	2483.50	72.0 PK	74.0	-2.0	2.45 H	78	77.3	-5.3
4	2483.50	51.3 AV	54.0	-2.7	2.45 H	78	56.6	-5.3
5	4960.00	52.0 PK	74.0	-22.0	3.75 H	59	49.6	2.4
6	4960.00	43.0 AV	54.0	-11.0	3.75 H	59	40.6	2.4
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	112.6 PK			4.00 V	169	80.8	31.8
2	*2480.00	110.2 AV			4.00 V	169	78.4	31.8
3	2483.50	69.5 PK	74.0	-4.5	4.00 V	169	74.8	-5.3
4	2483.50	50.0 AV	54.0	-4.0	4.00 V	169	55.3	-5.3
5	4960.00	48.3 PK	74.0	-25.7	1.11 V	275	45.9	2.4
6	4960.00	40.0 AV	54.0	-14.0	1.11 V	275	37.6	2.4

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.
5. " * ": Fundamental frequency.

RF Mode	TX BT-LE 125kbps	Channel	CH 0 : 2402 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Adair Peng	Test Date	2022/5/23

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	61.3 PK	74.0	-12.7	2.78 H	93	62.8	-1.5
2	2390.00	51.1 AV	54.0	-2.9	2.78 H	93	52.6	-1.5
3	*2402.00	117.5 PK			2.78 H	93	84.7	32.8
4	*2402.00	115.7 AV			2.78 H	93	82.9	32.8
5	4804.00	50.4 PK	74.0	-23.6	3.42 H	57	44.6	5.8
6	4804.00	40.4 AV	54.0	-13.6	3.42 H	57	34.6	5.8
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	2390.00	60.3 PK	74.0	-13.7	3.33 V	156	61.8	-1.5
2	2390.00	50.4 AV	54.0	-3.6	3.33 V	156	51.9	-1.5
3	*2402.00	112.0 PK			3.33 V	156	79.2	32.8
4	*2402.00	110.3 AV			3.33 V	156	77.5	32.8
5	4804.00	49.9 PK	74.0	-24.1	2.59 V	103	44.1	5.8
6	4804.00	40.1 AV	54.0	-13.9	2.59 V	103	34.3	5.8

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.

RF Mode	TX BT-LE 125kbps	Channel	CH 1 : 2404 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Adair Peng	Test Date	2022/5/23

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	60.8 PK	74.0	-13.2	2.79 H	117	62.3	-1.5
2	2390.00	50.3 AV	54.0	-3.7	2.79 H	117	51.8	-1.5
3	*2404.00	117.0 PK			2.79 H	117	84.2	32.8
4	*2404.00	115.5 AV			2.79 H	117	82.7	32.8
5	4808.00	50.2 PK	74.0	-23.8	3.39 H	52	44.4	5.8
6	4808.00	39.9 AV	54.0	-14.1	3.39 H	52	34.1	5.8
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	2390.00	60.0 PK	74.0	-14.0	2.42 V	161	61.5	-1.5
2	2390.00	50.8 AV	54.0	-3.2	2.42 V	161	52.3	-1.5
3	*2404.00	111.3 PK			3.42 V	161	78.5	32.8
4	*2404.00	109.8 AV			3.42 V	161	77.0	32.8
5	4808.00	49.8 PK	74.0	-24.2	2.67 V	107	44.0	5.8
6	4808.00	39.8 AV	54.0	-14.2	2.67 V	107	34.0	5.8

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.

RF Mode	TX BT-LE 125kbps	Channel	CH 19 : 2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Adair Peng	Test Date	2022/5/23

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	117.2 PK			2.69 H	127	84.4	32.8
2	*2440.00	115.7 AV			2.69 H	127	82.9	32.8
3	4880.00	50.1 PK	74.0	-23.9	3.33 H	55	44.6	5.5
4	4880.00	40.3 AV	54.0	-13.7	3.33 H	55	34.8	5.5
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	111.9 PK			3.49 V	150	79.1	32.8
2	*2440.00	110.6 AV			3.49 V	150	77.8	32.8
3	4880.00	49.7 PK	74.0	-24.3	2.58 V	97	44.2	5.5
4	4880.00	39.9 AV	54.0	-14.1	2.58 V	97	34.4	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.
5. " * ": Fundamental frequency.

RF Mode	TX BT-LE 125kbps	Channel	CH 38 : 2478 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Adair Peng	Test Date	2022/5/23

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	117.0 PK			3.15 H	120	84.1	32.9
2	*2478.00	115.4 AV			3.15 H	120	82.5	32.9
3	2483.50	67.0 PK	74.0	-7.0	3.15 H	120	68.5	-1.5
4	2483.50	52.4 AV	54.0	-1.6	3.15 H	120	53.9	-1.5
5	4956.00	50.3 PK	74.0	-23.7	3.43 H	61	44.7	5.6
6	4956.00	40.2 AV	54.0	-13.8	3.43 H	61	34.6	5.6
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	111.7 PK			3.42 V	161	78.8	32.9
2	*2478.00	109.7 AV			3.42 V	161	76.8	32.9
3	2483.50	62.9 PK	74.0	-11.1	3.42 V	161	64.4	-1.5
4	2483.50	50.8 AV	54.0	-3.2	3.42 V	161	52.3	-1.5
5	4956.00	50.0 PK	74.0	-24.0	2.66 V	101	44.4	5.6
6	4956.00	39.9 AV	54.0	-14.1	2.66 V	101	34.3	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.
5. " * ": Fundamental frequency.

RF Mode	TX BT-LE 125kbps	Channel	CH 39 : 2480 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Adair Peng	Test Date	2022/5/23

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	116.2 PK			3.17 H	135	83.3	32.9
2	*2480.00	114.6 AV			3.17 H	135	81.7	32.9
3	2483.50	73.6 PK	74.0	-0.4	3.17 H	135	75.1	-1.5
4	2483.50	53.5 AV	54.0	-0.5	3.17 H	135	55.0	-1.5
5	4960.00	50.0 PK	74.0	-24.0	3.51 H	59	44.3	5.7
6	4960.00	41.0 AV	54.0	-13.0	3.51 H	59	35.3	5.7
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	*2480.00	110.2 PK			3.46 V	159	77.3	32.9
2	*2480.00	108.4 AV			3.46 V	159	75.5	32.9
3	2483.50	67.4 PK	74.0	-6.6	3.46 V	159	68.9	-1.5
4	2483.50	53.0 AV	54.0	-1.0	3.46 V	159	54.5	-1.5
5	4960.00	49.7 PK	74.0	-24.3	2.55 V	97	44.0	5.7
6	4960.00	40.3 AV	54.0	-13.7	2.55 V	97	34.6	5.7

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.

RF Mode	TX BT-LE 2M	Channel	CH 1 : 2404 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/9

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	2365.68	57.7 PK	74.0	-16.3	2.62 H	77	63.0	-5.3
2	2365.68	46.4 AV	54.0	-7.6	2.62 H	77	51.7	-5.3
3	*2404.00	118.4 PK			2.62 H	77	86.4	32.0
4	*2404.00	116.8 AV			2.62 H	77	84.8	32.0
5	4808.00	50.9 PK	74.0	-23.1	3.83 H	38	48.8	2.1
6	4808.00	42.6 AV	54.0	-11.4	3.83 H	38	40.5	2.1
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	2365.68	57.7 PK	74.0	-16.3	3.73 V	177	63.0	-5.3
2	2365.68	44.5 AV	54.0	-9.5	3.73 V	177	49.8	-5.3
3	*2404.00	114.7 PK			3.73 V	177	82.7	32.0
4	*2404.00	113.2 AV			3.73 V	177	81.2	32.0
5	4808.00	47.7 PK	74.0	-26.3	2.37 V	61	45.6	2.1
6	4808.00	38.8 AV	54.0	-15.2	2.37 V	61	36.7	2.1

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.

RF Mode	TX BT-LE 2M	Channel	CH 19 : 2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/9

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	117.8 PK			2.74 H	75	86.0	31.8
2	*2440.00	116.5 AV			2.74 H	75	84.7	31.8
3	4880.00	51.3 PK	74.0	-22.7	3.84 H	44	49.1	2.2
4	4880.00	41.0 AV	54.0	-13.0	3.84 H	44	38.8	2.2
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	*2440.00	113.8 PK			3.61 V	174	82.0	31.8
2	*2440.00	112.4 AV			3.61 V	174	80.6	31.8
3	4880.00	47.7 PK	74.0	-26.3	2.36 V	81	45.5	2.2
4	4880.00	37.8 AV	54.0	-16.2	2.36 V	81	35.6	2.2

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.

RF Mode	TX BT-LE 2M	Channel	CH 38 : 2478 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Wade Huang	Test Date	2022/4/9

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	118.1 PK			2.45 H	77	86.3	31.8
2	*2478.00	116.9 AV			2.45 H	77	85.1	31.8
3	2483.50	67.5 PK	74.0	-6.5	2.45 H	77	72.8	-5.3
4	2483.50	51.3 AV	54.0	-2.7	2.45 H	77	56.6	-5.3
5	4956.00	51.1 PK	74.0	-22.9	3.71 H	56	48.8	2.3
6	4956.00	41.8 AV	54.0	-12.2	3.71 H	56	39.5	2.3
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	116.2 PK			4.00 V	183	84.4	31.8
2	*2478.00	113.9 AV			4.00 V	183	82.1	31.8
3	2483.50	67.4 PK	74.0	-6.6	4.00 V	183	72.7	-5.3
4	2483.50	50.5 AV	54.0	-3.5	4.00 V	183	55.8	-5.3
5	4956.00	49.0 PK	74.0	-25.0	1.06 V	272	46.7	2.3
6	4956.00	38.7 AV	54.0	-15.3	1.06 V	272	36.4	2.3

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.
5. " * ": Fundamental frequency.

9 kHz ~ 1 GHz Worst-Case Data:

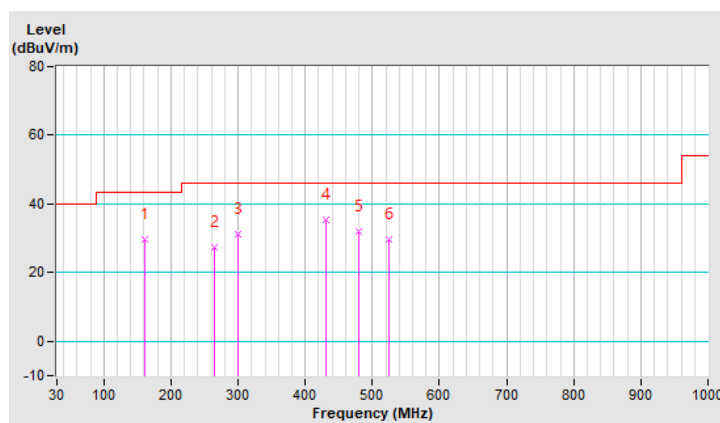
RF Mode	TX BT-LE 1M	Channel	CH 1 : 2404 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Wade Huang	Test Date	2022/4/11

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	160.95	29.69 QP	43.50	-13.81	1.49 H	87	43.01	-13.32
2	264.74	27.56 QP	46.00	-18.44	1.01 H	235	41.75	-14.19
3	300.63	31.08 QP	46.00	-14.92	1.01 H	183	44.10	-13.02
4	431.58	35.24 QP	46.00	-10.76	1.99 H	120	44.77	-9.53
5	479.11	31.99 QP	46.00	-14.01	1.99 H	97	40.63	-8.64
6	525.67	29.60 QP	46.00	-16.40	1.01 H	324	37.20	-7.60

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 emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

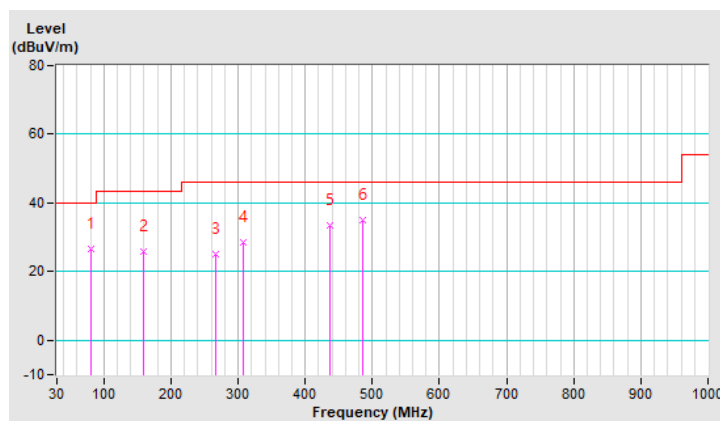


RF Mode	TX BT-LE 1M	Channel	CH 1 : 2404 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Wade Huang	Test Date	2022/4/11

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	80.44	26.44 QP	40.00	-13.56	1.01 V	184	44.84	-18.40
2	159.01	25.80 QP	43.50	-17.70	1.01 V	357	39.03	-13.23
3	265.71	25.13 QP	46.00	-20.87	1.01 V	31	39.26	-14.13
4	308.39	28.46 QP	46.00	-17.54	1.51 V	179	41.28	-12.82
5	436.43	33.54 QP	46.00	-12.46	1.01 V	122	42.84	-9.30
6	485.90	34.92 QP	46.00	-11.08	2.00 V	165	43.44	-8.52

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 emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

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

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESR3	102412	Jan. 22, 2022	Jan. 21, 2023
RF Coaxial Cable WORKEN	5D-FB	Cable-cond2-01	Sep. 4, 2021	Sep. 3, 2022
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Feb. 17, 2022	Feb. 16, 2023
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Sep. 17, 2021	Sep. 16, 2022
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Shielded Room 2.
 3. The VCCI Site Registration No. is C-12047.

4.2.3 Test Procedures

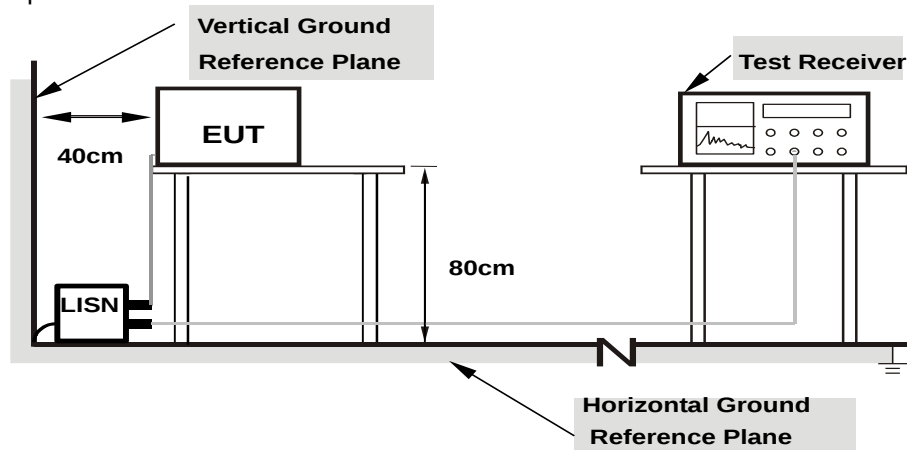
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling impedance 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.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

4.2.6 EUT Operating Conditions

- Placed the EUT on the testing table.
- Set the EUT under transmission condition continuously at specific channel frequency.

4.2.7 Test Results

CONDUCTED WORST-CASE DATA

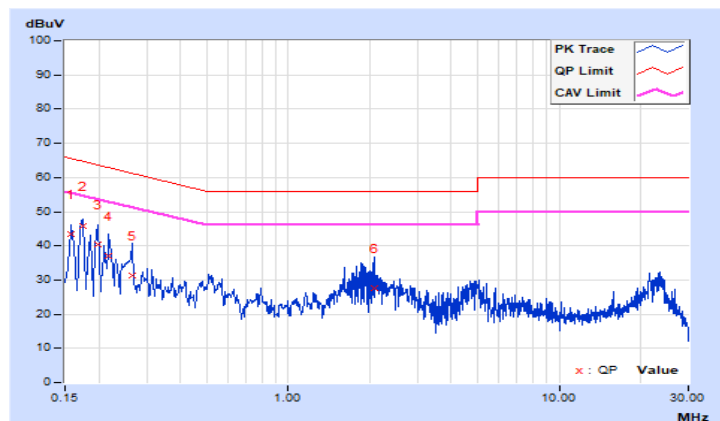
Mode A

Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 69% RH
Tested by	Wade Huang	Test Date	2022/4/11

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	0.15800	10.13	33.31	16.95	43.44	27.08	65.57	55.57	-22.13	-28.49
2	0.17384	10.13	35.56	17.93	45.69	28.06	64.77	54.77	-19.08	-26.71
3	0.19800	10.14	30.39	14.17	40.53	24.31	63.69	53.69	-23.16	-29.38
4	0.21800	10.14	26.91	11.87	37.05	22.01	62.89	52.89	-25.84	-30.88
5	0.26600	10.15	21.31	8.89	31.46	19.04	61.24	51.24	-29.78	-32.20
6	2.07400	10.22	17.50	7.57	27.72	17.79	56.00	46.00	-28.28	-28.21

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

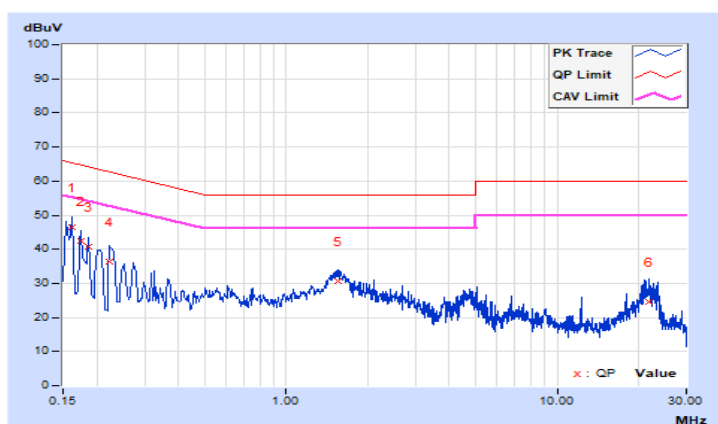


Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 69% RH
Tested by	Wade Huang	Test Date	2022/4/11

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	0.16200	10.14	36.45	19.59	46.59	29.73	65.36	55.36	-18.77	-25.63
2	0.17400	10.14	32.27	14.92	42.41	25.06	64.77	54.77	-22.36	-29.71
3	0.18600	10.15	30.67	15.56	40.82	25.71	64.21	54.21	-23.39	-28.50
4	0.22200	10.15	26.27	11.84	36.42	21.99	62.74	52.74	-26.32	-30.75
5	1.54600	10.22	20.58	16.00	30.80	26.22	56.00	46.00	-25.20	-19.78
6	21.91000	10.48	14.03	3.32	24.51	13.80	60.00	50.00	-35.49	-36.20

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



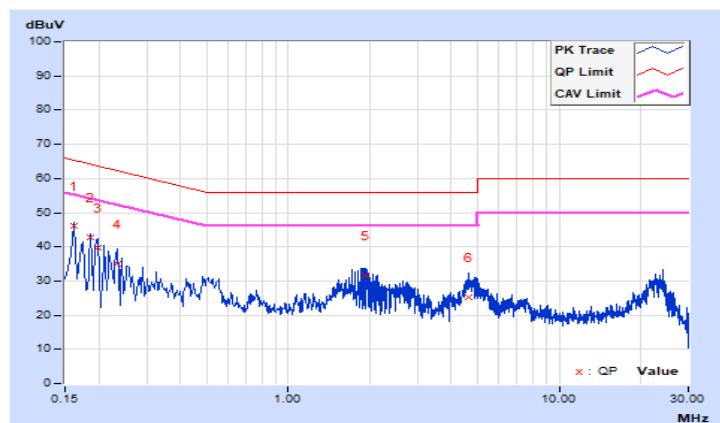
Mode B

Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 69% RH
Tested by	Wade Huang	Test Date	2022/4/11

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	0.16200	10.13	35.98	19.92	46.11	30.05	65.36	55.36	-19.25	-25.31
2	0.18600	10.14	32.64	15.94	42.78	26.08	64.21	54.21	-21.43	-28.13
3	0.19780	10.14	29.46	13.53	39.60	23.67	63.70	53.70	-24.10	-30.03
4	0.23400	10.14	24.80	10.24	34.94	20.38	62.31	52.31	-27.37	-31.93
5	1.93800	10.22	21.27	11.15	31.49	21.37	56.00	46.00	-24.51	-24.63
6	4.63000	10.25	14.97	5.54	25.22	15.79	56.00	46.00	-30.78	-30.21

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

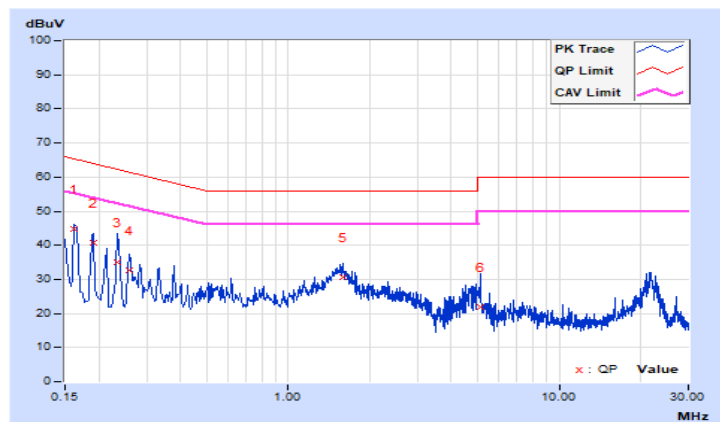


Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 69% RH
Tested by	Wade Huang	Test Date	2022/4/11

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	0.16200	10.14	34.57	20.33	44.71	30.47	65.36	55.36	-20.65	-24.89
2	0.19000	10.15	30.56	14.34	40.71	24.49	64.04	54.04	-23.33	-29.55
3	0.23400	10.15	24.73	10.44	34.88	20.59	62.31	52.31	-27.43	-31.72
4	0.25800	10.16	22.58	10.14	32.74	20.30	61.50	51.50	-28.76	-31.20
5	1.59793	10.22	20.32	15.75	30.54	25.97	56.00	46.00	-25.46	-20.03
6	5.12200	10.28	11.52	4.55	21.80	14.83	60.00	50.00	-38.20	-35.17

Remarks:

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

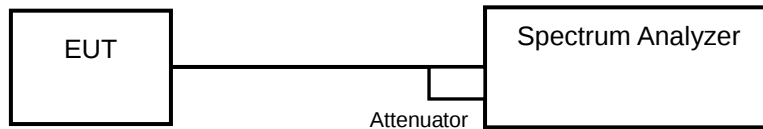


4.3 Number of Hopping Frequency Used

4.3.1 Limits of Hopping Frequency Used Measurement

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

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 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 on MaxHold 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.

4.3.5 Deviation from Test Standard

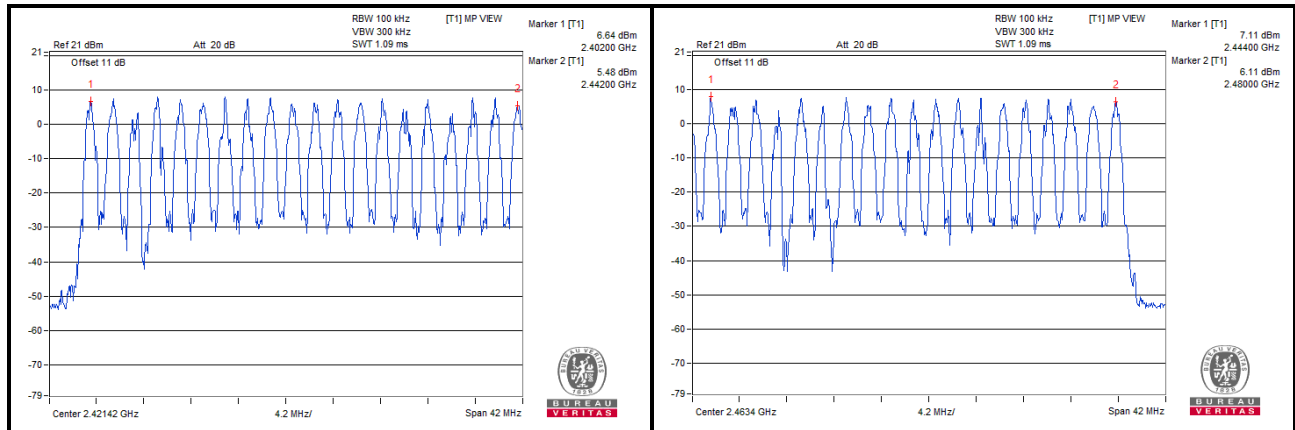
No deviation.

4.3.6 Test Results

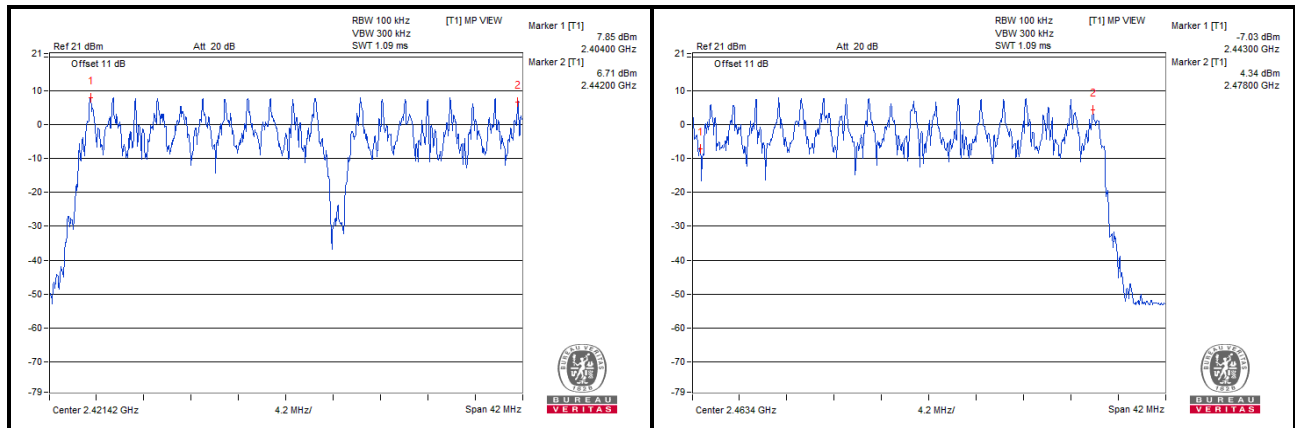
There are 39 hopping frequencies (for LE 1M) and 37 hopping frequencies (for LE 2M) in the hopping mode. Please refer to next page for the test result. On the plots, it shows that the hopping frequencies are equally spaced.

Mode A

<1MBaud PHY>

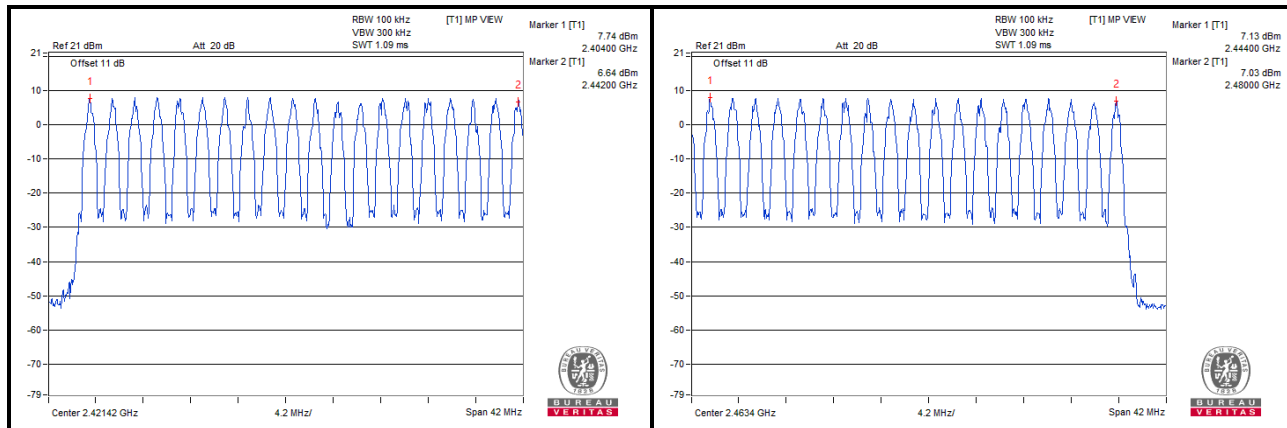


<2MBaud PHY>

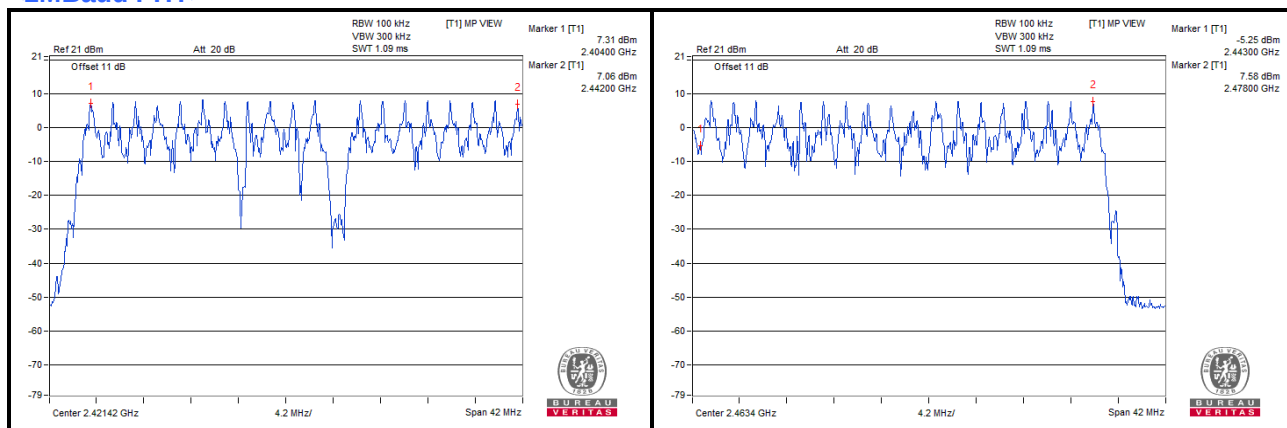


Mode B

<1MBaud PHY>



<2MBaud PHY>

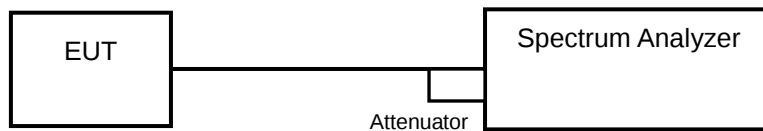


4.4 Dwell Time on Each Channel

4.4.1 Limits of Dwell Time on Each Channel Measurement

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.

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

- 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. 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.
- d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
- e. Repeat above procedures until all different time-slot modes have been completed.

4.4.5 Deviation from Test Standard

No deviation.

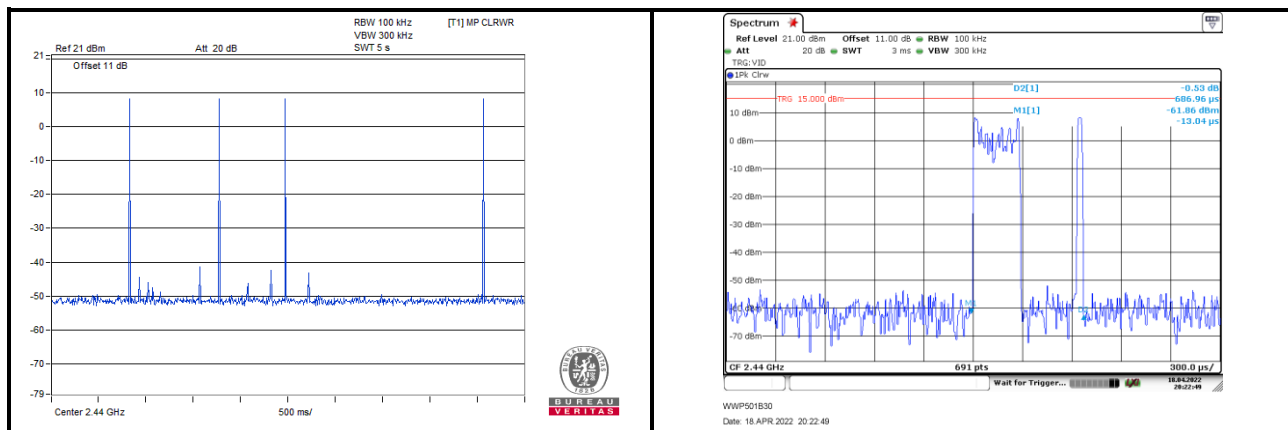
4.4.6 Test Results

Mode A

<1MBaud PHY>

Mode	Number of Transmission in a 16 sec	Length of Transmission Time (msec)	Result (msec)	Limit (msec)
Hopping	4 (times / 5 sec) * 3.2 = 13 times	0.68696	8.93048	400

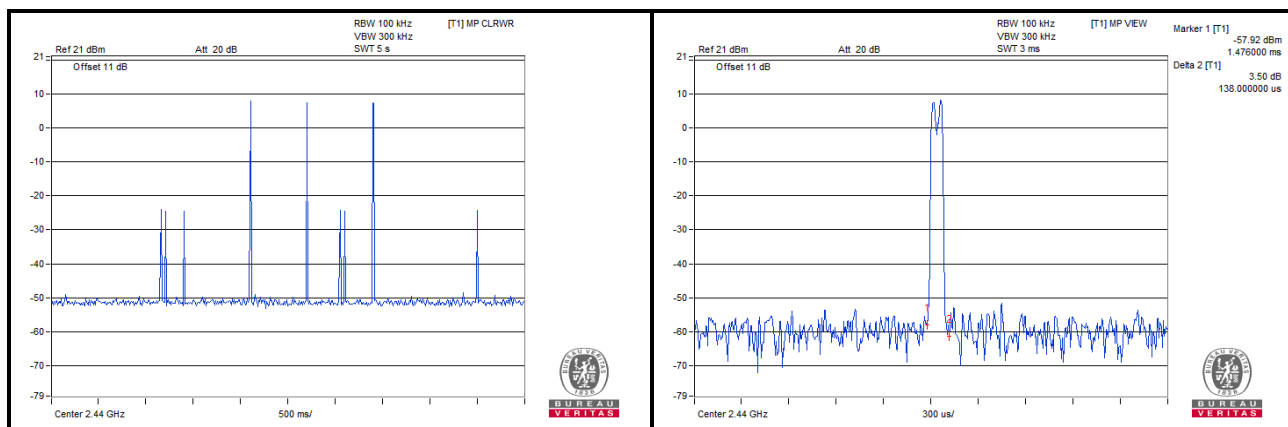
Note: Test plots of the transmitting time slot are shown as below.



<2MBaud PHY>

Mode	Number of Transmission in a 14.8 sec	Length of Transmission Time (msec)	Result (msec)	Limit (msec)
Hopping	3 (times / 5 sec) * 2.96 = 9 times	0.138	1.242	400

Note: Test plots of the transmitting time slot are shown as below.

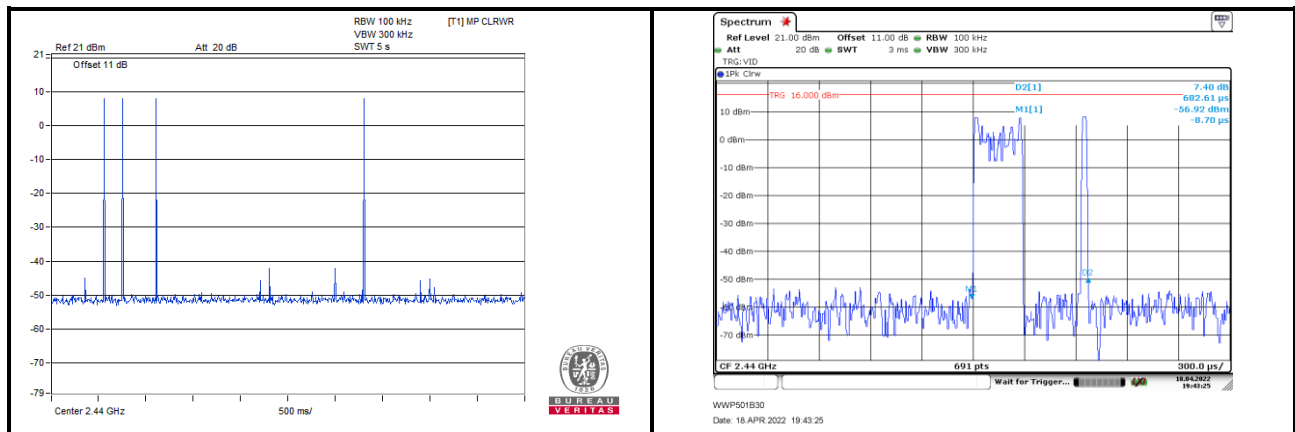


Mode B

<1MBaud PHY>

Mode	Number of Transmission in a 16 sec	Length of Transmission Time (msec)	Result (msec)	Limit (msec)
Hopping	4 (times / 5 sec) * 3.2 = 13 times	0.68261	8.8739	400

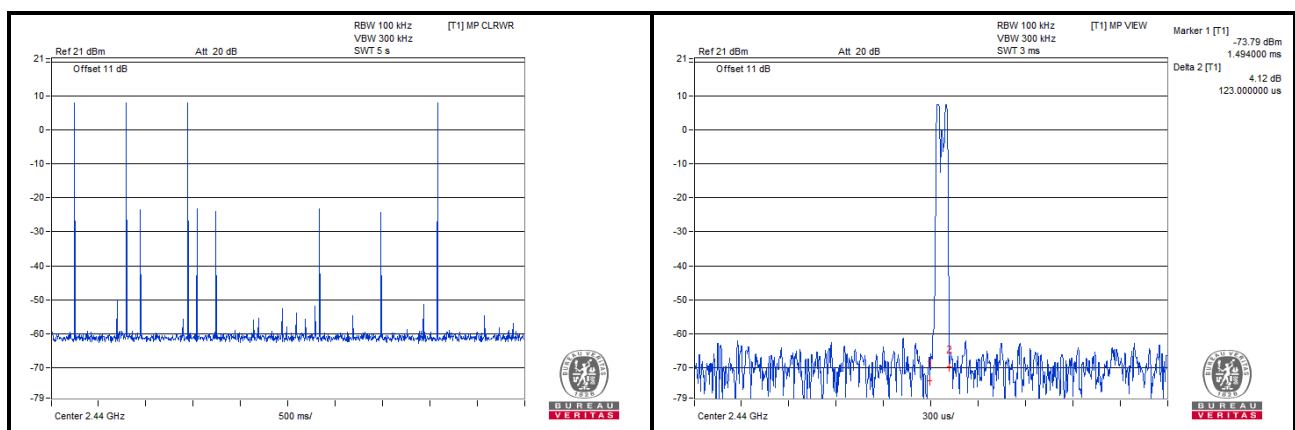
Note: Test plots of the transmitting time slot are shown as below.



<2MBaud PHY>

Mode	Number of Transmission in a 14.8 sec	Length of Transmission Time (msec)	Result (msec)	Limit (msec)
Hopping	4 (times / 5 sec) * 2.96 = 12 times	0.123	1.476	400

Note: Test plots of the transmitting time slot are shown as below.

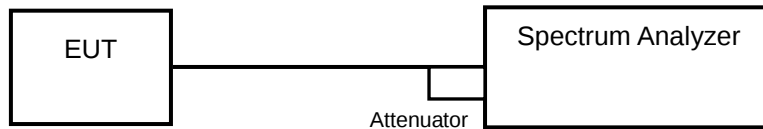


4.5 Channel Bandwidth

4.5.1 Limits of Channel Bandwidth Measurement

Maximum bandwidth is not specified.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 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.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

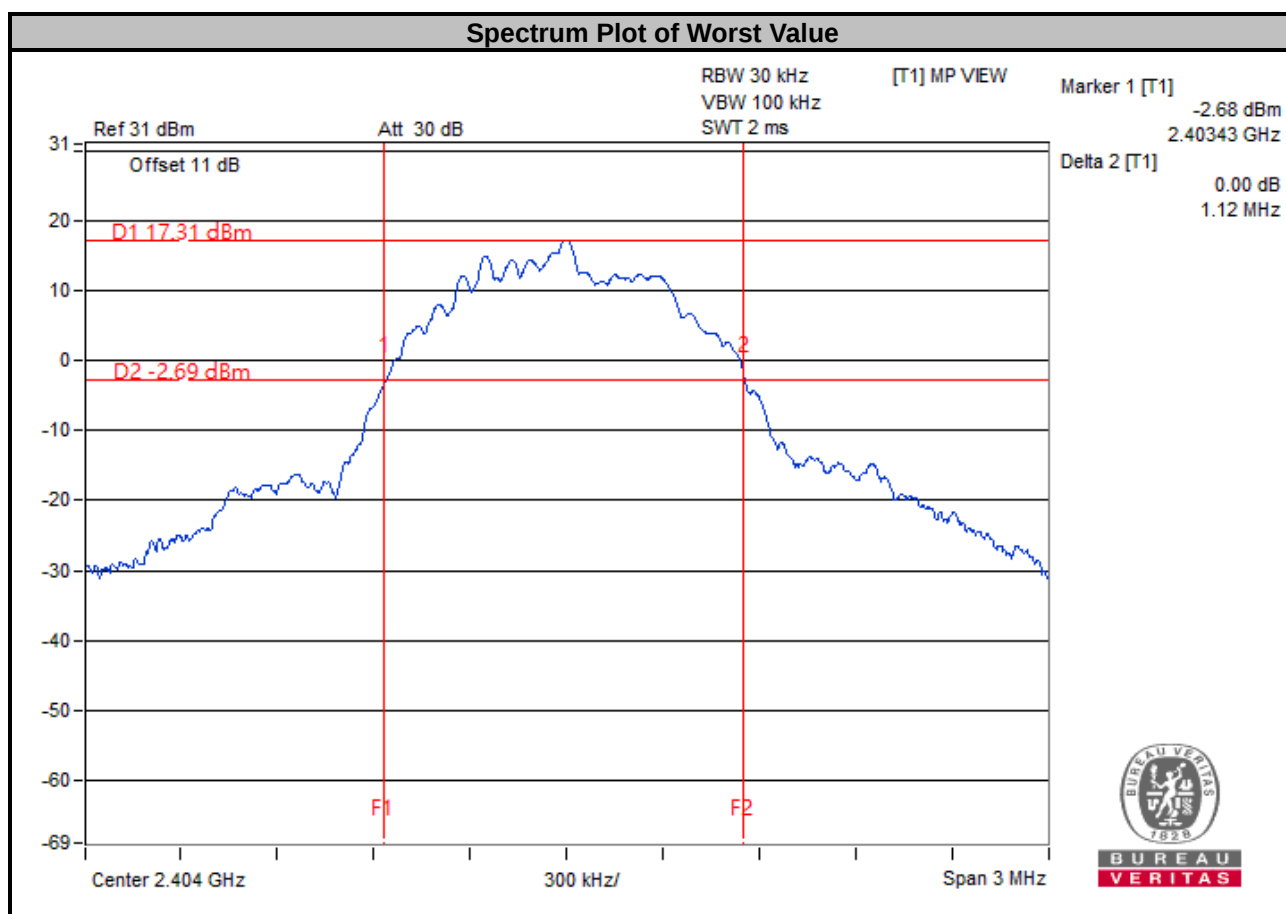
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.5.7 Test Results

Mode A

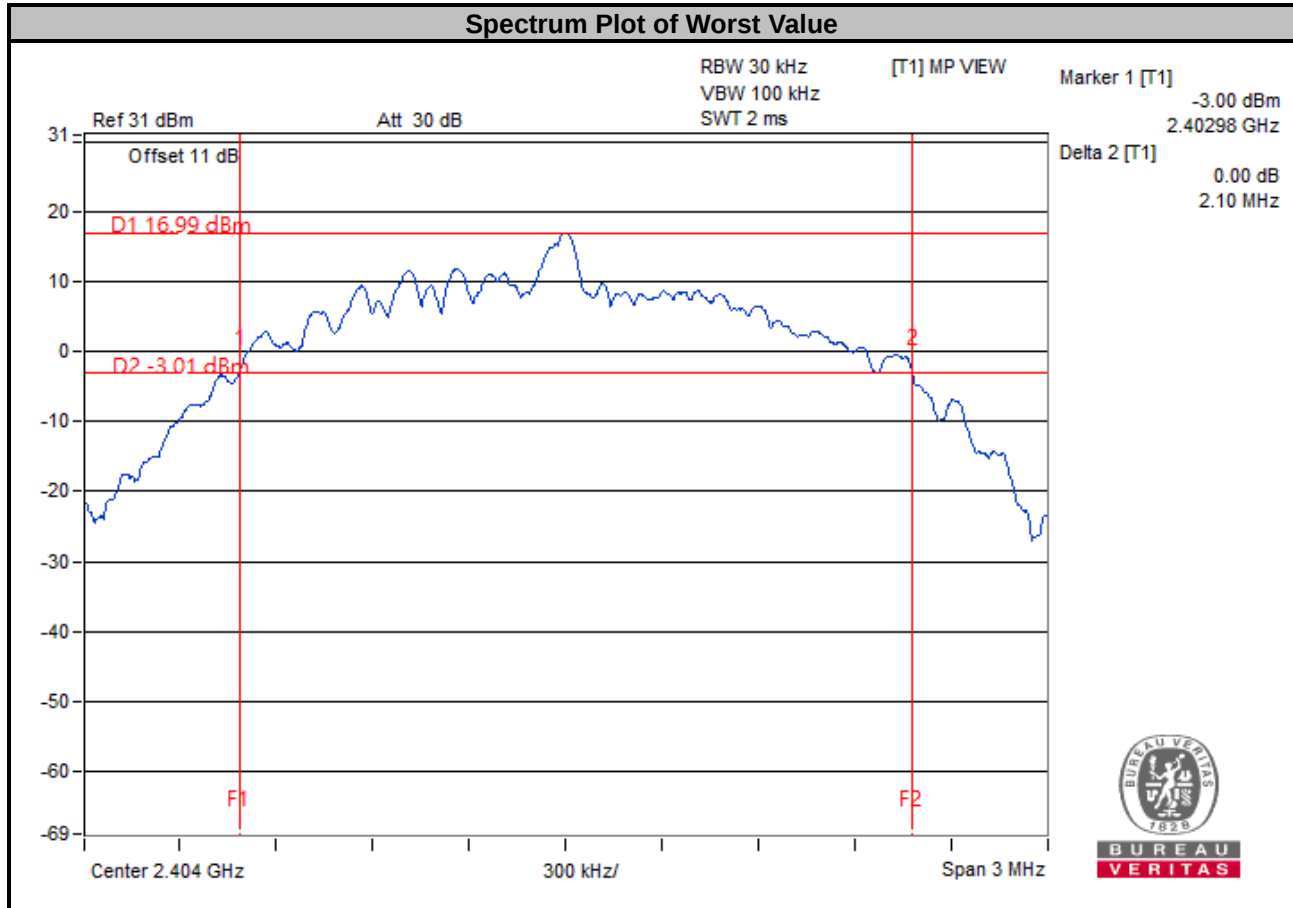
<1MBaud PHY>

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
0	2402	1.11
1	2404	1.12
19	2440	1.12
38	2478	1.12
39	2480	1.12



<2MBaud PHY>

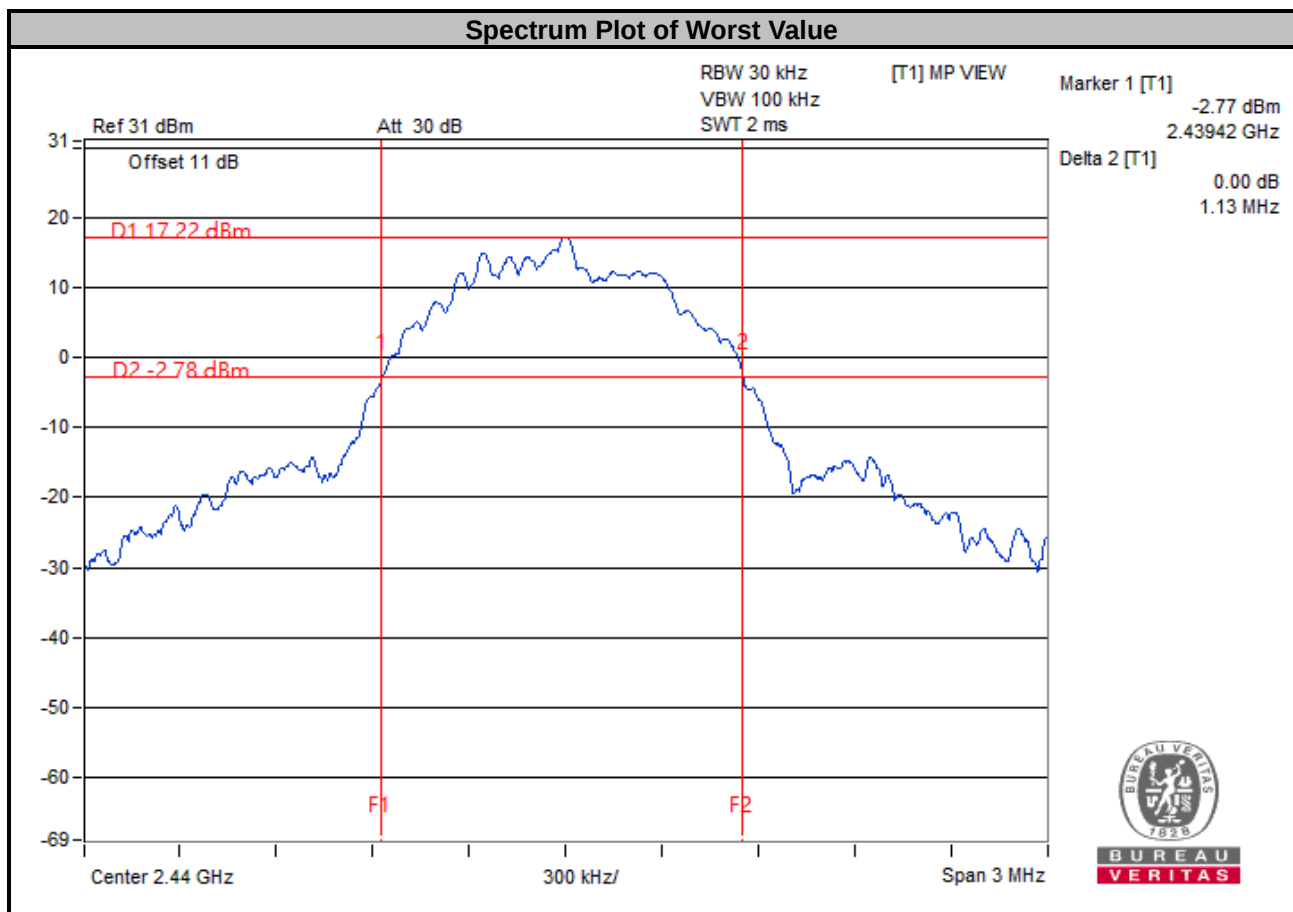
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
1	2404	2.10
19	2440	2.10
38	2478	2.10



Mode B

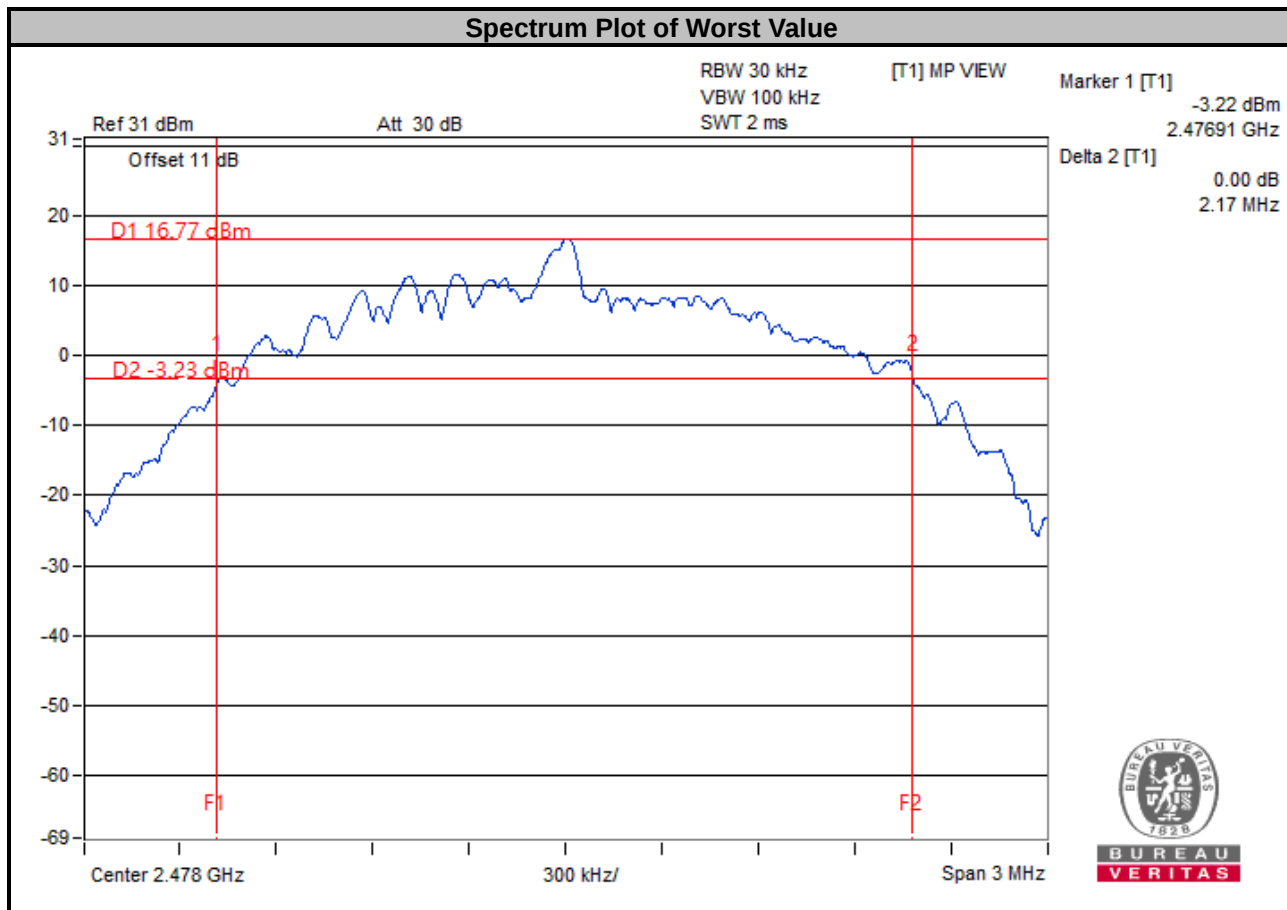
<1MBaud PHY>

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
0	2402	1.12
1	2404	1.12
19	2440	1.13
38	2478	1.12
39	2480	1.12



<2MBaud PHY>

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
1	2404	2.10
19	2440	2.10
38	2478	2.17

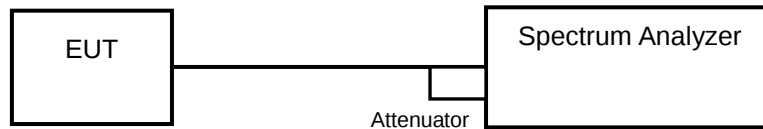


4.6 Hopping Channel Separation

4.6.1 Limits of Hopping Channel Separation Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

Measurement Procedure REF

- 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.
- By using the MaxHold function record the separation of two adjacent channels.
- Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
- Repeat above procedures until all frequencies measured were complete.

4.6.5 Deviation from Test Standard

No deviation.

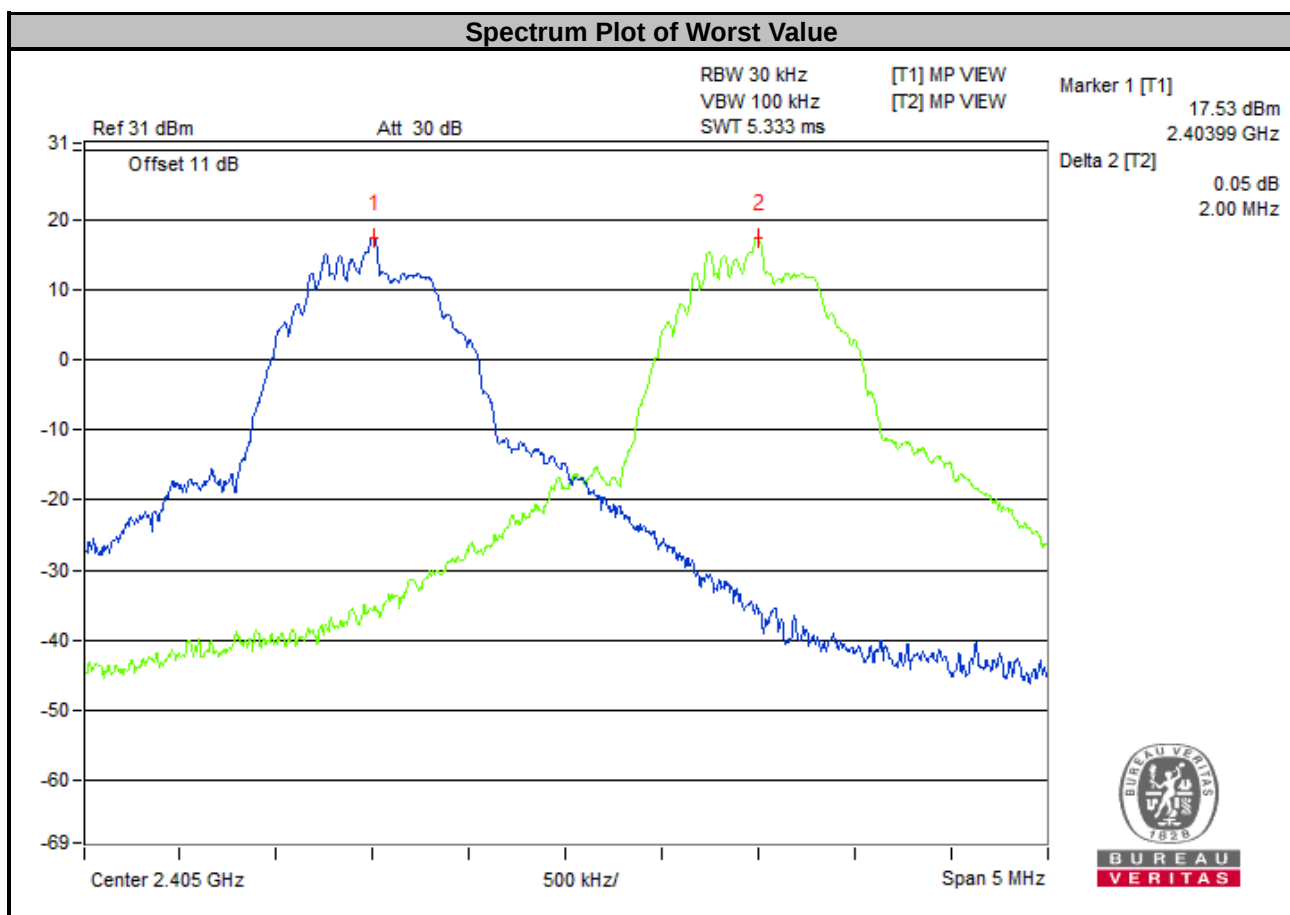
4.6.6 Test Results

Mode A

<1MBaud PHY>

Channel	Freq. (MHz)	Adjacent Channel Separation (MHz)	20 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
0	2402	2.00	1.11	0.74	Pass
1	2404	2.00	1.12	0.75	Pass
19	2440	2.00	1.12	0.75	Pass
38	2478	2.00	1.12	0.75	Pass
39	2480	2.00	1.12	0.75	Pass

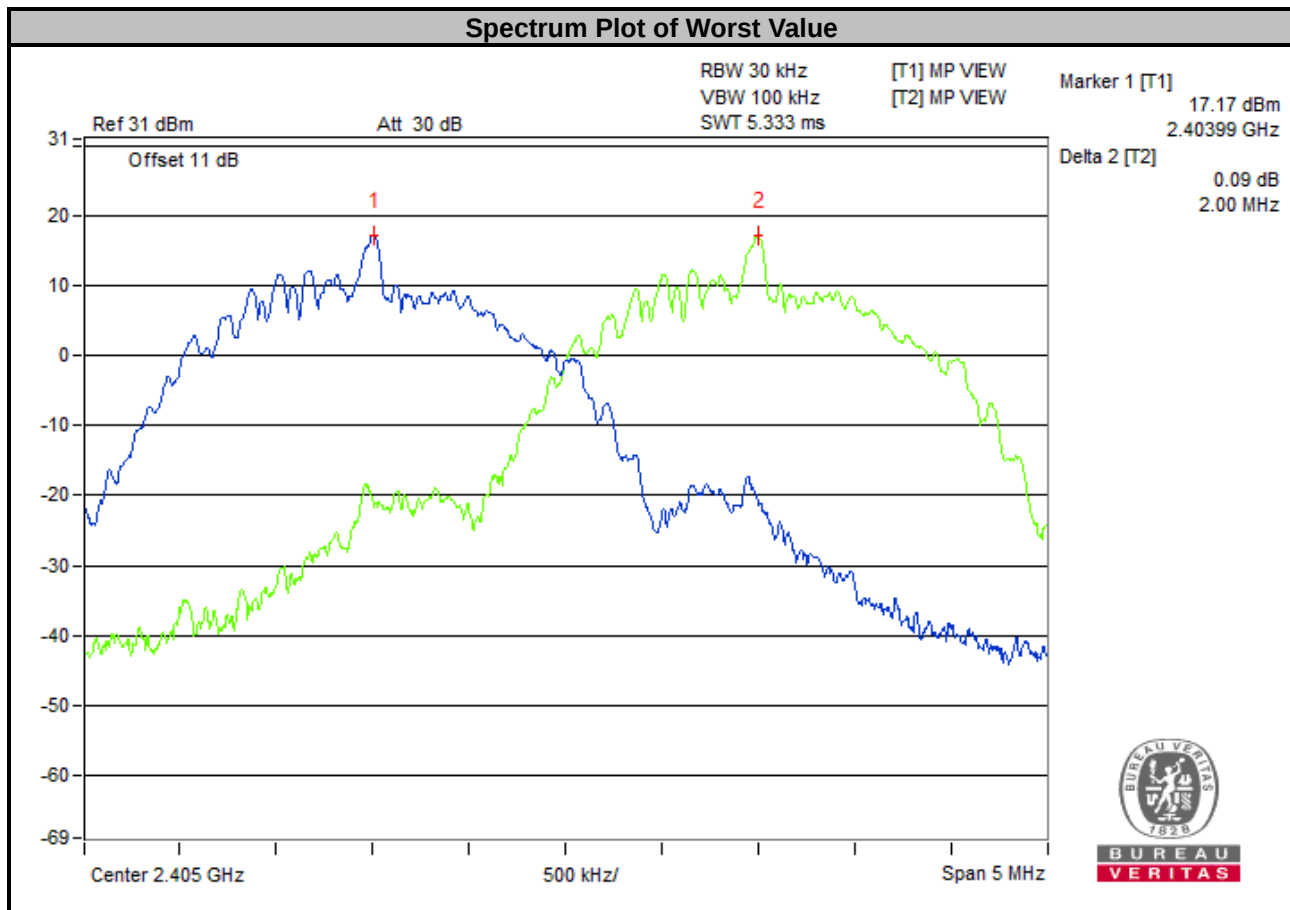
Note: The minimum limit is two-third 20 dB bandwidth.



<2MBaud PHY>

Channel	Freq. (MHz)	Adjacent Channel Separation (MHz)	20 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2404	2.00	2.10	1.4	Pass
19	2440	2.00	2.10	1.4	Pass
38	2478	2.00	2.10	1.4	Pass

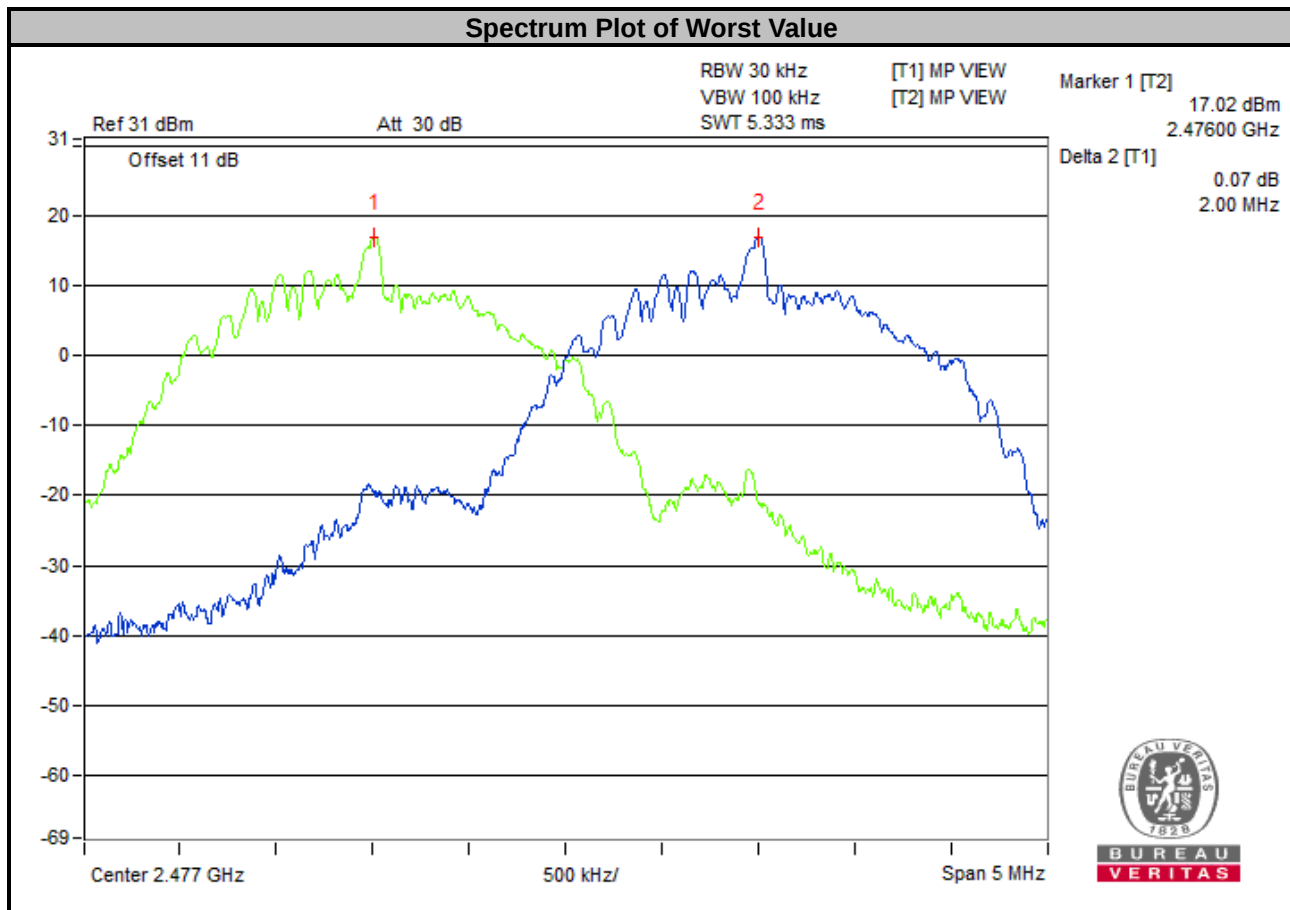
Note: The minimum limit is two-third 20 dB bandwidth.



<2MBaud PHY>

Channel	Freq. (MHz)	Adjacent Channel Separation (MHz)	20 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2404	2.00	2.10	1.40	Pass
19	2440	2.00	2.10	1.40	Pass
38	2478	2.00	2.17	1.45	Pass

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



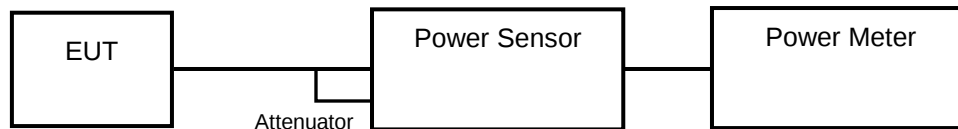
4.7 Maximum Output Power

4.7.1 Limits of Maximum Output Power Measurement

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels: 1 watt.

For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedures

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 sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.7.7 Test Results

Mode A

<1MBaud PHY with 1Mbps >

Channel	Freq. (MHz)	Peak Power		Average Power		Power Limit (mW)	Pass / Fail
		(mW)	(dBm)	(mW)	(dBm)		
0	2402	96.383	19.84	92.683	19.67	125 / 1000 Note	Pass
1	2404	95.719	19.81	92.257	19.65	125 / 1000 Note	Pass
19	2440	94.842	19.77	91.411	19.61	125 / 1000 Note	Pass
38	2478	93.325	19.70	89.95	19.54	125 / 1000 Note	Pass
39	2480	51.286	17.10	50.119	17.00	125 / 1000 Note	Pass

Note: RF Output Power limit depends on the operating channel numbers, please refer to section 4.3 of the results.

<1MBaud PHY with 125kbps>

Channel	Freq. (MHz)	Peak Power		Average Power		Power Limit (mW)	Pass / Fail
		(mW)	(dBm)	(mW)	(dBm)		
0	2402	95.94	19.82	92.47	19.66	125 / 1000 Note	Pass
1	2404	95.28	19.79	91.833	19.63	125 / 1000 Note	Pass
19	2440	94.406	19.75	91.201	19.60	125 / 1000 Note	Pass
38	2478	92.683	19.67	89.536	19.52	125 / 1000 Note	Pass
39	2480	87.096	19.40	83.56	19.22	125 / 1000 Note	Pass

Note: RF Output Power limit depends on the operating channel numbers, please refer to section 4.3 of the results.

<2MBaud PHY>

Channel	Freq. (MHz)	Peak Power		Average Power		Power Limit (mW)	Pass / Fail
		(mW)	(dBm)	(mW)	(dBm)		
1	2404	96.605	19.85	93.111	19.69	125 / 1000 Note	Pass
19	2440	95.719	19.81	92.045	19.64	125 / 1000 Note	Pass
38	2478	93.756	19.72	90.365	19.56	125 / 1000 Note	Pass

Note: RF Output Power limit depends on the operating channel numbers, please refer to section 4.3 of the results.

Mode B

<1MBaud PHY with 1Mbps >

Channel	Freq. (MHz)	Peak Power		Average Power		Power Limit (mW)	Pass / Fail
		(mW)	(dBm)	(mW)	(dBm)		
0	2402	94.842	19.77	91.622	19.62	125 / 1000 ^{Note}	Pass
1	2404	94.406	19.75	91.411	19.61	125 / 1000 ^{Note}	Pass
19	2440	93.325	19.70	90.365	19.56	125 / 1000 ^{Note}	Pass
38	2478	92.897	19.68	89.95	19.54	125 / 1000 ^{Note}	Pass
39	2480	50.119	17.00	48.978	16.90	125 / 1000 ^{Note}	Pass

Note: RF Output Power limit depends on the operating channel numbers, please refer to section 4.3 of the results.

<1MBaud PHY with 125kbps>

Channel	Freq. (MHz)	Peak Power		Average Power		Power Limit (mW)	Pass / Fail
		(mW)	(dBm)	(mW)	(dBm)		
0	2402	93.972	19.73	90.782	19.58	125 / 1000 ^{Note}	Pass
1	2404	93.541	19.71	90.573	19.57	125 / 1000 ^{Note}	Pass
19	2440	93.111	19.69	89.95	19.54	125 / 1000 ^{Note}	Pass
38	2478	92.683	19.67	89.536	19.52	125 / 1000 ^{Note}	Pass
39	2480	82.794	19.18	81.658	19.12	125 / 1000 ^{Note}	Pass

Note: RF Output Power limit depends on the operating channel numbers, please refer to section 4.3 of the results.

<2MBaud PHY>

Channel	Freq. (MHz)	Peak Power		Average Power		Power Limit (mW)	Pass / Fail
		(mW)	(dBm)	(mW)	(dBm)		
1	2404	94.406	19.75	91.411	19.61	125 / 1000 ^{Note}	Pass
19	2440	93.756	19.72	90.573	19.57	125 / 1000 ^{Note}	Pass
38	2478	93.325	19.70	89.95	19.54	125 / 1000 ^{Note}	Pass

Note: RF Output Power limit depends on the operating channel numbers, please refer to section 4.3 of the results.

4.8 Conducted Out of Band Emission Measurement

4.8.1 Limits Of Conducted Out of Band Emission Measurement

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

4.8.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.8.3 Test Procedure

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100 kHz and 300 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

4.8.4 Deviation from Test Standard

No deviation.

4.8.5 EUT Operating Condition

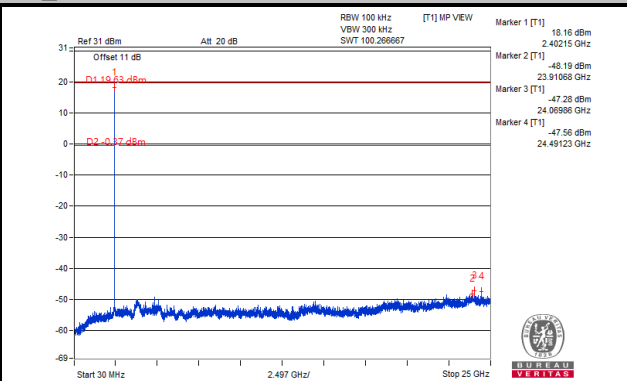
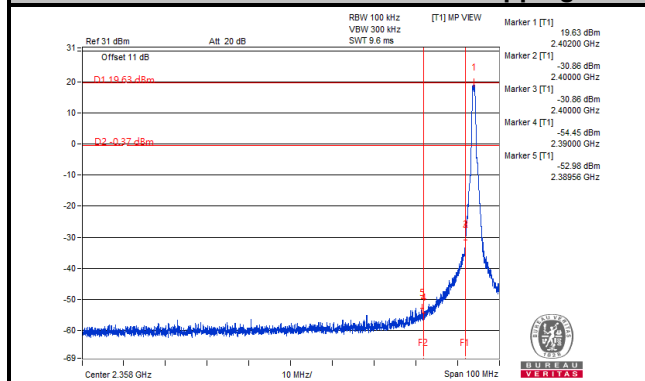
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.8.6 Test Results

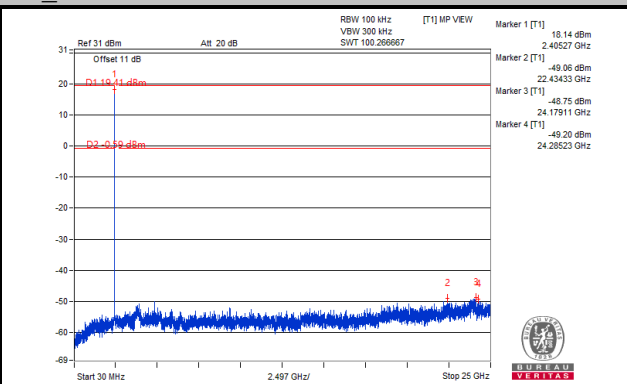
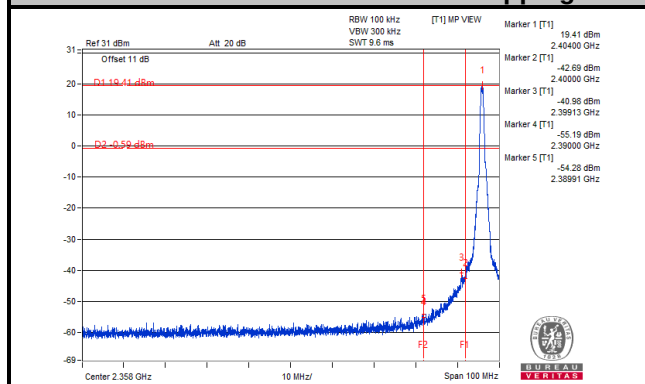
The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 20 dB offset below D1. It shows compliance with the requirement.

Mode A
<1Mbaud PHY>

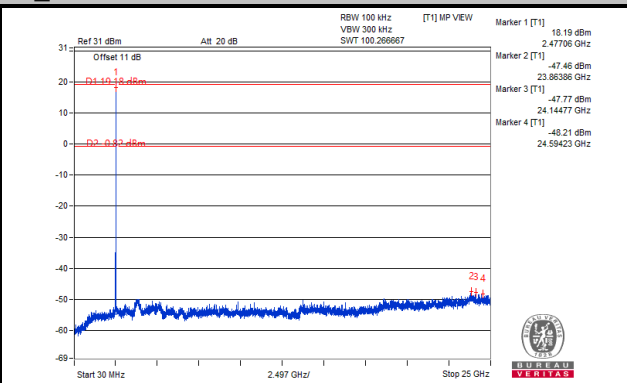
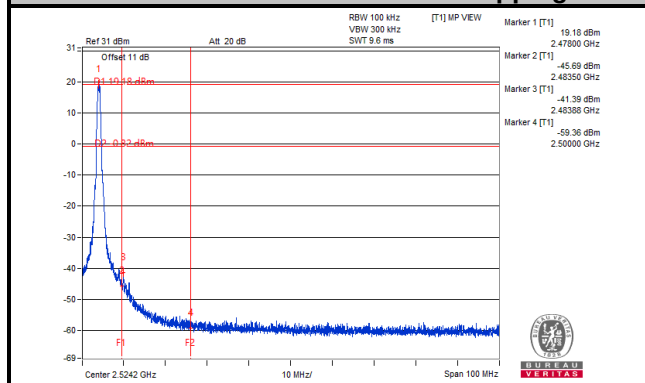
Hopping Disabled_Channel 0



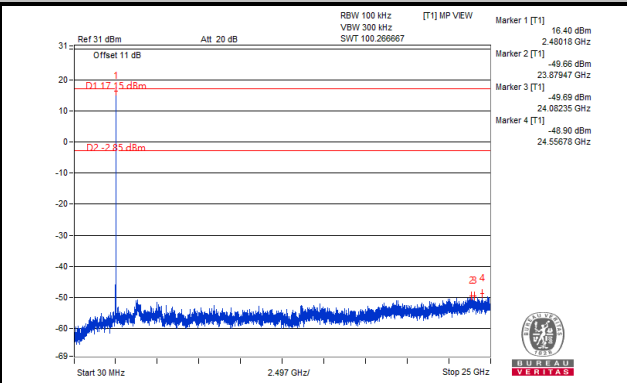
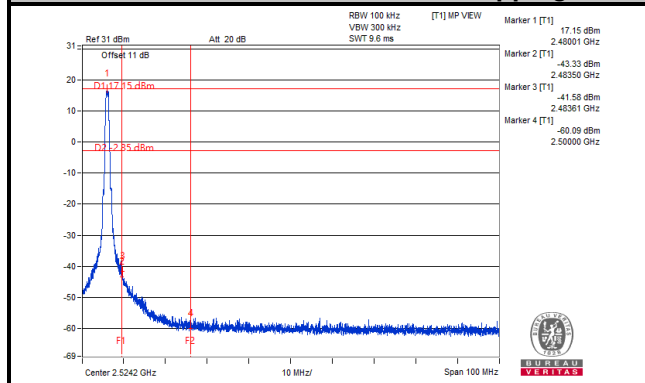
Hopping Disabled_Channel 1



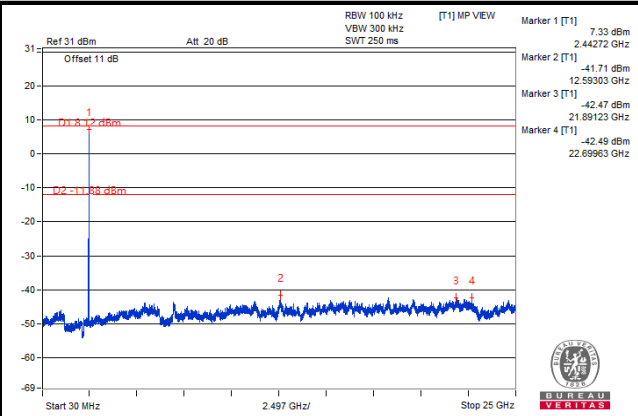
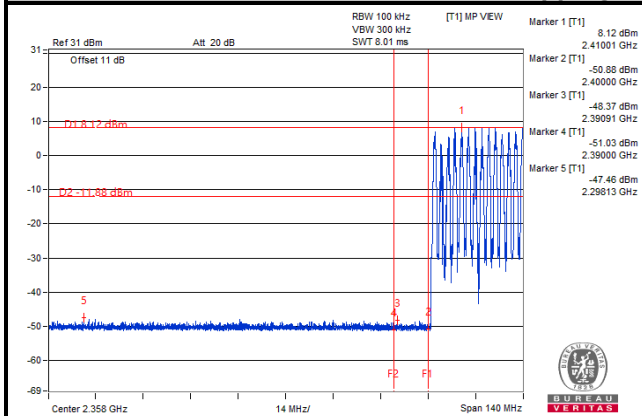
Hopping Disabled_Channel 38



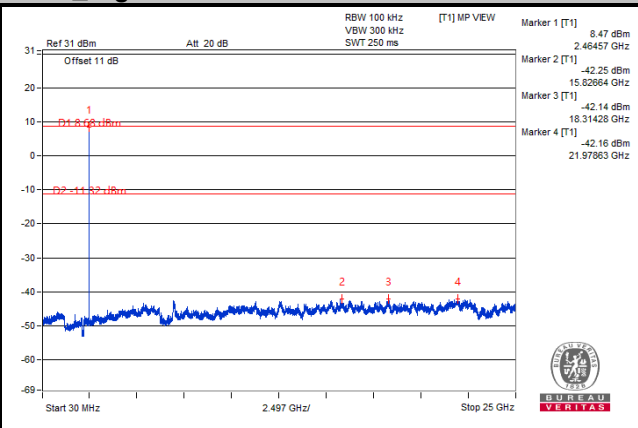
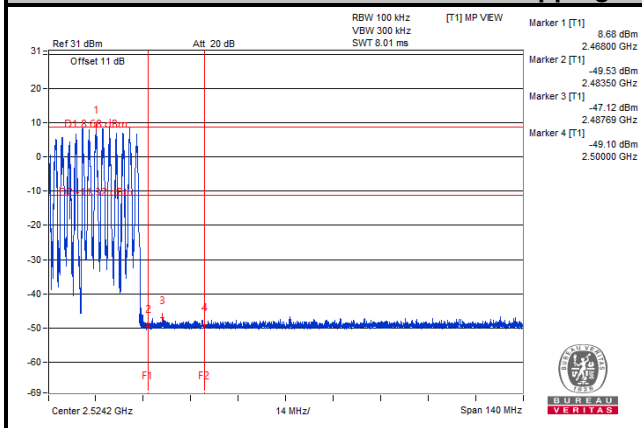
Hopping Disabled_Channel 39



Hopping Enabled_Low

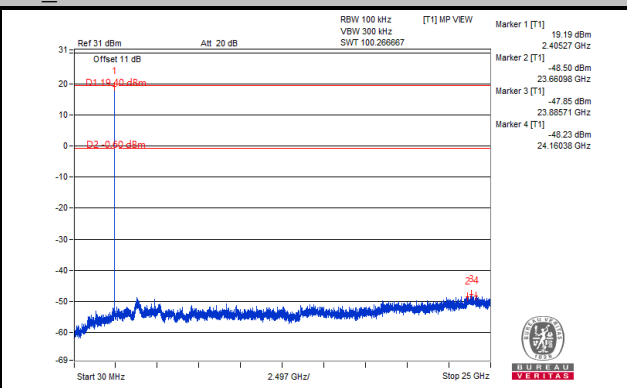
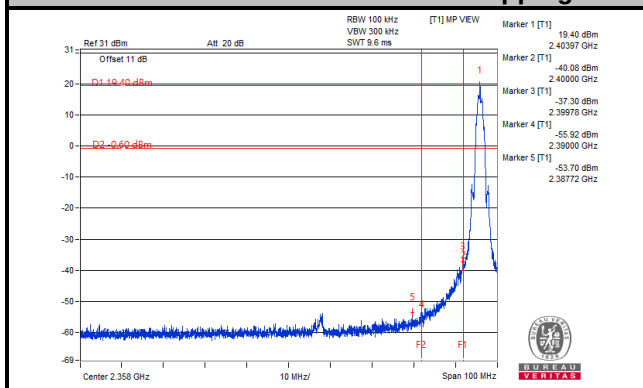


Hopping Enabled_High

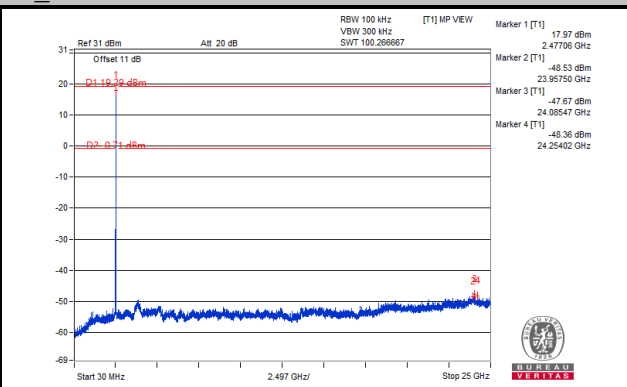
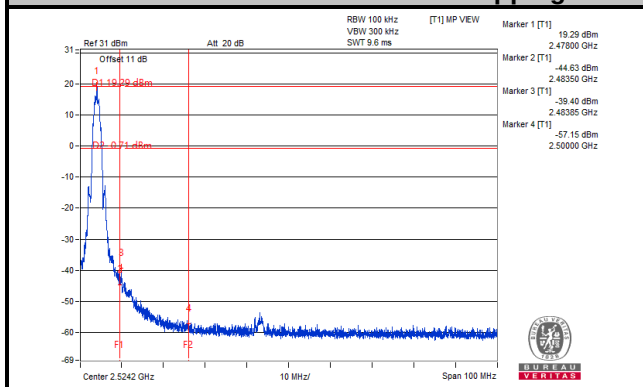


<2MBaud PHY>

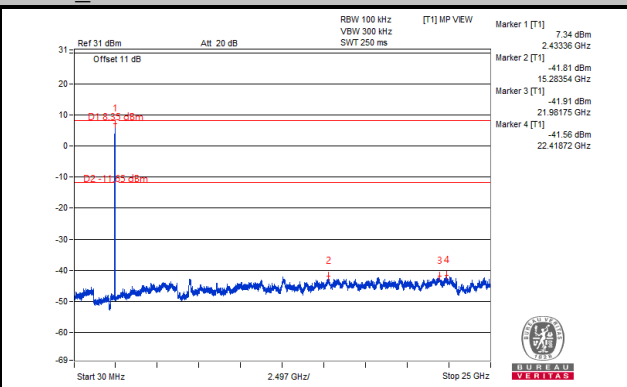
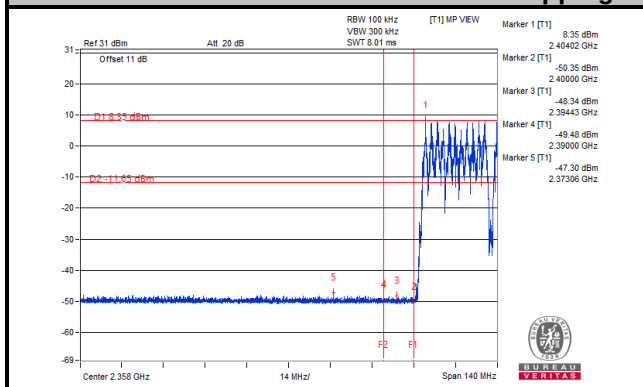
Hopping Disabled_Channel 1



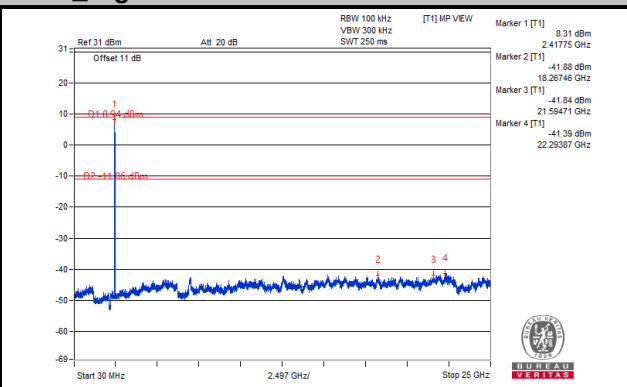
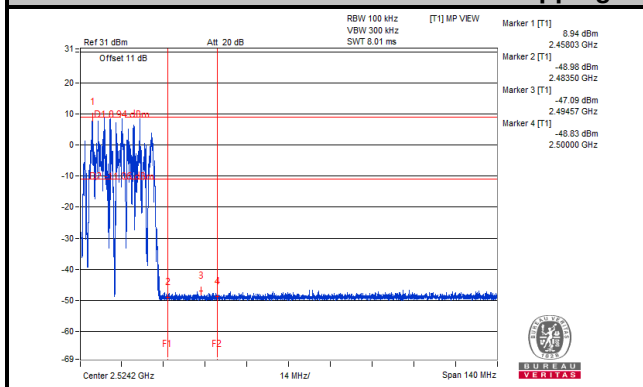
Hopping Disabled_Channel 38



Hopping Enabled_Low

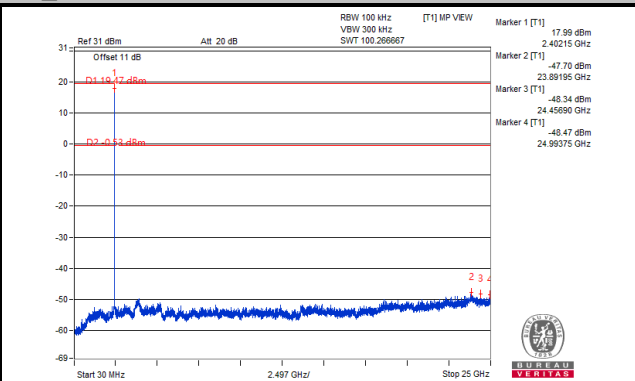
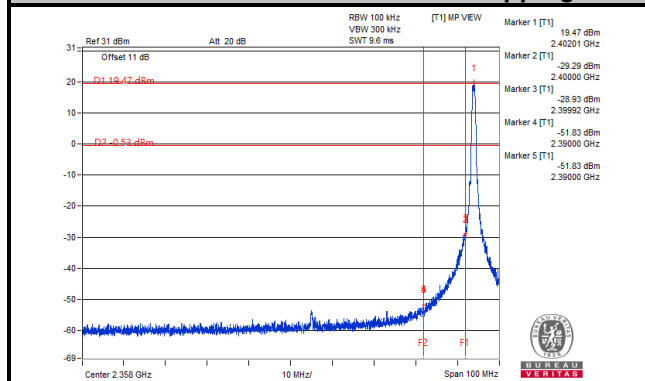


Hopping Enabled_High

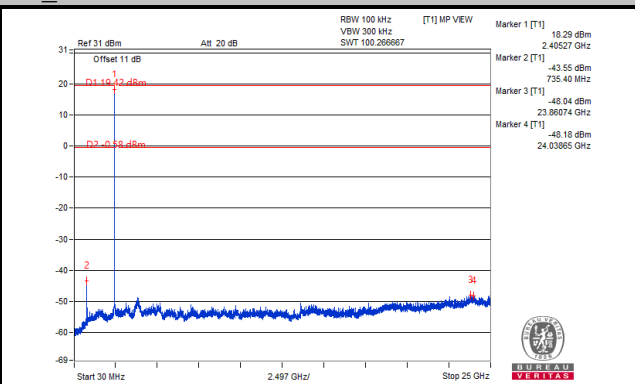
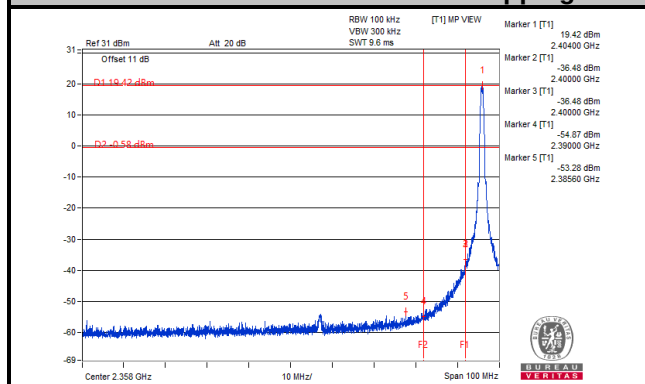


Mode B
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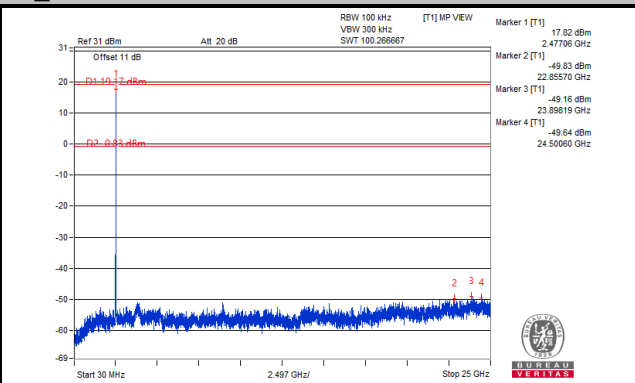
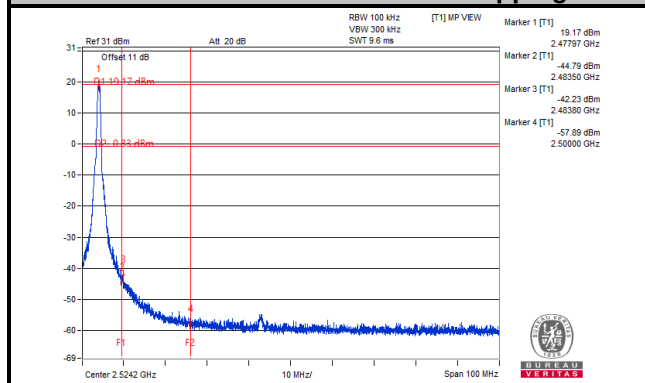
Hopping Disabled_Channel 0



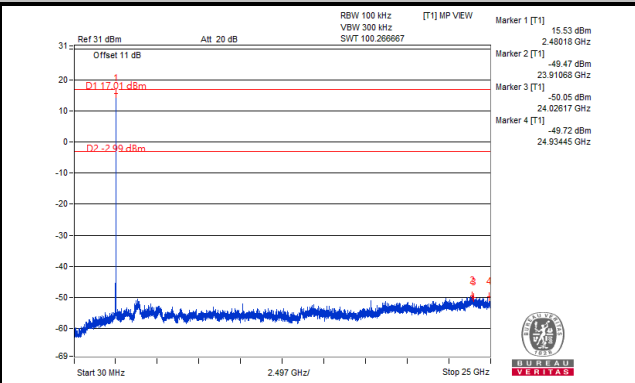
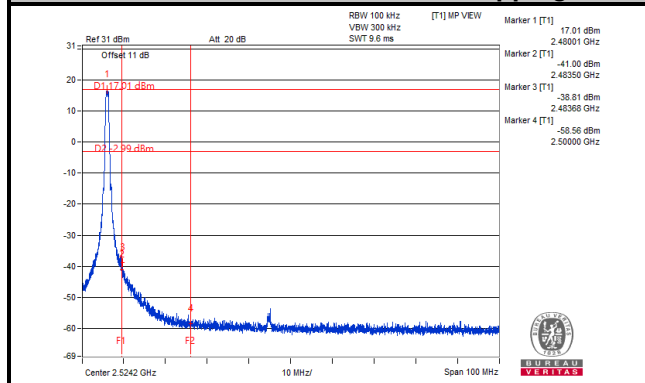
Hopping Disabled_Channel 1



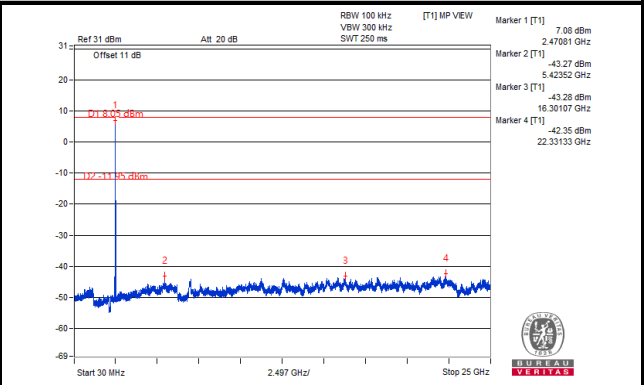
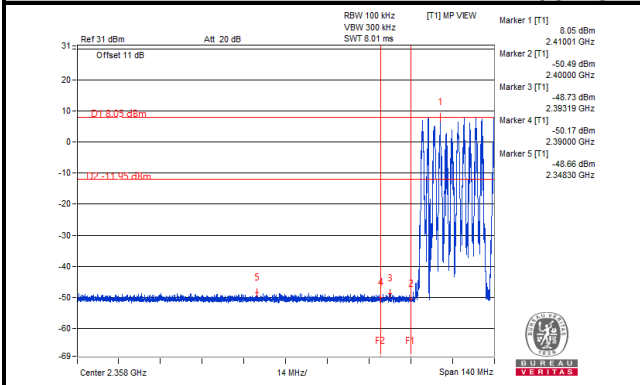
Hopping Disabled_Channel 38



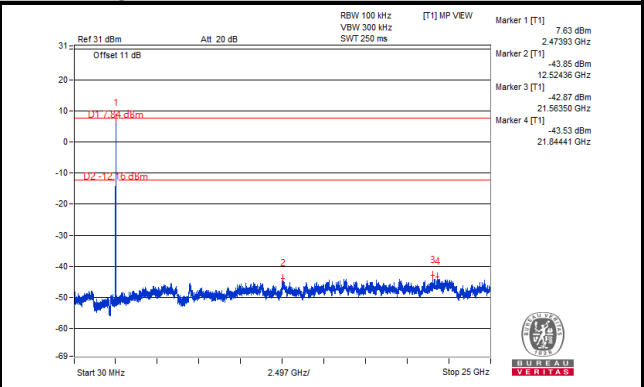
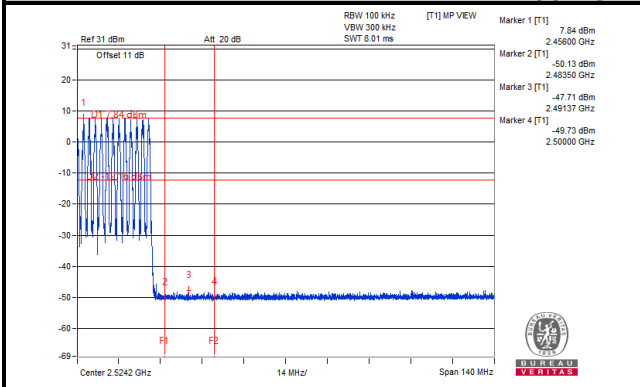
Hopping Disabled_Channel 39



Hopping Enabled_Low

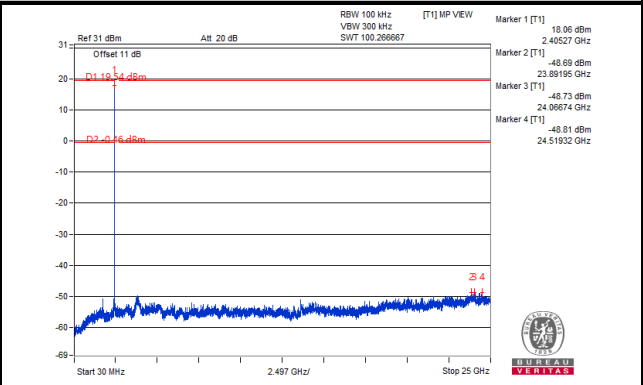
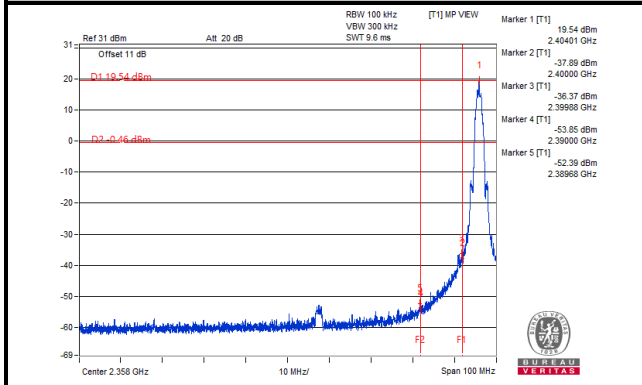


Hopping Enabled_High

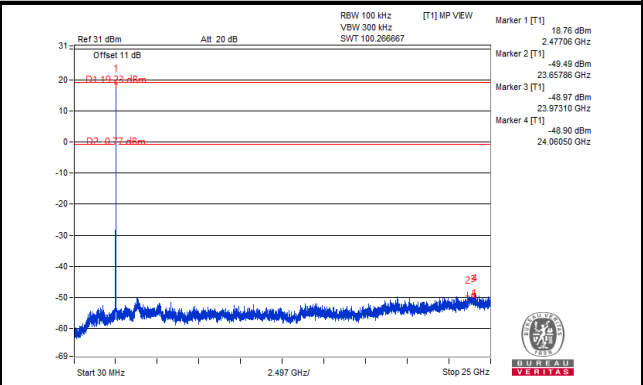
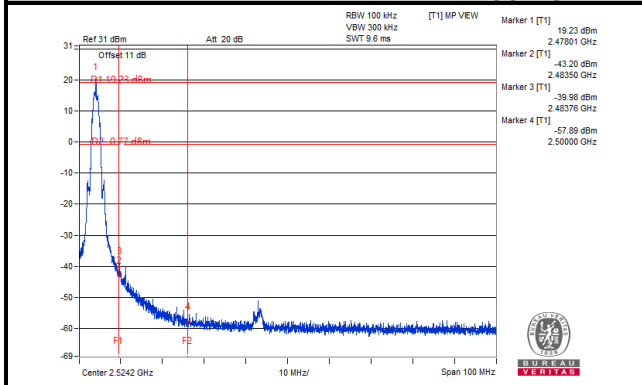


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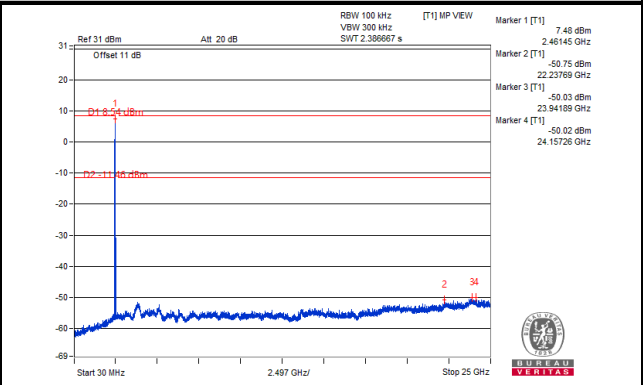
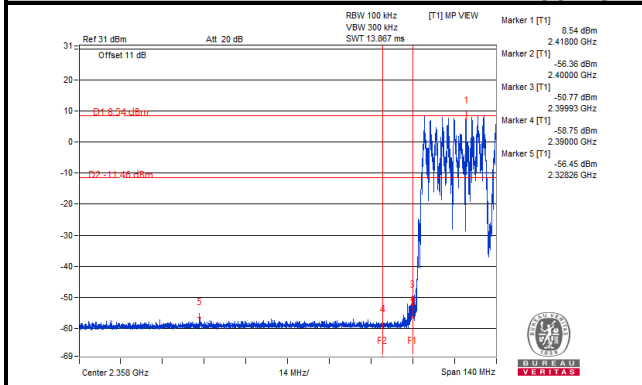
Hopping Disabled_Channel 1



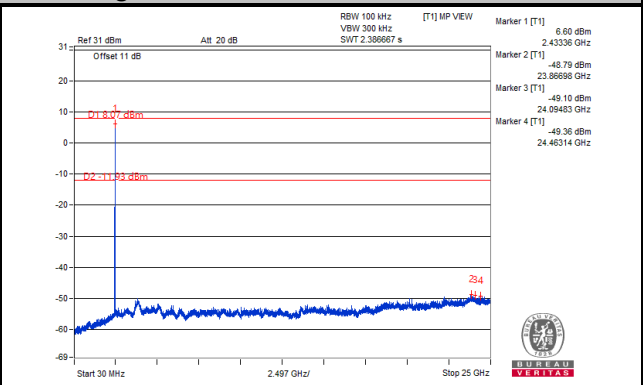
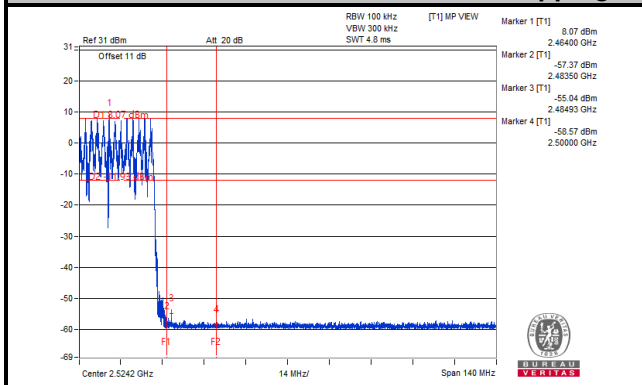
Hopping Disabled_Channel 38



Hopping Enabled_Low

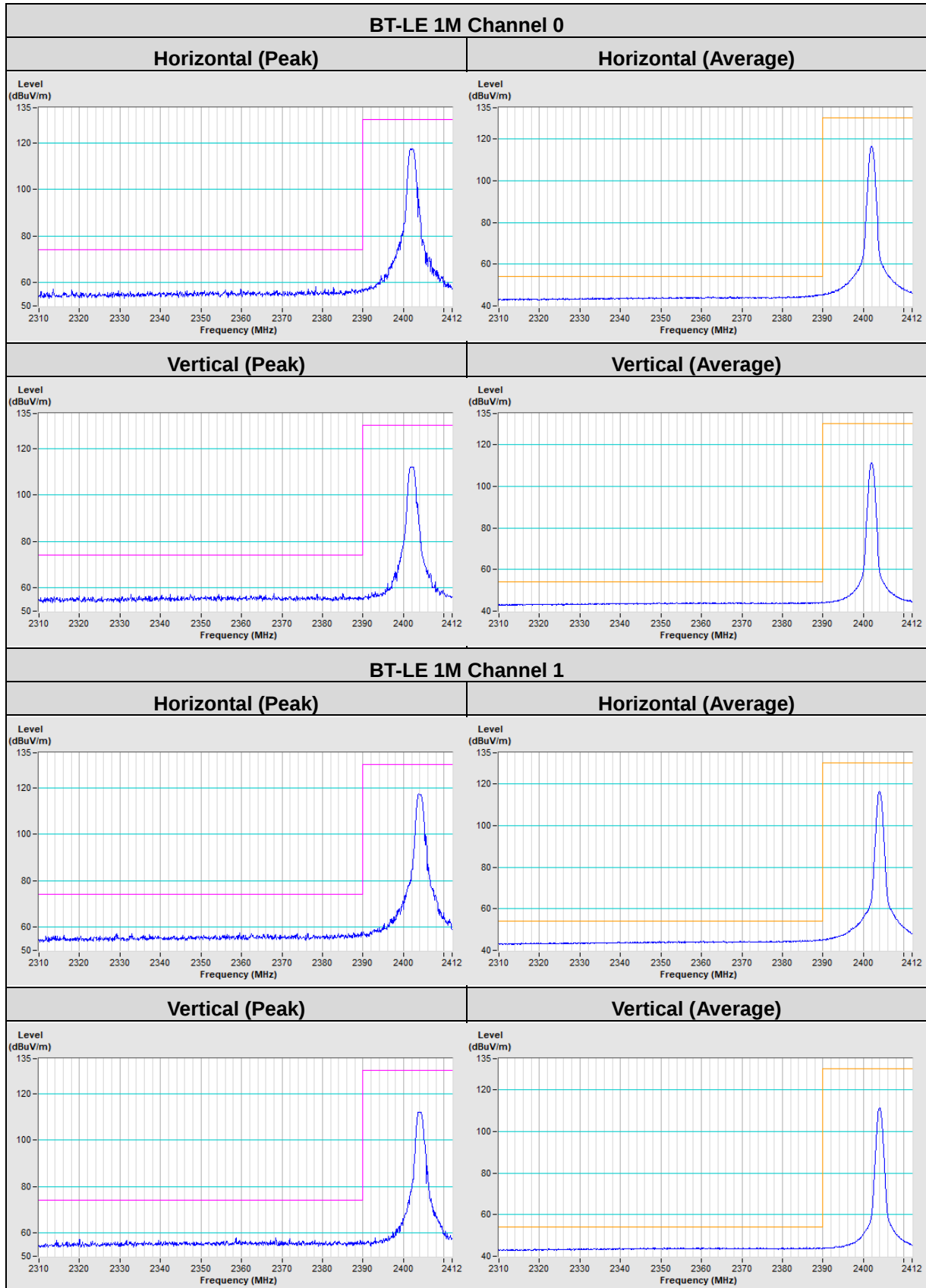


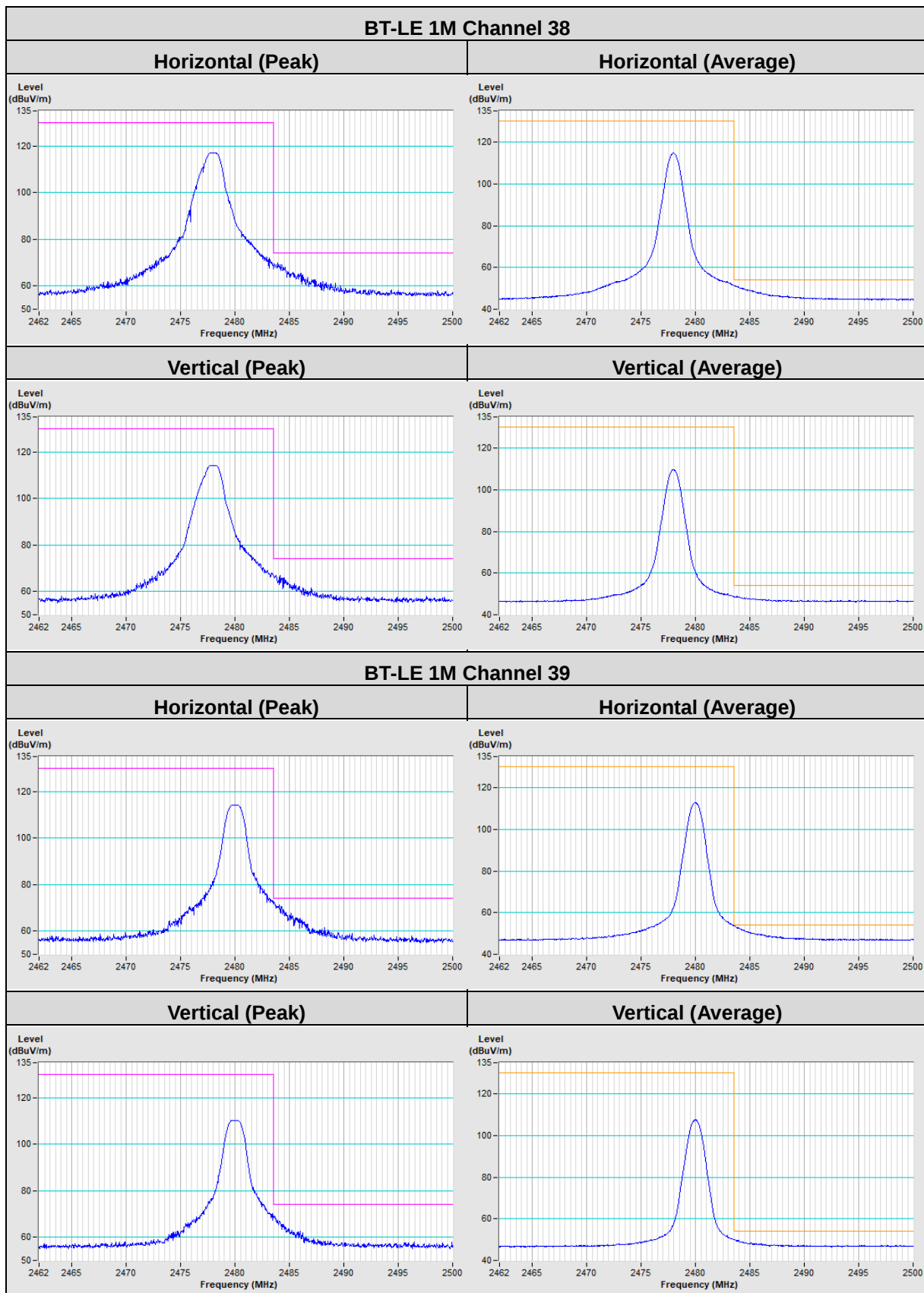
Hopping Enabled_High



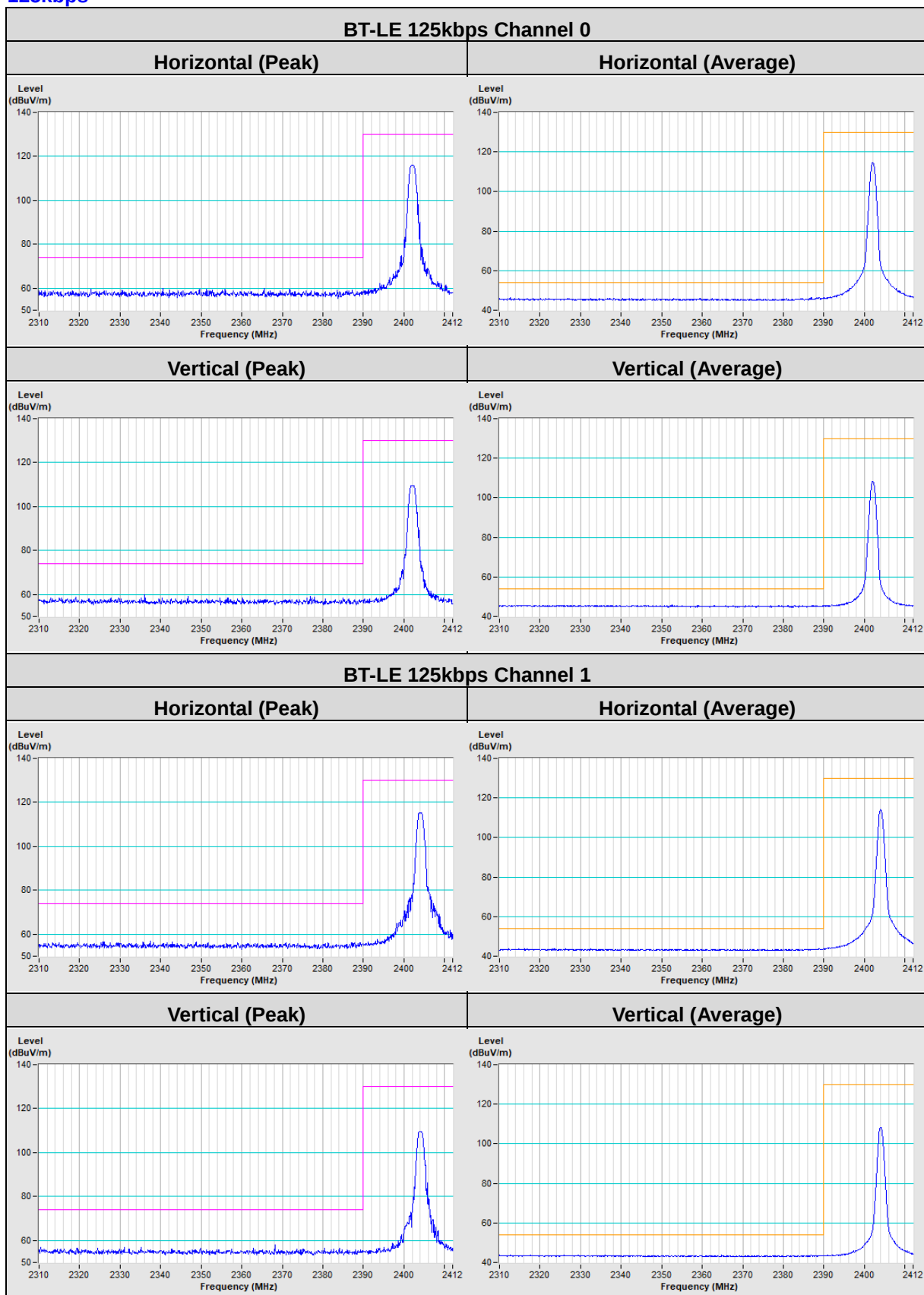
Annex A- Band Edge Measurement

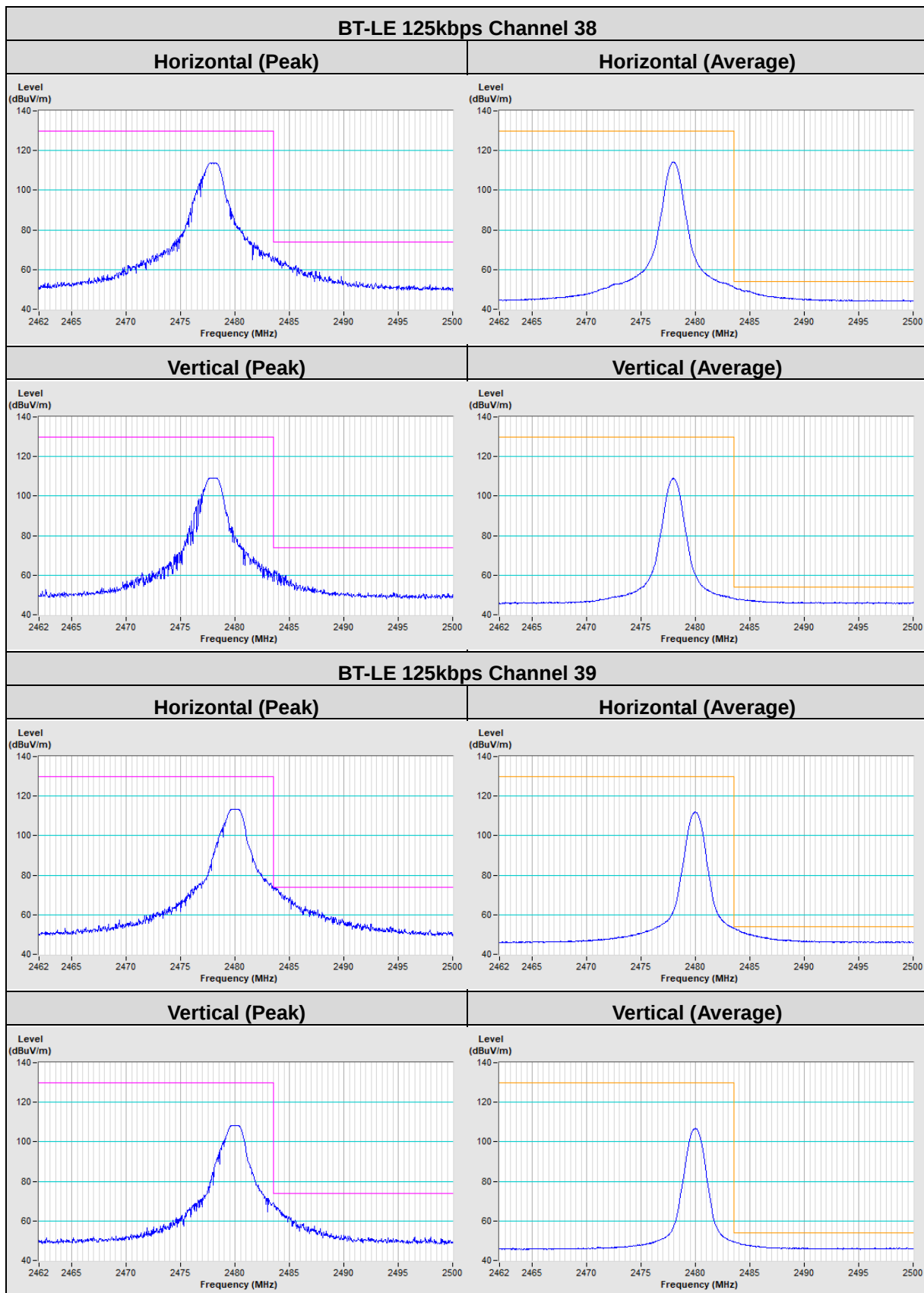
Mode A

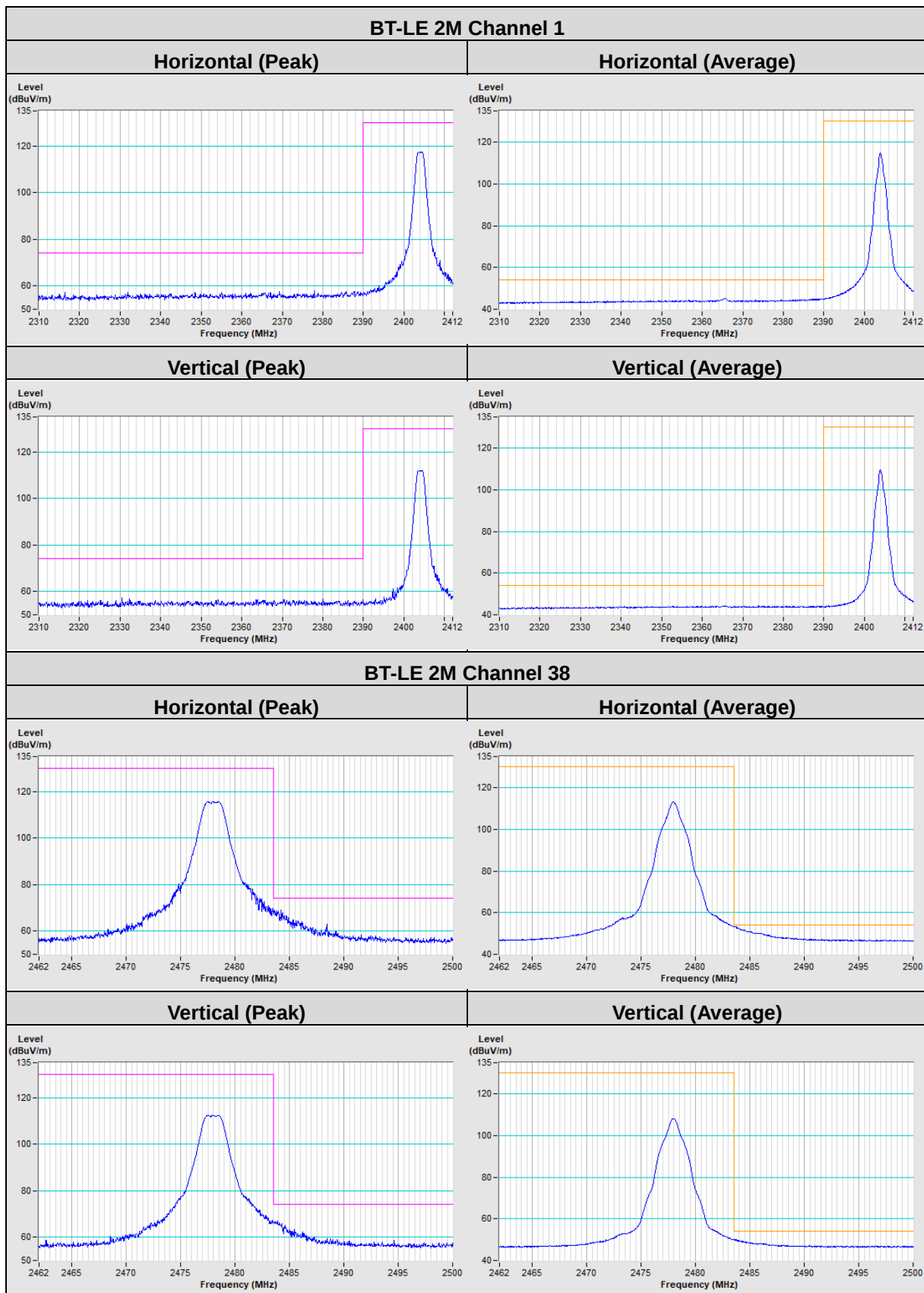




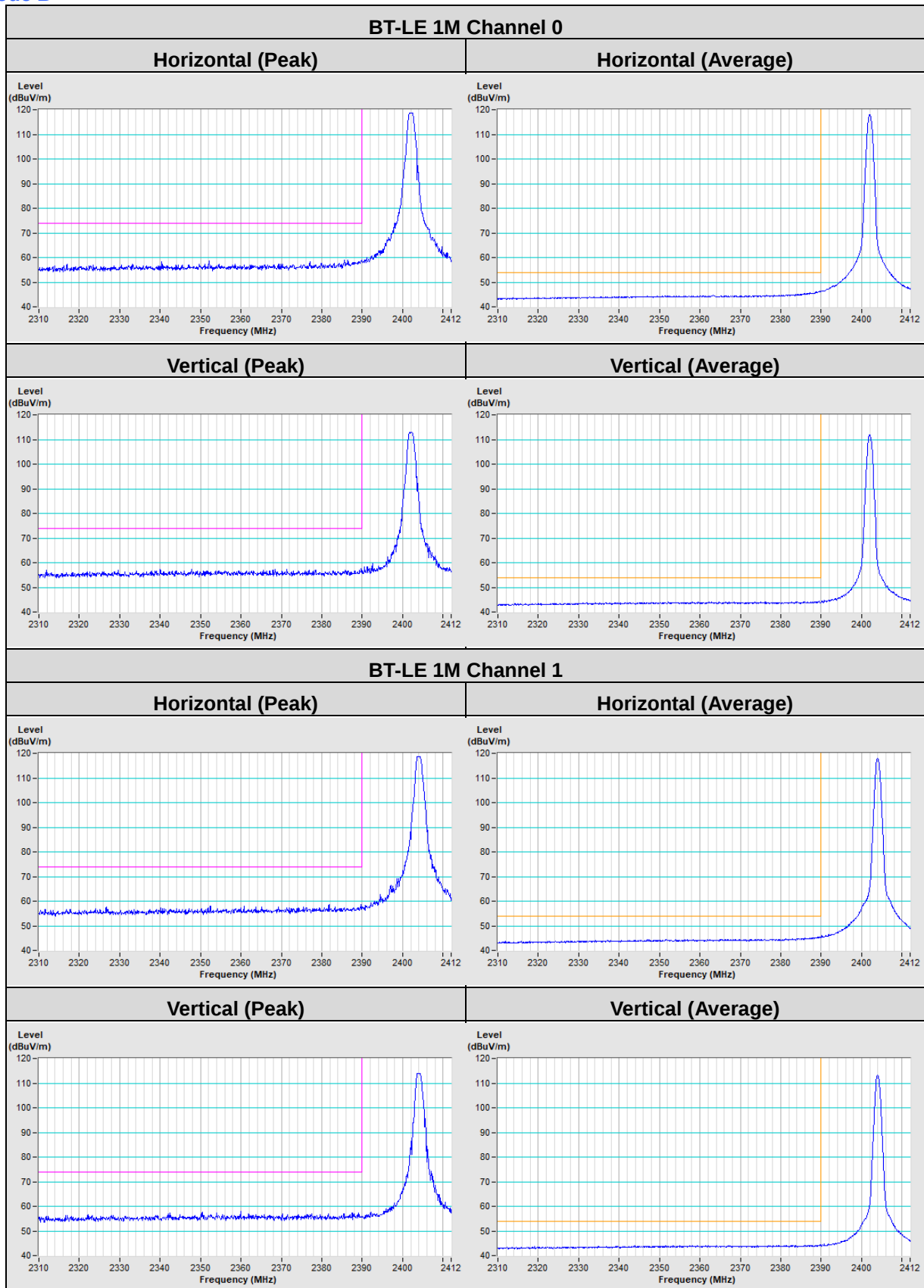
125kbps

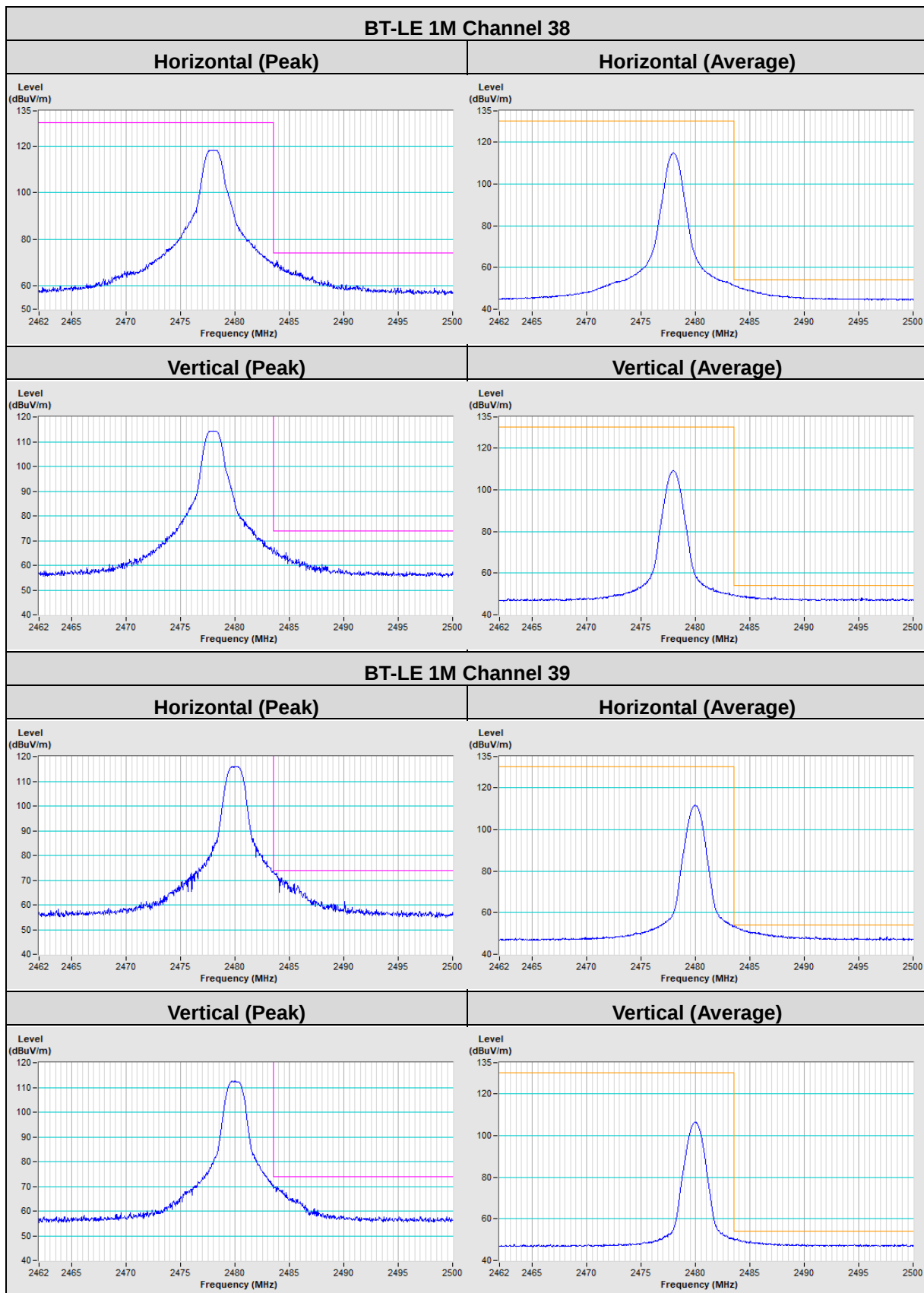




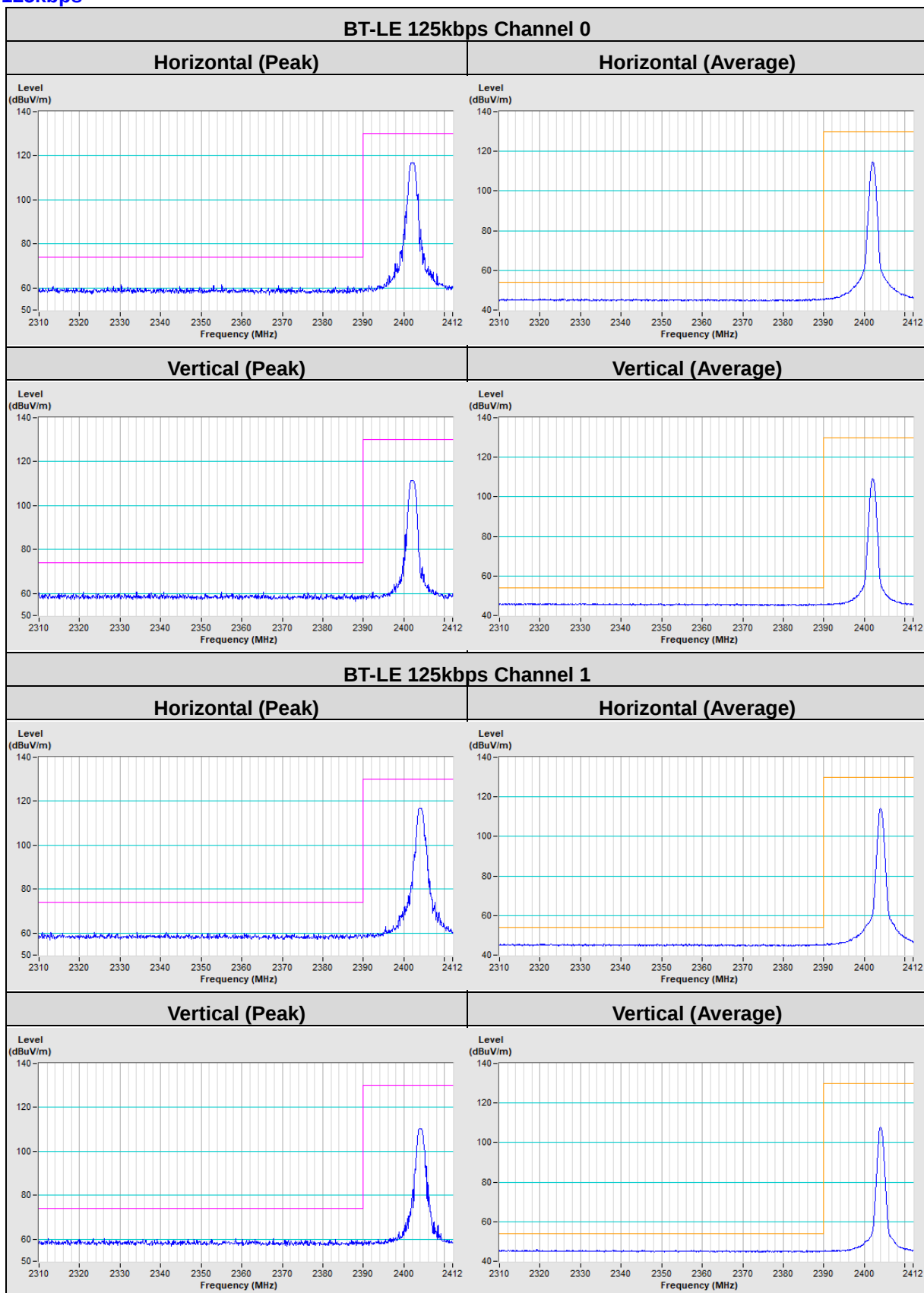


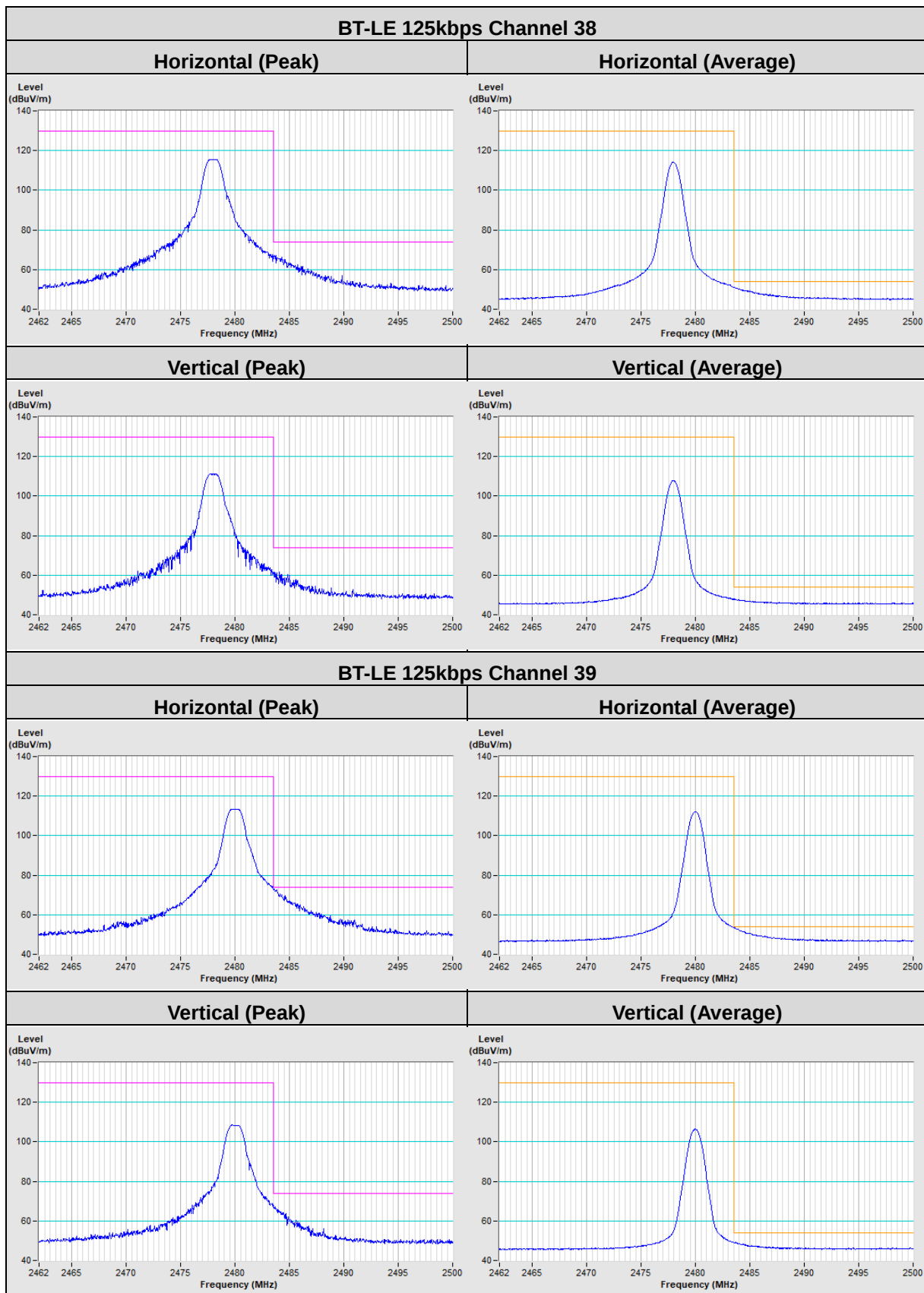
Mode B

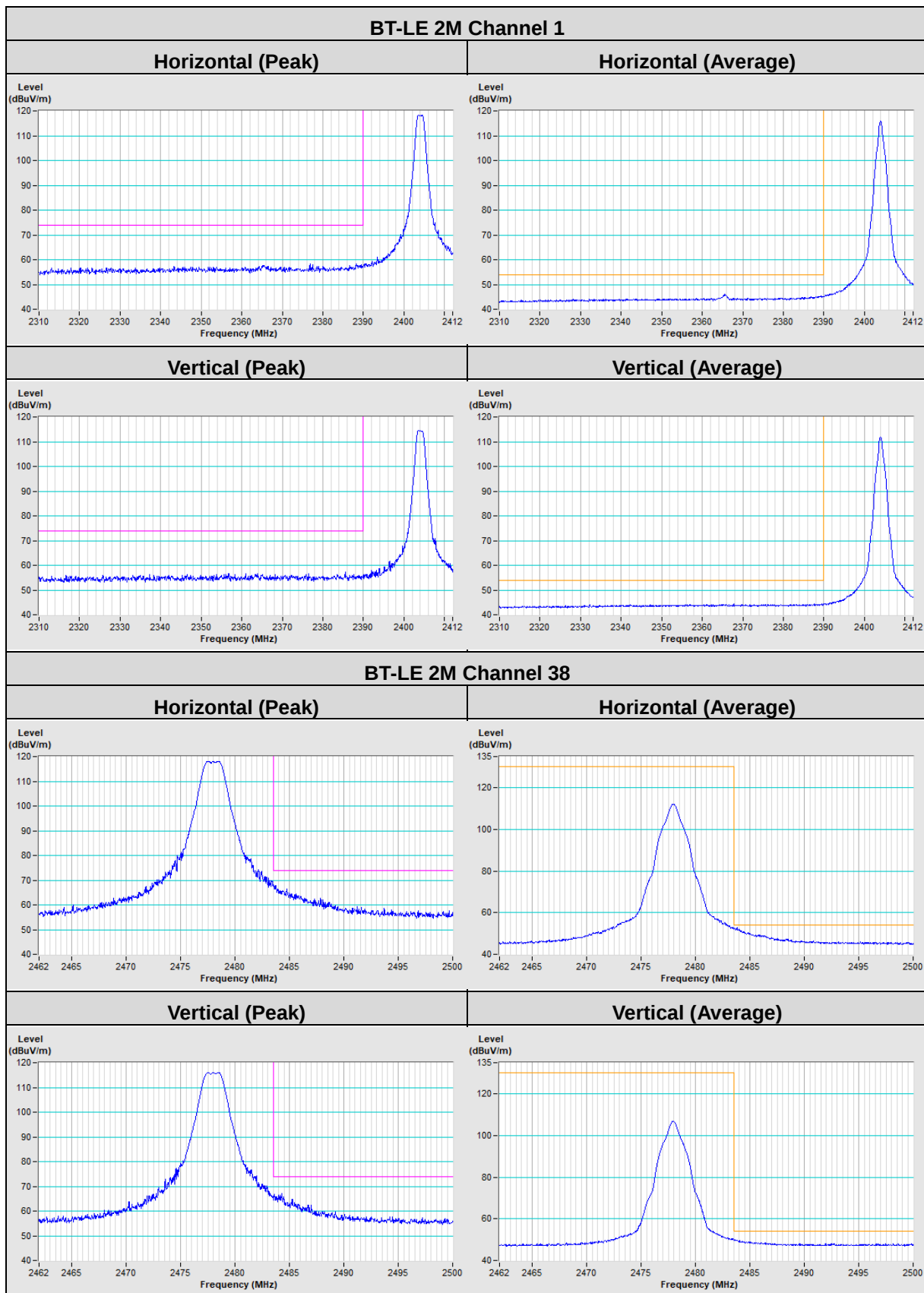




125kbps







5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

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