

Variant FCC Test Report

Report No.: RFBGSN-WTW-P21080119-1

FCC ID: I4L-BM25SD

Test Model: BM25

Received Date: Aug. 13, 2021

Test Date: Aug. 25, 2021 ~ Sep. 24, 2021

Issued Date: Oct. 15, 2021

Applicant: Micro-Star INT'L Co., Ltd

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 427177 / TW0011



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Release Control Record

Issue No.	Description	Date Issued
RFBGSN-WTW-P21080119-1	Original Release	Oct. 15, 2021

1 Certificate of Conformity

Product: 802.11a/b/g/n/ac + BT 4.2 Module

Brand: MSI

Test Model: BM25

Sample Status: Identical Prototype

Applicant: Micro-Star INT'L Co., Ltd

Test Date: Aug. 25, 2021 ~ Sep. 24, 2021

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 : Vera Huang, **Date:** Oct. 15, 2021
Vera Huang / Specialist

Approved by : Dylan Chiou, **Date:** Oct. 15, 2021
Dylan Chiou / Senior 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	N/A	Refer to Note 1
15.205 & 209	Radiated Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -6.69 dB at 55.32 MHz.
15.247(d)	Band Edge Measurement	N/A	Refer to Note 1
15.247(d)	Antenna Port Emission	N/A	Refer to Note 1
15.247(a)(2)	6 dB Bandwidth	N/A	Refer to Note 1
---	Occupied Bandwidth Measurement	N/A	Refer to Note 1
15.247(b)	Conducted Power	N/A	Refer to Note 1
15.247(e)	Power Spectral Density	N/A	Refer to Note 1
15.203	Antenna Requirement	N/A	No antenna connector is used.

Note:

1. Only radiated emissions test was performed for this addendum. Refer to BV CPS report no.: RF180518C15-2 for other test data.
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) (±)
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~ 1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
	18 GHz ~ 40 GHz	1.1508 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	802.11a/b/g/n/ac + BT 4.2 Module
Brand	MSI
Test Model	BM25
Status of EUT	Identical Prototype
Power Supply Rating	3.6 Vdc (host equipment)
Modulation Type	GFSK
Transfer Rate	1 Mbps
Operating Frequency	2402 ~ 2480 MHz
Number of Channel	40
Antenna Type	Refer to Note as below
Antenna Connector	N/A
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report to BV CPS report no. RF180518C15-2. The difference compared with original report is adding End-product. Therefore, only radiated emissions test was verified and recorded in this report.
2. The EUT is authorized for use in specific End-product. All models are electrically identical, different model names are for marketing purpose. The model 137000-99 and 134000-99 were chosen for final test. Please refer to below for more details.

Sample	Product Name	Brand Name	Model Name	Remark
A	Display System	Trimble	137000-99, GFX-1260, XCN-1260, TME-1260	12 inch
B	Display System	Trimble	134000-99, GFX-1060, XCN-1060, TME-1060	10 inch

3. The antenna information is listed as below.

Sample	Antenna type	Antenna Gain (dBi)				
		BT / 2412 ~ 2462 MHz	5180 ~ 5240 MHz	5260 ~ 5320 MHz	5500 ~ 5700 MHz	5745 ~ 5825 MHz
A	PIFA	1.67	2.14	0.79	2.37	2.37
B	PIFA	-0.09	1.24	1.44	2.95	2.29

4. 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.
5. 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.

3.2 Description of Test Modes

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description	Axis
	RE \geq 1G	RE<1G	PLC	APCM		
A	√	√	-	-	Sample A	Z-plane
B	√	√	-	-	Sample B	X-plane

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: "-" 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 (Mbps)
A, B	0 to 39	0, 19, 39	GFSK	1

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 (Mbps)
A, B	0 to 39	0	GFSK	1

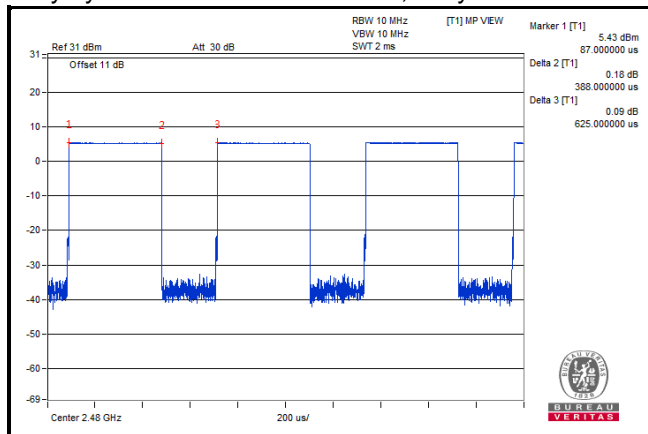
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE \geq 1G	25 deg. C, 62 % RH	120 Vac, 60 Hz	Charles Hsiao
RE<1G	25 deg. C, 62 % RH	120 Vac, 60 Hz	Charles Hsiao

3.3 Duty Cycle of Test Signal

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

$$\text{Duty cycle} = 0.388/0.625 = 0.621, \text{ Duty factor} = 10 * \log(1/0.621) = 2.07$$



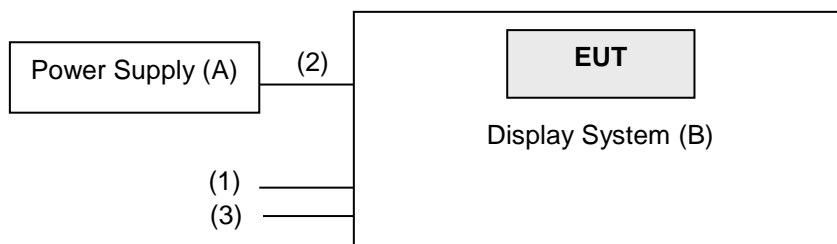
3.4 Description of Support Units

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	Power Supply	TOPWARD	3303D	N/A	N/A	--
B	Display System	Trimble	137000-99	N/A	N/A	Sample A, Provided by client
		Trimble	134000-99	N/A	N/A	Sample B, Provided by client

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Console Cable	1	0.4	N	0	Provided by client
2.	Power Cable	1	1.95	N	0	Provided by client
3.	Debug Cable	1	1.95	N	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.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent Technologies	N9038A	MY55420137	Apr. 09, 2021	Apr. 08, 2022
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 12, 2021	Apr. 11, 2022
HORN Antenna ETS-Lindgren	3117	00143293	Nov. 22, 2020	Nov. 21, 2021
BILOG Antenna SCHWARZBECK	VULB 9168	9168-616	Nov. 09, 2020	Nov. 08, 2021
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 13, 2021	Apr. 12, 2022
Loop Antenna	HLA 6121	45745	Jul. 21, 2021	Jul. 20, 2022
Preamplifier Agilent	310N	187226	Jun. 17, 2021	Jun. 16, 2022
Preamplifier Agilent	83017A	MY39501357	Jun. 17, 2021	Jun. 16, 2022
Preamplifier EMCI	EMC 184045	980116	Oct. 07, 2020	Oct. 06, 2021
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC -SMS-100-SMS-12 0+RFC-SMS-100-S MS-400)	Jun. 17, 2021	Jun. 16, 2022
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC -SMS-100-SMS-24)	Jun. 17, 2021	Jun. 16, 2022
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	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 HsinTien Chamber 1.

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:

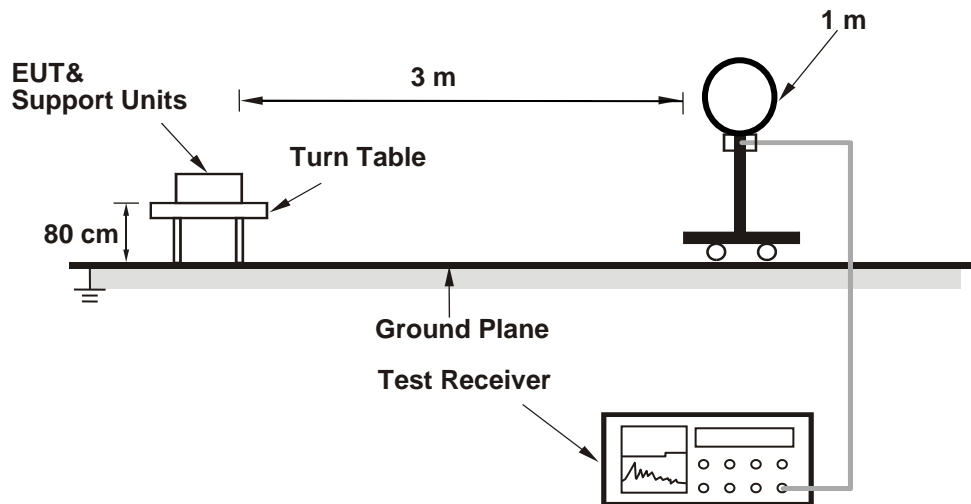
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) 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 kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

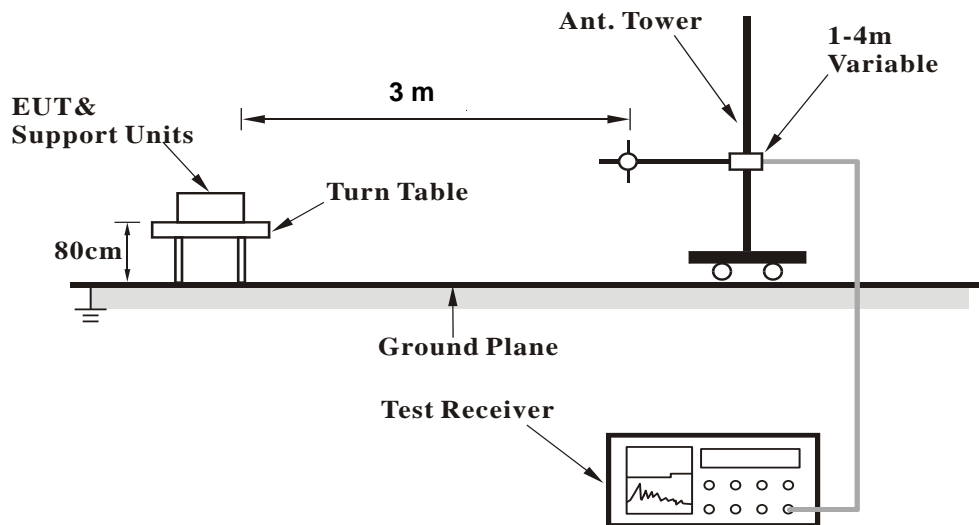
No deviation.

4.1.5 Test Set Up

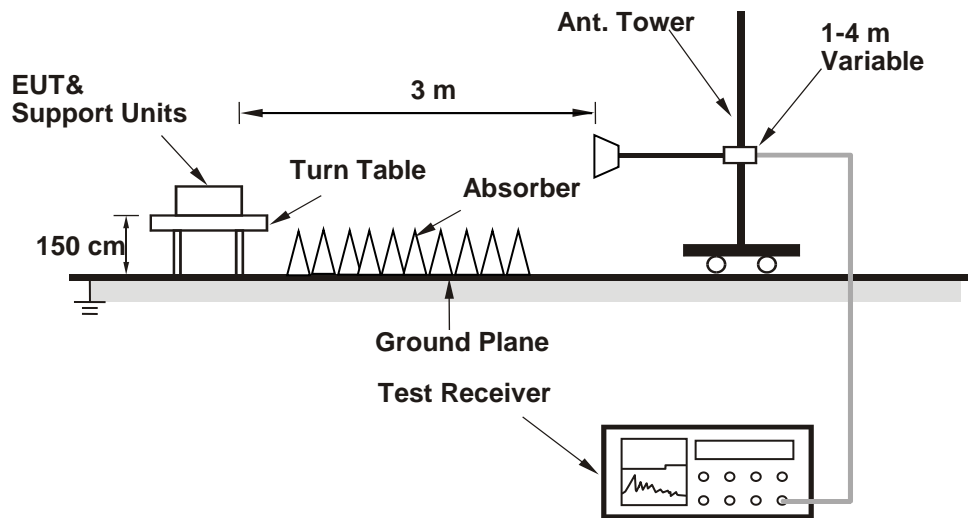
<Radiated Emission below 30 MHz>



<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

- a. Placed the EUT on the testing table.
- b. 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	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	52.75 PK	74.00	-21.25	2.00 H	227	15.77	36.98
2	2390.00	42.66 AV	54.00	-11.34	2.00 H	227	5.68	36.98
3	*2402.00	95.12 PK			2.00 H	227	58.06	37.06
4	*2402.00	94.50 AV			2.00 H	227	57.44	37.06
5	4804.00	49.94 PK	74.00	-24.06	1.78 H	322	40.29	9.65
6	4804.00	40.93 AV	54.00	-13.07	1.78 H	322	31.28	9.65

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	53.03 PK	74.00	-20.97	1.77 V	206	16.05	36.98
2	2390.00	42.98 AV	54.00	-11.02	1.77 V	206	6.00	36.98
3	*2402.00	99.28 PK			1.77 V	206	62.22	37.06
4	*2402.00	98.21 AV			1.77 V	206	61.15	37.06
5	4804.00	50.21 PK	74.00	-23.79	1.99 V	345	40.56	9.65
6	4804.00	41.63 AV	54.00	-12.37	1.99 V	345	31.98	9.65

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	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	52.65 PK	74.00	-21.35	1.77 H	206	15.67	36.98
2	2390.00	42.84 AV	54.00	-11.16	1.77 H	206	5.86	36.98
3	*2440.00	97.60 PK			1.77 H	206	60.35	37.25
4	*2440.00	96.99 AV			1.77 H	206	59.74	37.25
5	2483.50	52.97 PK	74.00	-21.03	1.77 H	206	15.60	37.37
6	2483.50	43.26 AV	54.00	-10.74	1.77 H	206	5.89	37.37
7	4880.00	51.99 PK	74.00	-22.01	1.78 H	296	41.59	10.40
8	4880.00	42.51 AV	54.00	-11.49	1.78 H	296	32.11	10.40

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	52.64 PK	74.00	-21.36	2.00 V	227	15.66	36.98
2	2390.00	42.21 AV	54.00	-11.79	2.00 V	227	5.23	36.98
3	*2440.00	99.64 PK			2.00 V	227	62.39	37.25
4	*2440.00	98.44 AV			2.00 V	227	61.19	37.25
5	2483.50	52.03 PK	74.00	-21.97	2.00 V	227	14.66	37.37
6	2483.50	42.10 AV	54.00	-11.90	2.00 V	227	4.73	37.37
7	4880.00	50.33 PK	74.00	-23.67	1.93 V	74	39.93	10.40
8	4880.00	41.06 AV	54.00	-12.94	1.93 V	74	30.66	10.40

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	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2480.00	92.65 PK			2.00 H	227	55.29	37.36
2	*2480.00	91.96 AV			2.00 H	227	54.60	37.36
3	2483.50	53.70 PK	74.00	-20.30	2.00 H	227	16.33	37.37
4	2483.50	43.61 AV	54.00	-10.39	2.00 H	227	6.24	37.37
5	4960.00	50.41 PK	74.00	-23.59	1.87 H	77	40.33	10.08
6	4960.00	41.35 AV	54.00	-12.65	1.87 H	77	31.27	10.08

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	97.53 PK			1.77 V	206	60.17	37.36
2	*2480.00	96.83 AV			1.77 V	206	59.47	37.36
3	2483.50	54.82 PK	74.00	-19.18	1.77 V	206	17.45	37.37
4	2483.50	45.77 AV	54.00	-8.23	1.77 V	206	8.40	37.37
5	4960.00	51.22 PK	74.00	-22.78	1.75 V	338	41.14	10.08
6	4960.00	41.33 AV	54.00	-12.67	1.75 V	338	31.25	10.08

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 ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

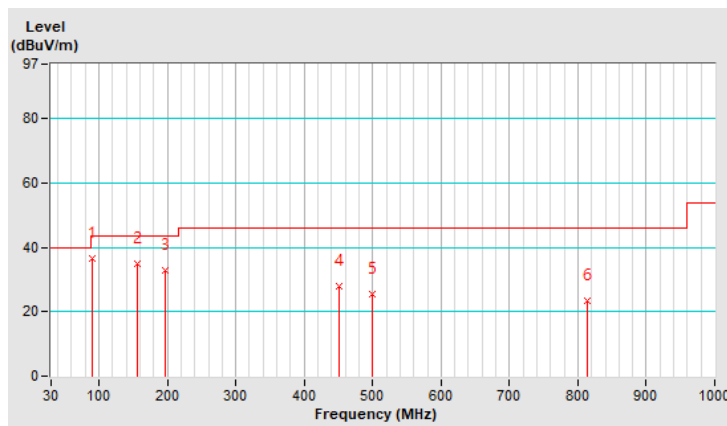
30 MHz ~ 1 GHz Worst-Case Data:

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

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	90.99	36.52 QP	43.50	-6.98	1.84 H	199	59.23	-22.71
2	156.32	34.88 QP	43.50	-8.62	1.76 H	251	51.28	-16.40
3	196.23	33.08 QP	43.50	-10.42	1.54 H	25	52.82	-19.74
4	450.02	28.14 QP	46.00	-17.86	1.21 H	1	39.71	-11.57
5	500.14	25.42 QP	46.00	-20.58	1.54 H	156	36.17	-10.75
6	814.11	23.45 QP	46.00	-22.55	1.15 H	16	28.74	-5.29

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

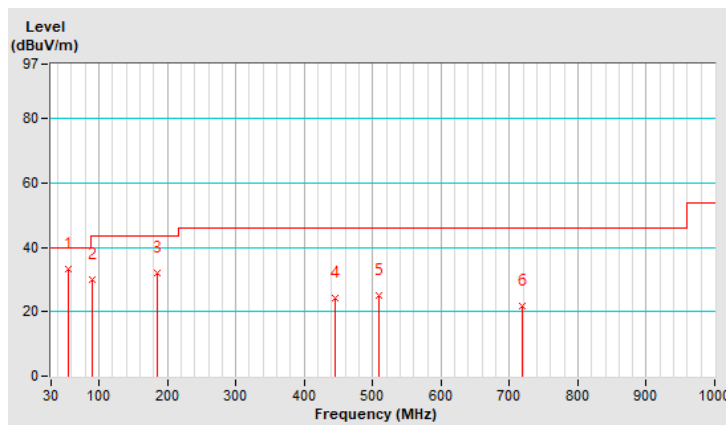


RF Mode	TX BT_LE-1M	Channel	CH 0 : 2402 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	55.32	33.31 QP	40.00	-6.69	1.78 V	54	50.50	-17.19
2	90.17	29.88 QP	43.50	-13.62	1.17 V	245	52.68	-22.80
3	185.46	32.15 QP	43.50	-11.35	1.63 V	185	50.91	-18.76
4	445.12	24.44 QP	46.00	-21.56	1.67 V	71	36.11	-11.67
5	510.00	25.25 QP	46.00	-20.75	1.55 V	186	35.93	-10.68
6	718.90	21.92 QP	46.00	-24.08	1.53 V	5	28.88	-6.96

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



Mode B

Above 1 GHz Data:

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

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	52.66 PK	74.00	-21.34	1.65 H	134	15.68	36.98
2	2390.00	42.34 AV	54.00	-11.66	1.65 H	134	5.36	36.98
3	*2402.00	93.92 PK			1.65 H	134	56.86	37.06
4	*2402.00	92.59 AV			1.65 H	134	55.53	37.06
5	4804.00	49.42 PK	74.00	-24.58	1.64 H	32	39.77	9.65
6	4804.00	41.58 AV	54.00	-12.42	1.64 H	32	31.93	9.65

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	52.85 PK	74.00	-21.15	1.00 V	177	15.87	36.98
2	2390.00	42.64 AV	54.00	-11.36	1.00 V	177	5.66	36.98
3	*2402.00	99.04 PK			1.00 V	177	61.98	37.06
4	*2402.00	98.24 AV			1.00 V	177	61.18	37.06
5	4804.00	49.26 PK	74.00	-24.74	1.77 V	127	39.61	9.65
6	4804.00	41.54 AV	54.00	-12.46	1.77 V	127	31.89	9.65

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	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	52.67 PK	74.00	-21.33	1.53 H	182	15.69	36.98
2	2390.00	42.74 AV	54.00	-11.26	1.53 H	182	5.76	36.98
3	*2440.00	93.02 PK			1.53 H	182	55.77	37.25
4	*2440.00	92.14 AV			1.53 H	182	54.89	37.25
5	2483.50	52.93 PK	74.00	-21.07	1.53 H	182	15.56	37.37
6	2483.50	42.69 AV	54.00	-11.31	1.53 H	182	5.32	37.37
7	4880.00	49.52 PK	74.00	-24.48	1.88 H	274	39.12	10.40
8	4880.00	41.74 AV	54.00	-12.26	1.88 H	274	31.34	10.40

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	52.88 PK	74.00	-21.12	1.00 V	177	15.90	36.98
2	2390.00	42.64 AV	54.00	-11.36	1.00 V	177	5.66	36.98
3	*2440.00	98.28 PK			1.00 V	177	61.03	37.25
4	*2440.00	97.55 AV			1.00 V	177	60.30	37.25
5	2483.50	52.90 PK	74.00	-21.10	1.00 V	177	15.53	37.37
6	2483.50	42.88 AV	54.00	-11.12	1.00 V	177	5.51	37.37
7	4880.00	49.33 PK	74.00	-24.67	1.79 V	358	38.93	10.40
8	4880.00	41.70 AV	54.00	-12.30	1.79 V	358	31.30	10.40

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	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2480.00	93.53 PK			1.53 H	182	56.17	37.36
2	*2480.00	92.22 AV			1.53 H	182	54.86	37.36
3	2483.50	52.84 PK	74.00	-21.16	1.53 H	182	15.47	37.37
4	2483.50	43.26 AV	54.00	-10.74	1.53 H	182	5.89	37.37
5	4960.00	49.52 PK	74.00	-24.48	1.85 H	174	39.44	10.08
6	4960.00	41.57 AV	54.00	-12.43	1.85 H	174	31.49	10.08

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	98.28 PK			1.00 V	177	60.92	37.36
2	*2480.00	97.25 AV			1.00 V	177	59.89	37.36
3	2483.50	53.91 PK	74.00	-20.09	1.00 V	177	16.54	37.37
4	2483.50	44.99 AV	54.00	-9.01	1.00 V	177	7.62	37.37
5	4960.00	49.52 PK	74.00	-24.48	1.66 V	316	39.44	10.08
6	4960.00	41.57 AV	54.00	-12.43	1.66 V	316	31.49	10.08

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 ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

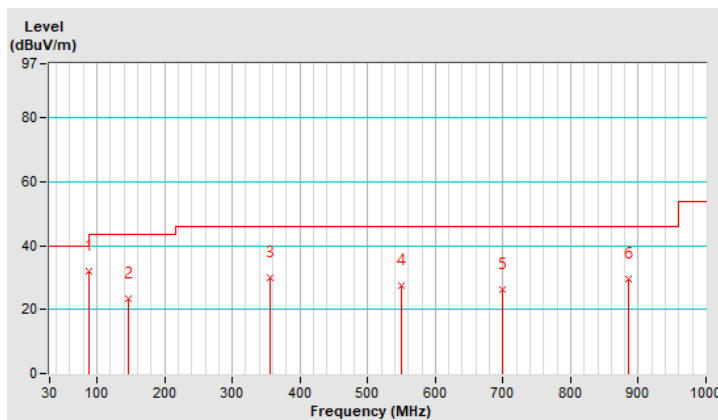
30 MHz ~ 1 GHz Worst-Case Data:

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

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	88.19	31.91 QP	43.50	-11.59	1.08 H	219	54.78	-22.87
2	146.23	23.27 QP	43.50	-20.23	2.24 H	214	39.61	-16.34
3	356.32	29.87 QP	46.00	-16.13	2.48 H	301	44.12	-14.25
4	549.02	27.74 QP	46.00	-18.26	1.92 H	99	37.96	-10.22
5	699.32	26.24 QP	46.00	-19.76	2.78 H	188	33.61	-7.37
6	884.81	29.41 QP	46.00	-16.59	1.75 H	169	33.85	-4.44

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

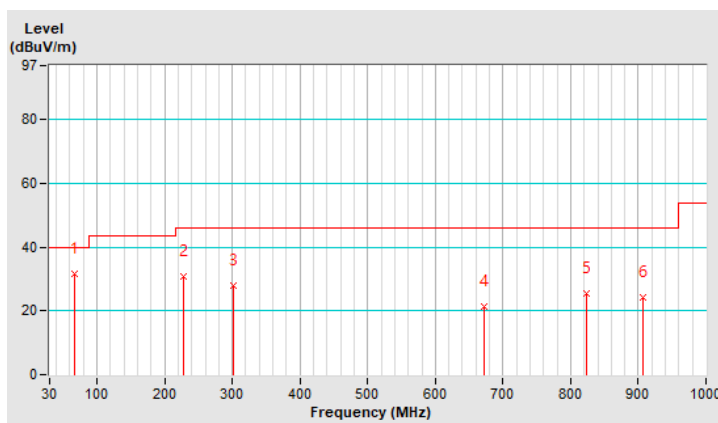


RF Mode	TX BT_LE-1M	Channel	CH 0 : 2402 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	67.34	31.48 QP	40.00	-8.52	1.09 V	287	50.23	-18.75
2	228.39	30.99 QP	46.00	-15.01	1.18 V	231	50.14	-19.15
3	301.82	28.14 QP	46.00	-17.86	2.27 V	235	43.57	-15.43
4	672.00	21.57 QP	46.00	-24.43	1.13 V	268	29.38	-7.81
5	823.24	25.67 QP	46.00	-20.33	2.78 V	312	30.71	-5.04
6	907.38	24.23 QP	46.00	-21.77	1.75 V	102	27.92	-3.69

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

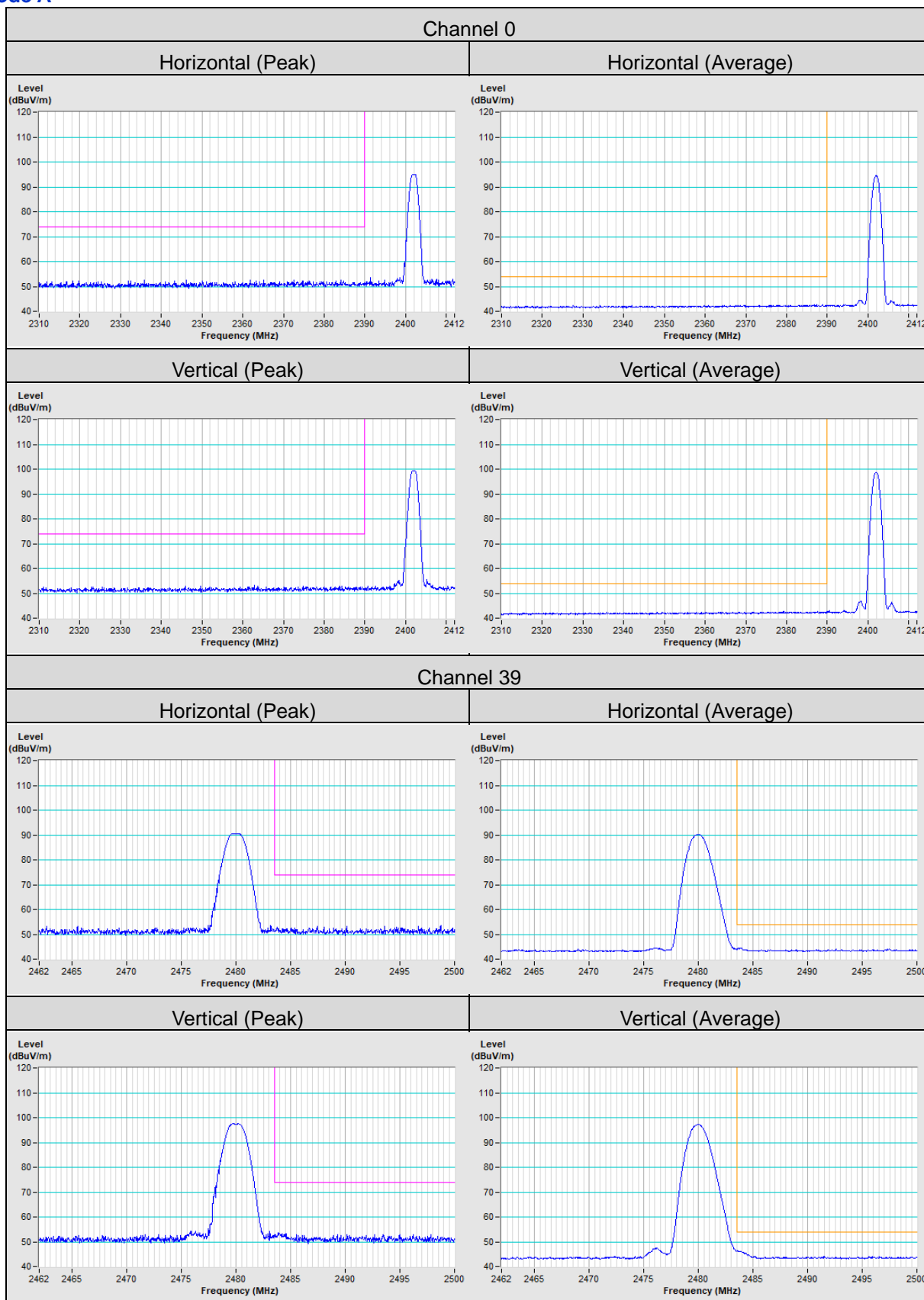


5 Pictures of Test Arrangements

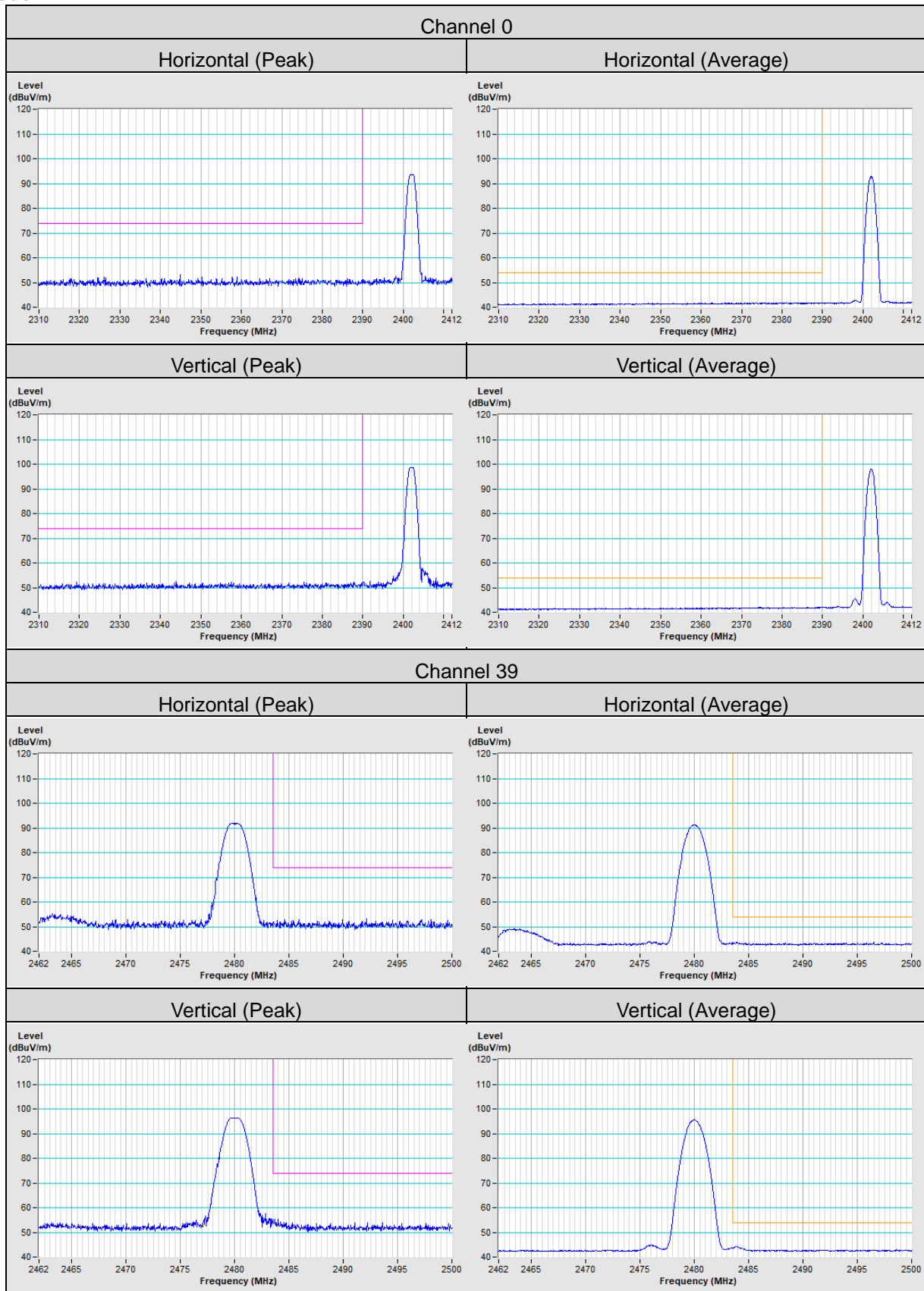
Please refer to the attached file (Test Setup Photo).

Annex A- Band Edge Measurement

Mode A



Mode B



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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Web Site: www.bureauveritas-adt.com

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

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