Certificate #7136.01

FCC Radio Test Report

FCC ID: ACLAPCW91

This report concerns: Original Grant

Project No.	:	2410H001
Equipment	:	Microwave Oven
Brand Name	:	Panasonic
Test Model	:	NN-CV88QS
Series Model	:	NN-CV87QS
Applicant	:	Panasonic Corporation of North America
Address	:	Two Riverfront Plaza, Newark New Jersey USA
Manufacturer	:	Panasonic Kitchen Appliances Technology(Jiaxing) Co.,Ltd
Address	:	No.369 Chenggong Road, Economic and Technological Development Zone, Jiaxing, Zhejiang Province, China
Factory	:	Panasonic Kitchen Appliances Technology(Jiaxing) Co.,Ltd
Address	:	No.369 Chenggong Road, Economic and Technological Development Zone, Jiaxing, Zhejiang Province, China
Date of Receipt	:	Oct. 08, 2024
Date of Test	:	Oct. 08, 2024~Nov. 01, 2024
Issued Date	:	Nov. 19, 2024
Report Version	:	R00
Test Sample	:	Engineering Sample No.: SH2024101812
Standard(s)	:	FCC CFR Title 47, Part 15, Subpart C FCC KDB 558074 D01 15.247 Meas Guidance v05r02 ANSI C63.10-2013

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc. (Shanghai)

Louis Li

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Riley Wei

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. BTL assumes no responsibility for the data provided by the customer, any statements, inferences or generalizations drawn by the customer or others from the reports issued by BTL.

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BTL's laboratory quality assurance procedures are in compliance with the ISO/IEC 17025: 2017 requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.
Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

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REPORT ISSUED HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-FCCP-3-2410H001	R00	Original Report.	Nov. 19, 2024	Valid

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC CFR Title 47, Part 15, Subpart C				
Standard(s) Section	**Test Item**	**Test Result**	**Judgment**	**Remark**
15.207	AC Power Line Conducted Emissions	APPENDIX A	PASS	------
15.247(d) 15.205(a) 15.209(a)	Radiated Emissions	APPENDIX B APPENDIX C APPENDIX D	PASS	------
15.247(a)(2)	Bandwidth	APPENDIX E	PASS	------
15.247(b)(3)	Maximum Output Power	APPENDIX F	PASS	------
15.247(d)	Conducted Spurious Emission	APPENDIX G	PASS	------
15.247(e)	Power Spectral Density	APPENDIX H	PASS	------
15.203	Antenna Requirement	------	PASS	Note(2)

Note:

(1) "N/A" denotes test is not applicable to this device.

(2) The device what use a permanently attached antenna were considered sufficient to comply with the provisions of 15.203.

1.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No. 29, Jintang Road, Tangzhen Industry Park, Pudong New Area, Shanghai 201210,China
BTL's Registration Number for FCC: 964234
BTL's Designation Number for FCC: CN1374

1.2 MEASUREMENT UNCERTAINTY

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))
The BTL measurement uncertainty as below table:

A. Radiated emissions test:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
SH-CB02	CISPR	9 KHz~30 MHz	-	2.72
		30 MHz~200 MHz	V	4.4
		30 MHz~200 MHz	H	3.16
		200 MHz~1,000 MHz	V	4.6
		200 MHz~1,000 MHz	H	4.2
		1GHz ~ 6GHz	-	4.56
		6GHz ~ 18GHz	-	5.14
		18 ~ 26.5 GHz	-	3.36

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage	Tested By
AC Power Line Conducted Emissions	24°C	49%	AC 120V/60Hz	Landon Yang
Radiated Emissions-9 kHz to 30 MHz	22.5°C	47%	AC 120V/60Hz	Yahya Fang
Radiated Emissions-30 MHz to 1000 MHz	22.5°C	47%	AC 120V/60Hz	Yahya Fang
Radiated Emissions-Above 1000 MHz	22.5°C	47%	AC 120V/60Hz	Yahya Fang
Bandwidth	23°C ~24°C	41%~43%	DC 3.3V	Thacker Tang
Maximum Output Power	23°C ~24°C	41%~43%	DC 3.3V	Thacker Tang
Conducted Spurious Emission	23°C ~24°C	41%~43%	DC 3.3V	Thacker Tang
Power Spectral Density	23°C ~24°C	41%~43%	DC 3.3V	Thacker Tang

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Microwave Oven
Brand Name	Panasonic
Test Model	NN-CV88QS
Series Model	NN-CV87QS
Model Difference(s)	Only the accessories are different
Software Version	N/A
Hardware Version	N/A
Power Source	AC&DC Mains.
Power Rating	1110W (Microwave) / 1350W (Broil/HEATER)
Operation Frequency	2402 MHz ~ 2480 MHz
Modulation Type	GFSK
Bit Rate of Transmitter	1Mbps
Max. Output Power	1Mbps: 12.45 dBm (0.0176 W)

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2. Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	20	2442
01	2404	21	2444
02	2406	22	2446
03	2408	23	2448
04	2410	24	2450
05	2412	25	2452
06	2414	26	2454
07	2416	27	2456
08	2418	28	2458
09	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480

3. Table for Filed Antenna:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Internal	N/A	3.42

Note:
The antenna gain is provided by the manufacturer.

2.2 DESCRIPTION OF TEST MODES

The test system was pre-tested based on the consideration of all possible combinations of EUT operation mode.

Pretest Mode	Description
Mode 1	TX Mode_1Mbps Channel 00/19/39

Following mode(s) was (were) found to be the worst case(s) and selected for the final test.

AC power line conducted emissions test	
Final Test Mode	Description
Mode 1	TX Mode_1Mbps Channel 19

Radiated emissions test - Below 1GHz	
Final Test Mode	Description
Mode 1	TX Mode_1Mbps Channel 19

Radiated emissions test - Above 1GHz	
Final Test Mode	Description
Mode 1	TX Mode_1Mbps Channel 00/19/39

Conducted test	
Final Test Mode	Description
Mode 1	TX Mode_1Mbps Channel 00/19/39

Note:

(1) For radiated emission above 1 GHz test, the spurious points of 18GHz~40GHz have been pre-tested and in this report only recorded the worst case.

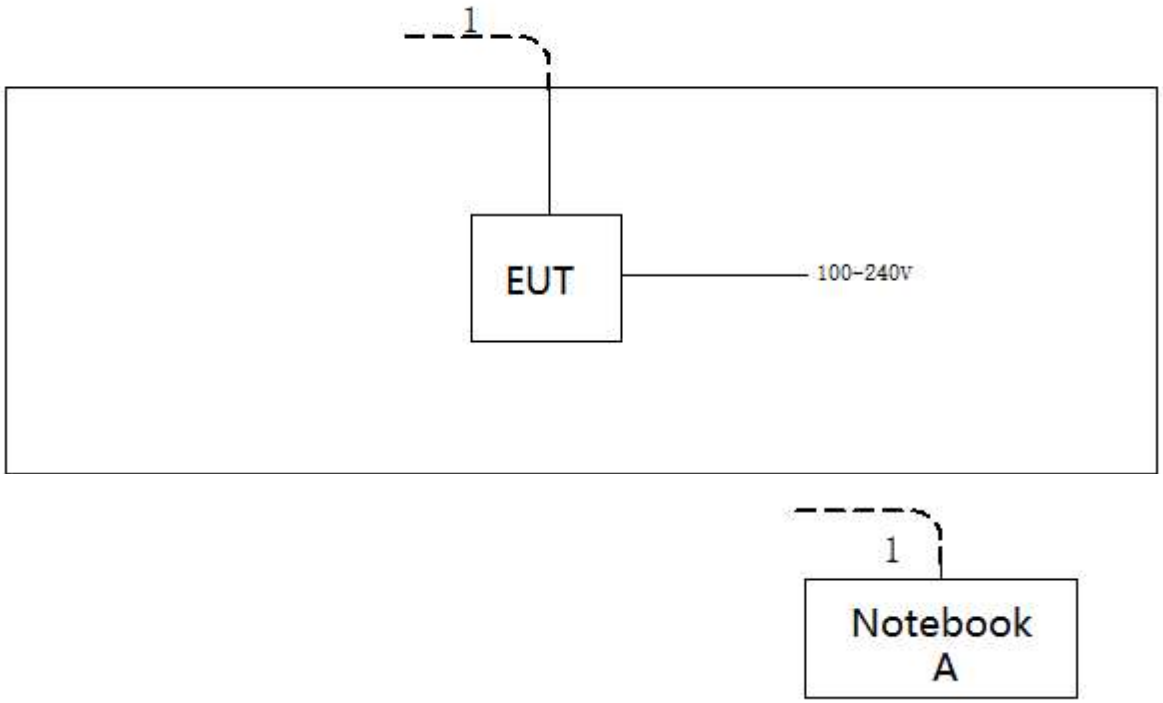
(2) For AC power line conducted emissions and radiated emissions below 1 GHz test, the 1Mbps Channel 19 is found to be the worst case and recorded.

2.3 PARAMETERS OF TEST SOFTWARE

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level.

Test Software Version	EspRFTestTool_v3.6_Manual		
Frequency (MHz)	2402	2440	2480
1Mbps	7	7	7

2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.5 SUPPORT UNITS

Item	Equipment	Brand	Model No.	Series No.
A	Notebook	Dell	Inspiron 15-7559	N/A

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	USB Cable	NO	NO	10m

3. AC POWER LINE CONDUCTED EMISSIONS

3.1 LIMIT

Frequency of Emission (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56*	56 to 46*
0.5 - 5.0	56	6
5.0 - 30.0	60	50

Note:

(1) The tighter limit applies at the band edges.
(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

3.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

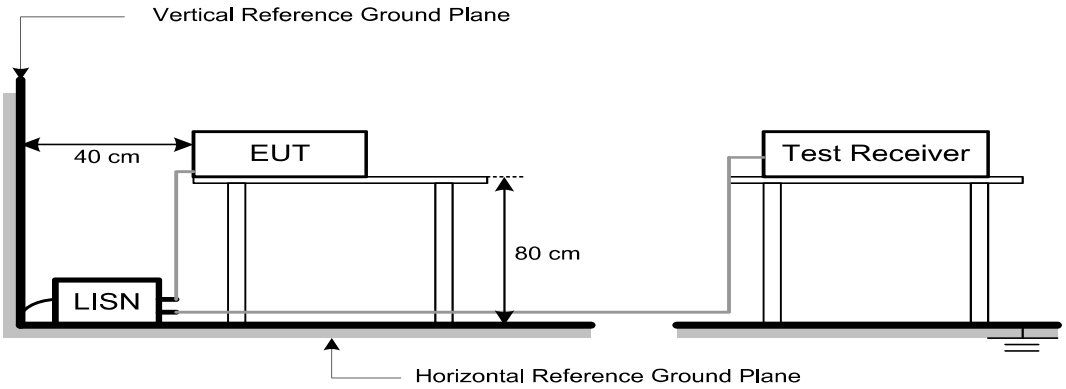
The following table is the setting of the receiver:

Receiver Parameters	Setting
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.3 DEVIATION FROM TEST STANDARD

No deviation.

3.4 TEST SETUP



3.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

3.6 TEST RESULTS

Please refer to the APPENDIX A.

Remark:

(1) All readings are QP Mode value unless otherwise stated AVG in column of『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform.In this case, a " * " marked in AVG Mode column of Interference Voltage Measured.

(2) Measuring frequency range from 150 kHz to 30 MHz.

4. RADIATED EMISSIONS

4.1 LIMIT

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (9 kHz-1000 MHz)

Frequency (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

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000 MHz)

Frequency (MHz)	(dBuV/m at 3 m)	
	Peak	Average
Above 1000	74	54

Note:

(1) The limit for radiated test was performed according to FCC CFR Title 47, Part 15, Subpart C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

4.2 TEST PROCEDURE

a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)
b. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1 GHz)
c. The height of the equipment or of the substitution antenna shall be 0.8m or 1.5m; the height of the test antenna shall vary between 1 m to 4 m. 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 find the maximum reading (used Bore sight function).
e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
f. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
g. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn‘t perform. (below 1 GHz)
h. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn‘t perform. (above 1 GHz)
i. For the actual test configuration, please refer to the related Item –EUT Test Photos.

The following table is the setting of the receiver:

Spectrum Parameters	Setting
Start ~ Stop Frequency	9 kHz~150 kHz for RBW 200 Hz
Start ~ Stop Frequency	0.15 MHz~30 MHz for RBW 9 kHz
Start ~ Stop Frequency	30 MHz~1000 MHz for RBW 100 kHz

Spectrum Parameters	Setting
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1 MHz / 3 MHz for PK value 1 MHz / 1/T Hz for AVG value

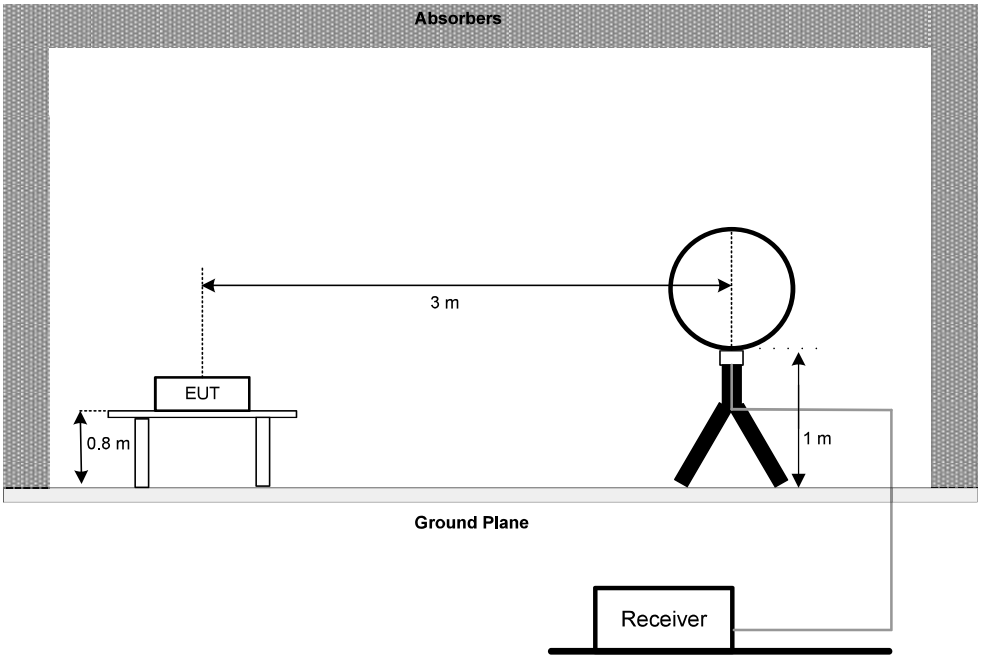
Spectrum Parameters	Setting
Start ~ Stop Frequency	9 kHz~90 kHz for PK/AVG detector
Start ~ Stop Frequency	90 kHz~110 kHz for QP detector
Start ~ Stop Frequency	110 kHz~490 kHz for PK/AVG detector
Start ~ Stop Frequency	490 kHz~30 MHz for QP detector
Start ~ Stop Frequency	30 MHz~1000 MHz for QP detector
Start ~ Stop Frequency	1 GHz~26.5 GHz for PK/AVG detector

4.3 DEVIATION FROM TEST STANDARD

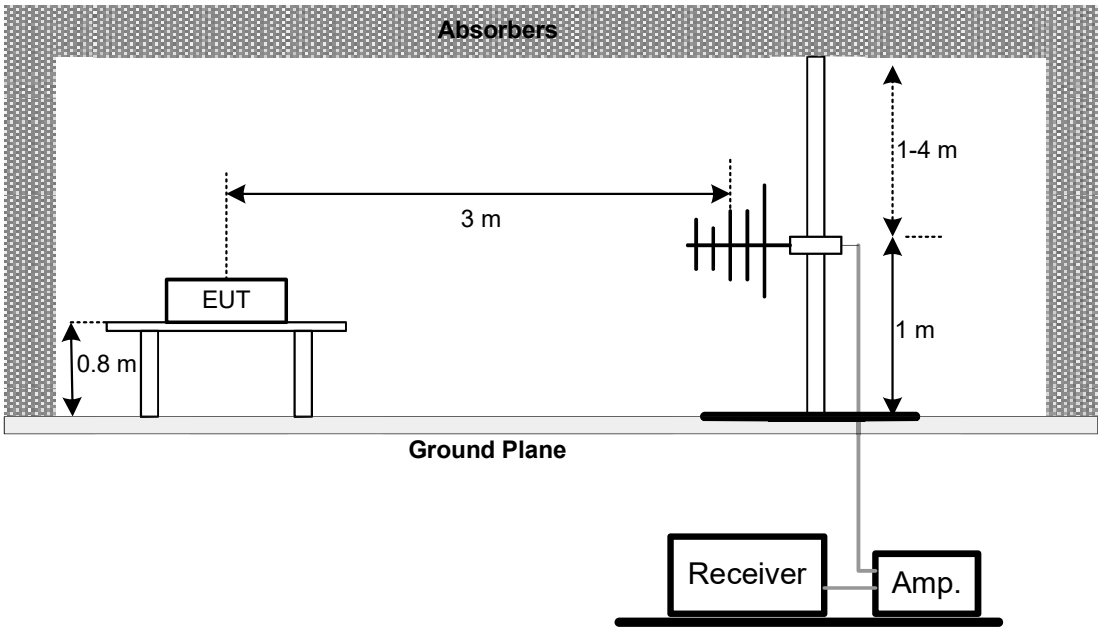
No deviation.

4.4 TEST SETUP

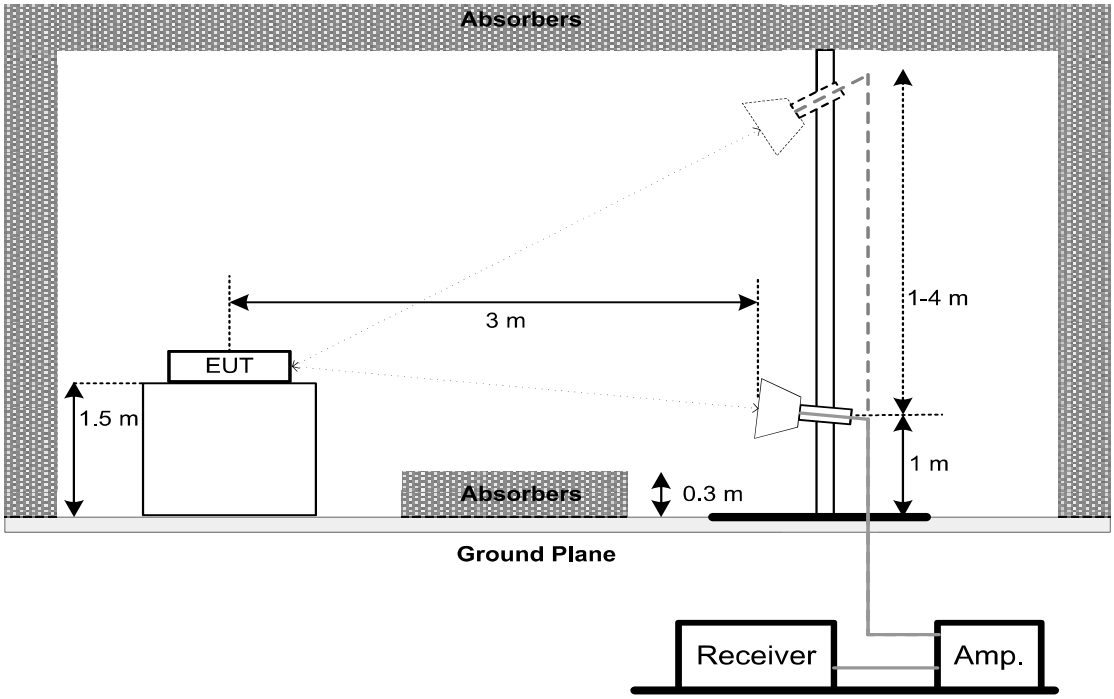
9 kHz to 30 MHz



30 MHz to 1 GHz



Above 1 GHz


Absorbers
3 m
1-4 m
EUT
1.5 m
Absorbers
0.3 m
1 m
Ground Plane
Receiver
Amp.

4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.6 TEST RESULT - 9 kHz TO 30 MHz

Please refer to the APPENDIX B.

Remark:

(1) Distance extrapolation factor = 40 log (specific distance / test distance) (dB).
(2) Limit line = specific limits (dBuV) + distance extrapolation factor.

4.7 TEST RESULT - 30 MHz TO 1000 MHz

Please refer to the APPENDIX C.

4.8 TEST RESULT - ABOVE 1000 MHz

Please refer to the APPENDIX D.

Remark:

(1) No limit: This is fundamental signal, the judgment is not applicable.
For fundamental signal judgment was referred to Peak output test.

5. BANDWIDTH

5.1 LIMIT

Section	Test Item	Limit
FCC 15.247(a)(2)	6 dB Bandwidth	>= 500 kHz
	99% Emission Bandwidth	-

5.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.

b. The following table is the setting of the spectrum analyzer:

For 6 dB Bandwidth:

Spectrum Parameters	Setting
Span Frequency	> Measurement Bandwidth
RBW	100 kHz
VBW	300 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

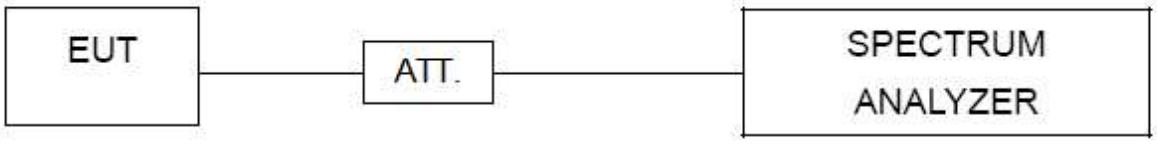
For 99% Emission Bandwidth:

Spectrum Parameters	Setting
Span Frequency	Between 1.5 times and 5.0 times the OBW
RBW	30 kHz
VBW	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.6 TEST RESULTS

Please refer to the APPENDIX E.

6. MAXIMUM OUTPUT POWER

6.1 LIMIT

Section	Test Item	Limit
FCC 15.247(b)(3)	Maximum Output Power	1.0000 watt or 30.00 dBm

6.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.

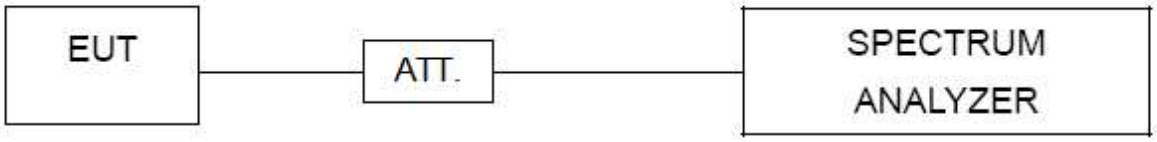
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	≥ 3×RBW
RBW	3 MHz
VBW	3 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

6.6 TEST RESULTS

Please refer to the APPENDIX F.

7. CONDUCTED SPURIOUS EMISSION

7.1 LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak Output Power limits. If the transmitter complies with the Output Power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required.

7.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Start Frequency	30 MHz
Stop Frequency	26.5 GHz
RBW	100 kHz
VBW	300 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP

7.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

7.6 TEST RESULTS

Please refer to the APPENDIX G.

8. POWER SPECTRAL DENSITY

8.1 LIMIT

Section	Test Item	Limit
FCC 15.247(e)	Power Spectral Density	8 dBm (in any 3 kHz)

8.2 TEST PROCEDURE

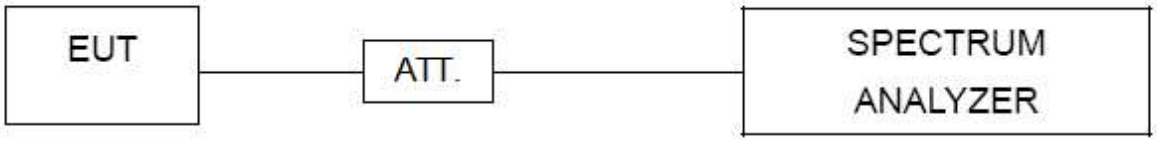
a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	2 MHz (1 Mbps)
RBW	3 kHz
VBW	10 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

8.6 TEST RESULTS

Please refer to the APPENDIX H.

9. MEASUREMENT INSTRUMENTS LIST

AC Power Line Conducted Emissions					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	TWO-LINE V-NETWORK	R&S	ENV216	101340	Jul. 12, 2025
2	Test Cable	emci	EMCRG400-BM-NM-10000	N/A	Mar. 09, 2025
3	EMI Test Receiver	R&S	ESR3	100082	Dec. 22, 2024
4	50Ω Terminator	SHX	TF2-1G-A	17051601	Feb. 2, 2025
5	50Ω coaxial switch	Anritsu	MP59B	6201750902	Feb. 2, 2025
6	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Radiated Emissions - 9 kHz to 30 MHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Loop Antenna	EMCI	EMCI LPA600	275	Mar. 12, 2025
2	MXE EMI Receiver	Keysight	N9038A	MY56400088	Feb. 2, 2025
3	Measurement Software	Farad	EZ-EMC Ver.NB-03A1	N/A	N/A
4	Pre-Amplifier	emci	EMC9135	980401	Feb. 2, 2025

Radiated Emissions - 30 MHz to 1 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	emci	VULB 9168	1467	Mar. 12, 2025
2	Pre-Amplifier	emci	EMC9135	980401	Feb. 2, 2025
3	MXE EMI Receiver	Keysight	N9038A	MY56400088	Feb. 2, 2025
4	Test Cable	emci	EMC104-SM-SM-7000	181020	May. 20, 2025
5	Test Cable	emci	RWP50-4.6A-SMSM-1M	20200928 002	May. 20, 2025
6	Test Cable	emci	EMC104-SM-SM-2500	170618	May. 20, 2025
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1	N/A	N/A

Radiated Emissions - 1 GHz to 18 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Double-Ridged Waveguide Horn Antenna	ETS-Lindgren	BBHA 9120D	9120D-1817	Mar.12, 2025
2	Pre-Amplifier	emci	EMC051845SE	980725	Jul. 12, 2025
3	EXA Spectrum Analyzer	Keysight	N9010A	MY56480579	Feb. 2, 2025
4	Test Cable	emci	EMC104-SM-SM-7000	181020	May. 20, 2025
5	Test Cable	emci	RWP50-4.6A-SMSM-1M	20200928 002	May. 20, 2025
6	Test Cable	emci	EMC104-SM-SM-2500	170618	May. 20, 2025
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1	N/A	N/A

Radiated Emissions - 18 GHz to 40 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarzbeck	BBHA9170	9170-651	Mar. 15, 2025
2	Pre-Amplifier	EMC INSTRUMENT	EMC184045B	980265	Feb. 2, 2025
3	Test Cable	emci	EMC-104HS-SM-SM-1000	240625	Aug. 5, 2025
4	Test Cable	emci	EMC104HS-SM-SM-5000	240627	Aug. 5, 2025
5	Measurement Software	Farad	EZ-EMC Ver.NB-03A1	N/A	N/A

Bandwidth					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	MXA Signal Analyzer	Keysight	N9020B	MY57120173	Feb. 2, 2025

Maximum Output Power					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	MXA Signal Analyzer	Keysight	N9020B	MY57120173	Feb. 2, 2025

Antenna Conducted Spurious Emissions					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	MXA Signal Analyzer	Keysight	N9020B	MY57120173	Feb. 2, 2025

Power Spectral Density					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	MXA Signal Analyzer	Keysight	N9020B	MY57120173	Feb. 2, 2025

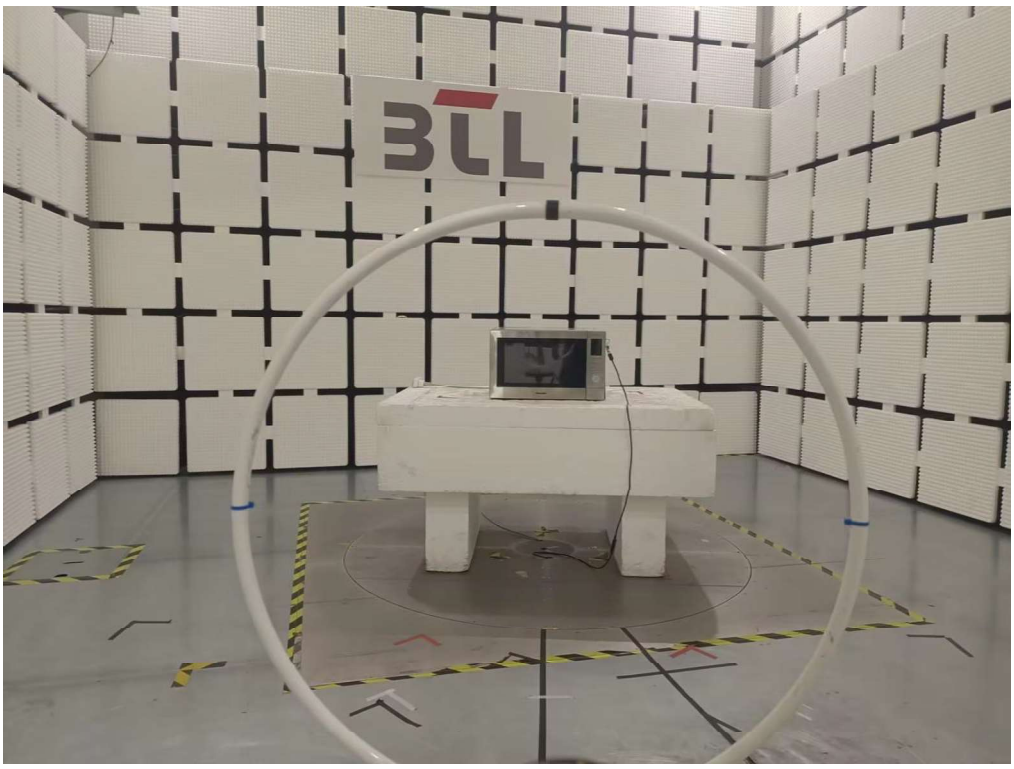
Remark: “N/A” denotes no model name, serial no. or calibration specified.
All calibration period of equipment list is one year.

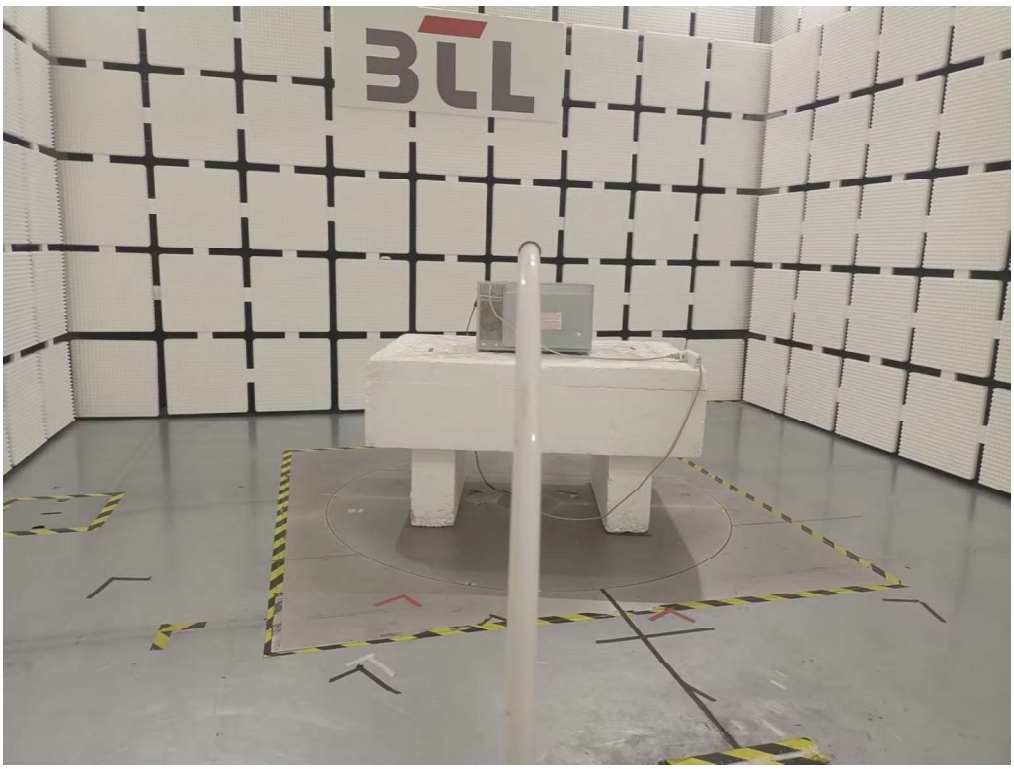
10. EUT TEST PHOTO

AC Power Line Conducted Emissions Test Photos

Radiated Emissions Test Photos

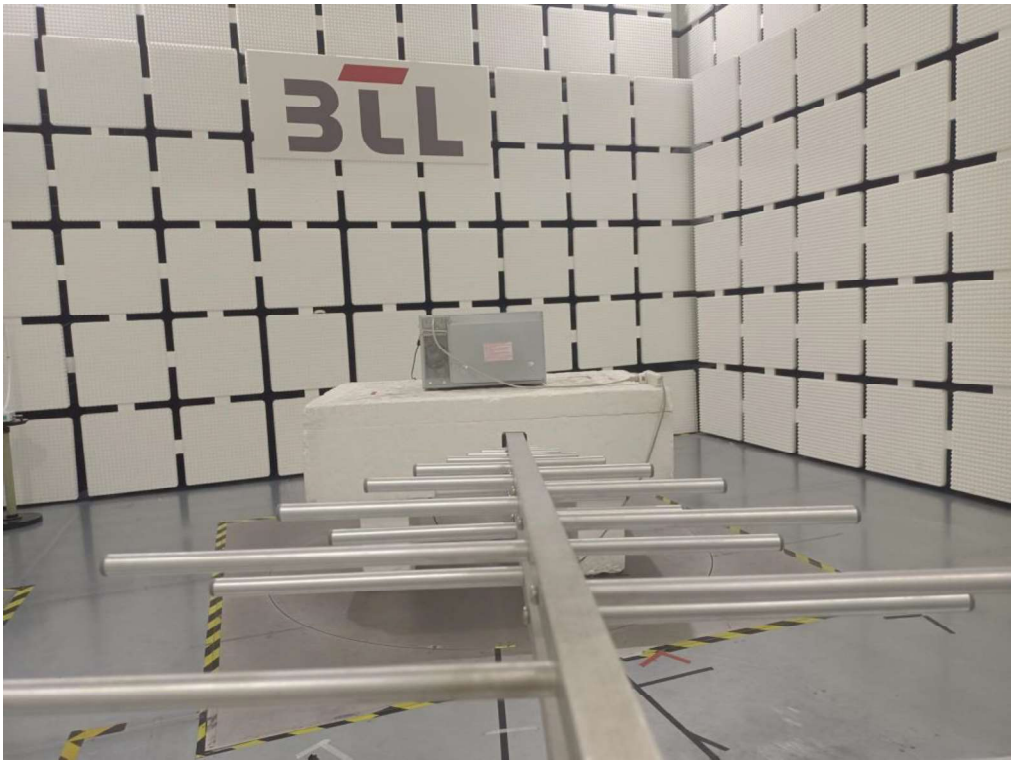
9 kHz to 30 MHz

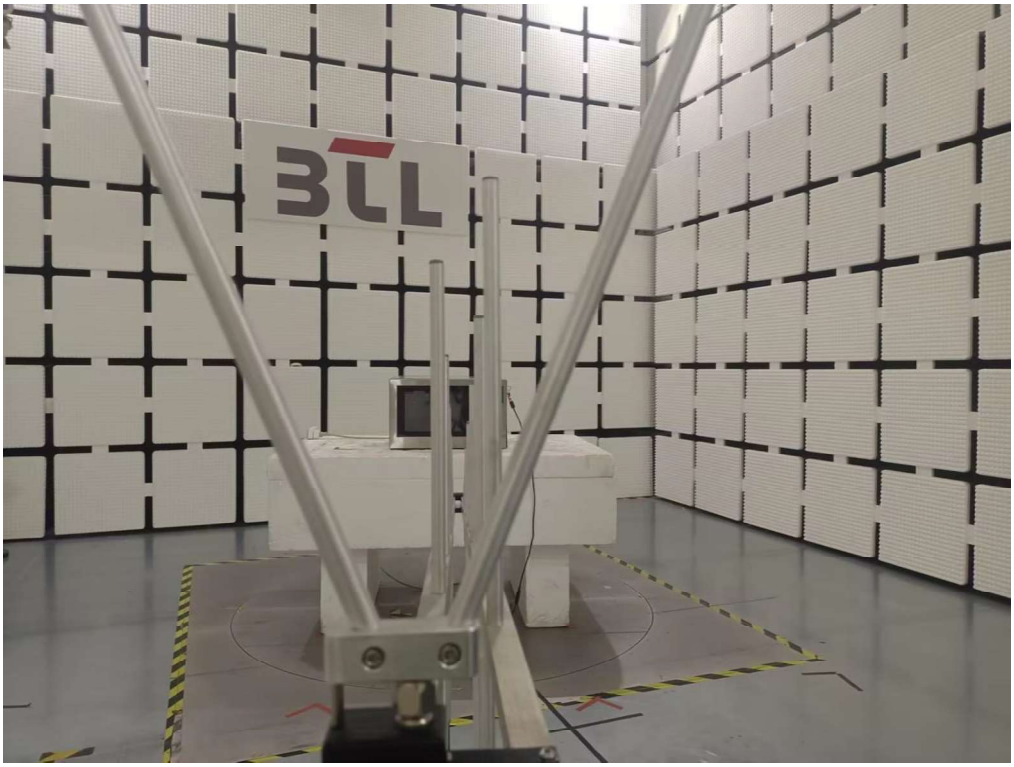




Radiated Emissions Test Photos

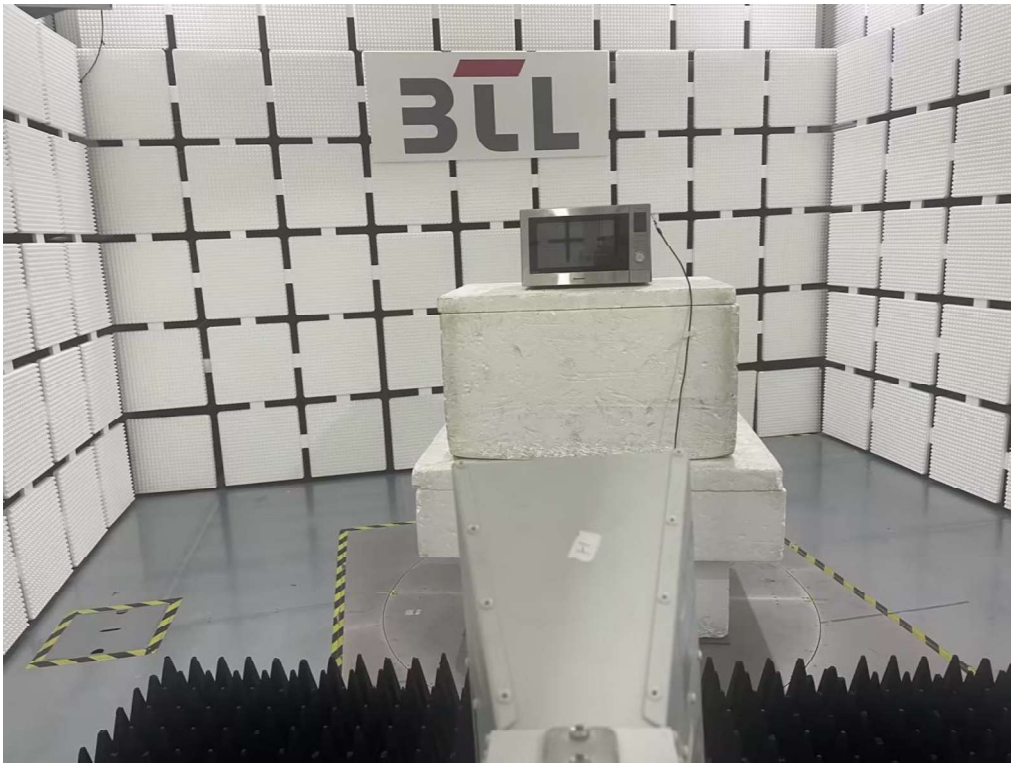
30 MHz to 1000 MHz





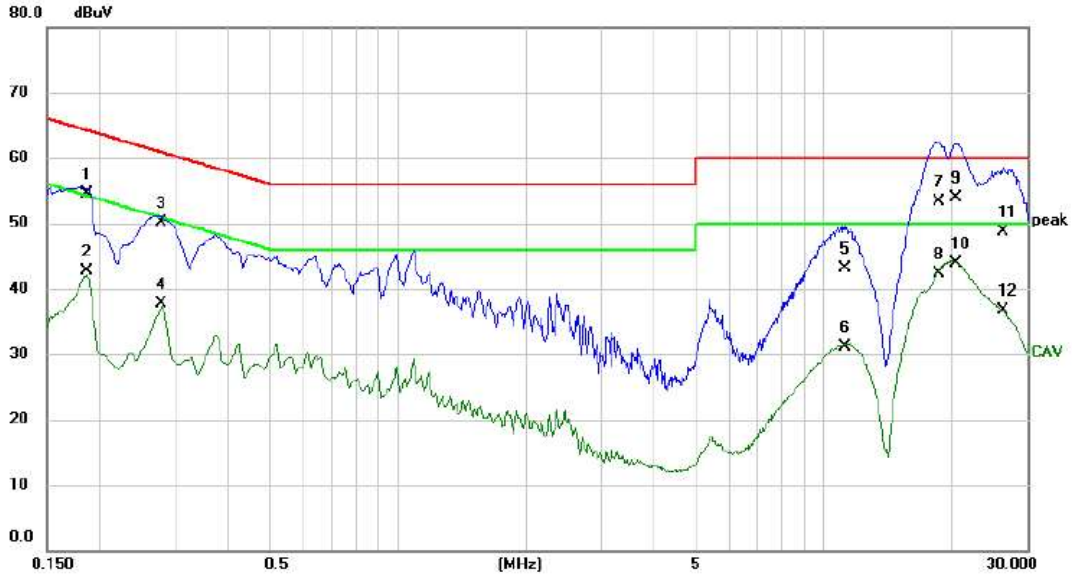
Radiated Emissions Test Photos

Above 1 GHz



APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS

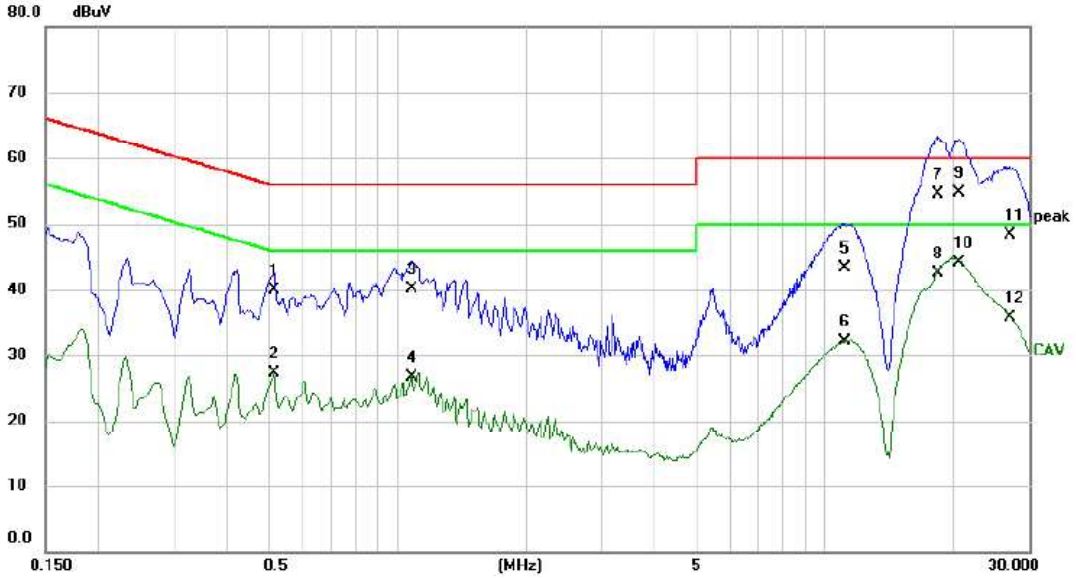
Test Mode	TX Mode_1Mbps Channel 19	Phase	Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1860	44.70	9.80	54.50	64.21	-9.71	QP	
2		0.1860	32.90	9.80	42.70	54.21	-11.51	AVG	
3		0.2788	40.20	9.83	50.03	60.85	-10.82	QP	
4		0.2788	27.90	9.83	37.73	50.85	-13.12	AVG	
5		11.1930	32.80	10.28	43.08	60.00	-16.92	QP	
6		11.1930	20.80	10.28	31.08	50.00	-18.92	AVG	
7		18.6630	42.70	10.63	53.33	60.00	-6.67	QP	
8		18.6630	31.70	10.63	42.33	50.00	-7.67	AVG	
9	*	20.4293	43.10	10.71	53.81	60.00	-6.19	QP	
10		20.4293	33.10	10.71	43.81	50.00	-6.19	AVG	
11		26.2838	37.90	10.86	48.76	60.00	-11.24	QP	
12		26.2838	25.80	10.86	36.66	50.00	-13.34	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX Mode_1Mbps Channel 19	Phase	Neutral

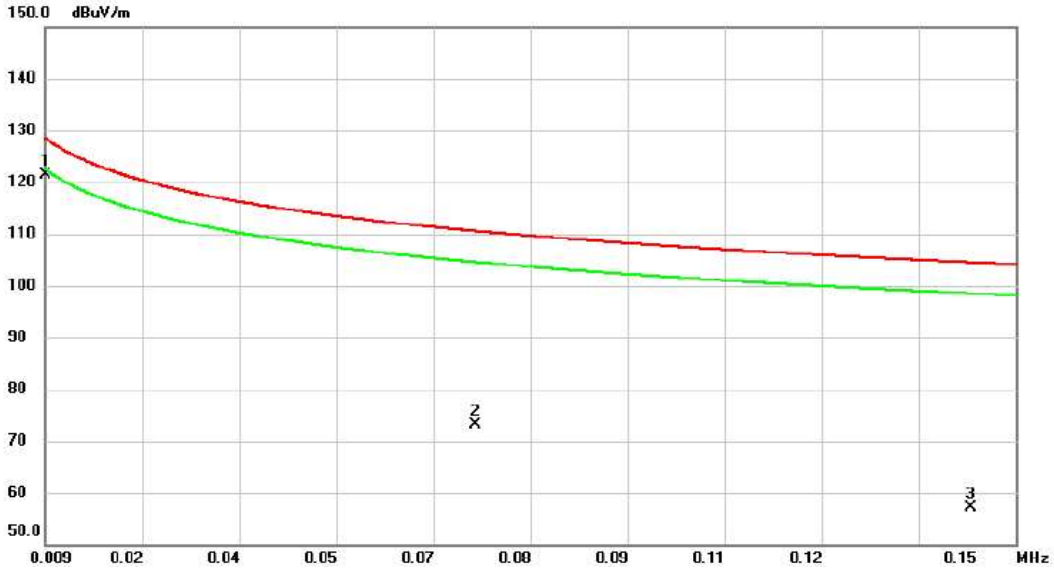


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.5144	30.10	9.83	39.93	56.00	-16.07	QP	
2		0.5144	17.50	9.83	27.33	46.00	-18.67	AVG	
3		1.0770	30.30	9.86	40.16	56.00	-15.84	QP	
4		1.0770	16.80	9.86	26.66	46.00	-19.34	AVG	
5		11.1210	33.00	10.33	43.33	60.00	-16.67	QP	
6		11.1210	21.70	10.33	32.03	50.00	-17.97	AVG	
7		18.3008	43.80	10.71	54.51	60.00	-5.49	QP	
8		18.3008	31.80	10.71	42.51	50.00	-7.49	AVG	
9	*	20.5980	43.80	10.84	54.64	60.00	-5.36	QP	
10		20.5980	33.30	10.84	44.14	50.00	-5.86	AVG	
11		27.1343	37.20	11.01	48.21	60.00	-11.79	QP	
12		27.1343	24.60	11.01	35.61	50.00	-14.39	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX B - RADIATED EMISSION - 9 KHZ TO 30 MHZ

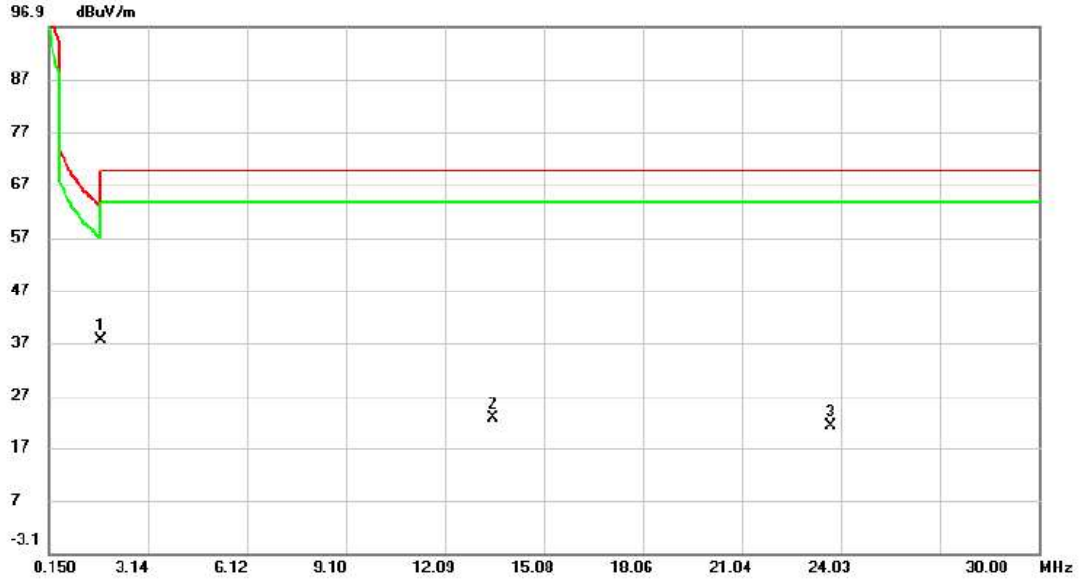
Test Mode	TX Mode_1Mbps Channel 19	Polarization	Ant 0°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV		dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.0090	51.48	69.99	121.47	128.52	-7.05	peak	
2		0.0715	37.34	35.84	73.18	110.52	-37.34	peak	
3		0.1435	31.42	25.63	57.05	104.47	-47.42	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.
(3) The peak infinite value requires that the QP measurement is < the peak measurement, so the actual value is less than the listed value

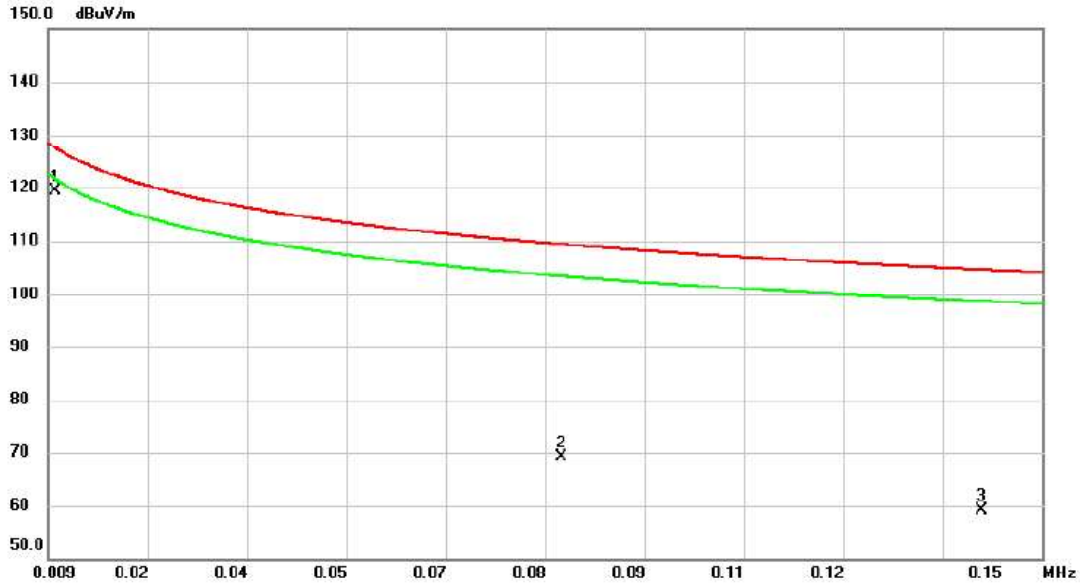
Test Mode	TX Mode_1Mbps Channel 19	Polarization	Ant 0°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV		dBuV/m	dBuV/m	dB	Detector	Comment
1	*	1.7022	35.59	1.94	37.53	62.98	-25.45	peak	
2		13.5526	24.90	-2.07	22.83	69.54	-46.71	peak	
3		23.7314	26.18	-5.02	21.16	69.54	-48.38	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.
(3) The peak infinite value requires that the QP measurement is < the peak measurement, so the actual value is less than the listed value

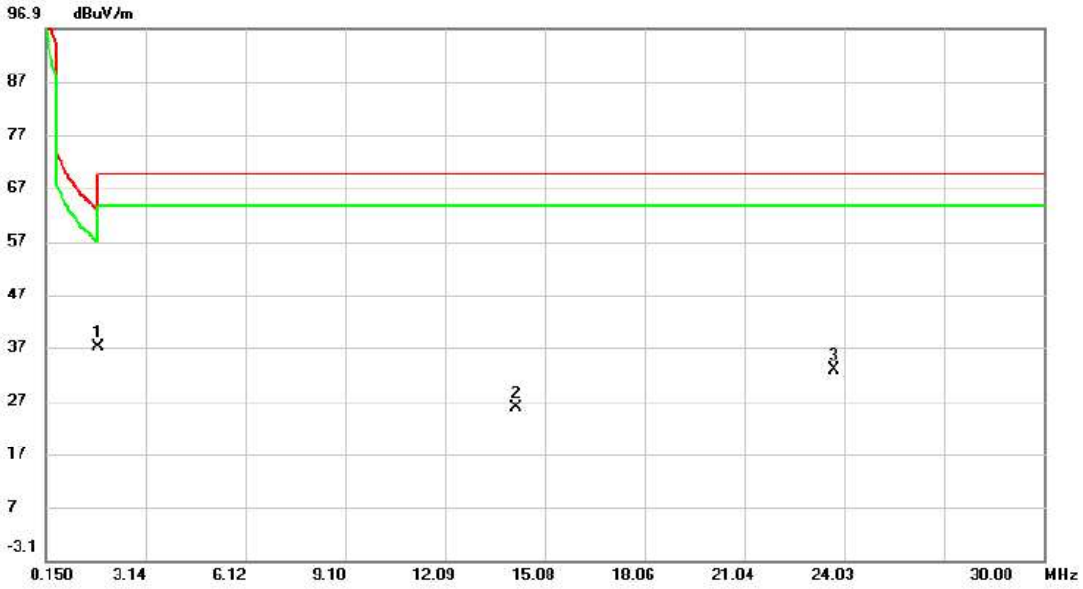
Test Mode	TX Mode_1Mbps Channel 19	Polarization	Ant 90°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV		dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.0101	51.45	67.83	119.28	127.52	-8.24	peak	
2		0.0818	36.01	33.15	69.16	109.35	-40.19	peak	
3		0.1414	33.40	25.79	59.19	104.60	-45.41	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.
(3) The peak infinite value requires that the QP measurement is < the peak measurement, so the actual value is less than the listed value

Test Mode	TX Mode_1Mbps Channel 19	Polarization	Ant 90°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV		dBuV/m	dBuV/m	dB	Detector	Comment
1	*	1.7022	35.19	1.94	37.13	62.98	-25.85	peak	
2		14.2094	27.84	-2.18	25.66	69.54	-43.88	peak	
3		23.7314	37.91	-5.02	32.89	69.54	-36.65	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.
(3) The peak infinite value requires that the QP measurement is < the peak measurement, so the actual value is less than the listed value

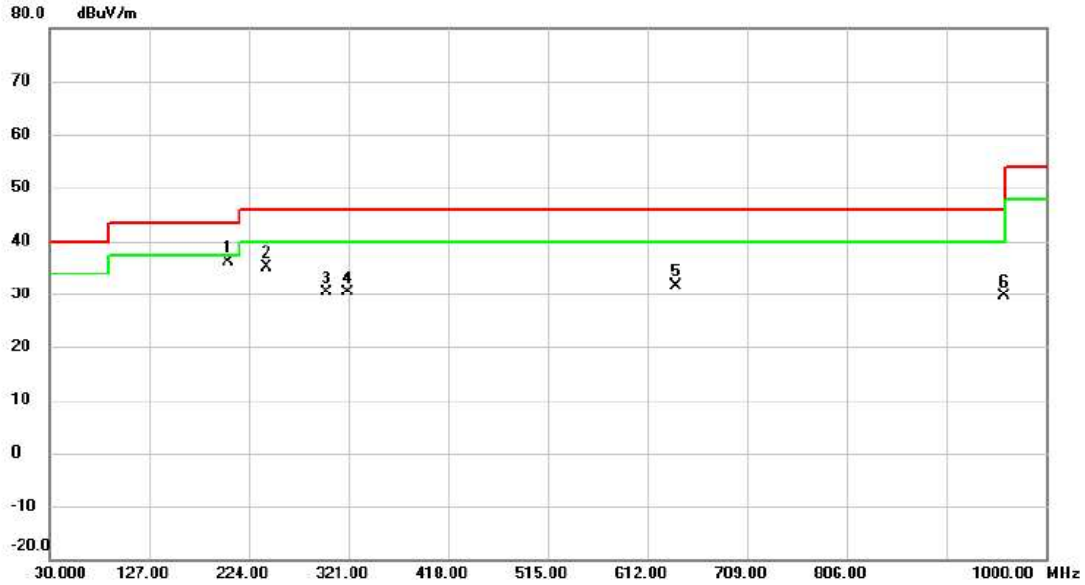
APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ

Test Mode	TX Mode_1Mbps Channel 19	Polarization	Vertical

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV		dBuV/m	dBuV/m	dB	Detector	Comment
1	*	72.6800	52.56	-19.42	33.14	40.00	-6.86	peak	
2		244.8550	43.58	-17.28	26.30	46.00	-19.70	peak	
3		400.0550	39.06	-13.01	26.05	46.00	-19.95	peak	
4		480.0800	38.52	-11.12	27.40	46.00	-18.60	peak	
5		831.2200	33.19	-5.18	28.01	46.00	-17.99	peak	
6		959.7450	38.43	-3.94	34.49	46.00	-11.51	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.
(3) The peak infinite value requires that the QP measurement is < the peak measurement, so the actual value is less than the listed value

Test Mode	TX Mode_1Mbps Channel 19	Polarization	Horizontal

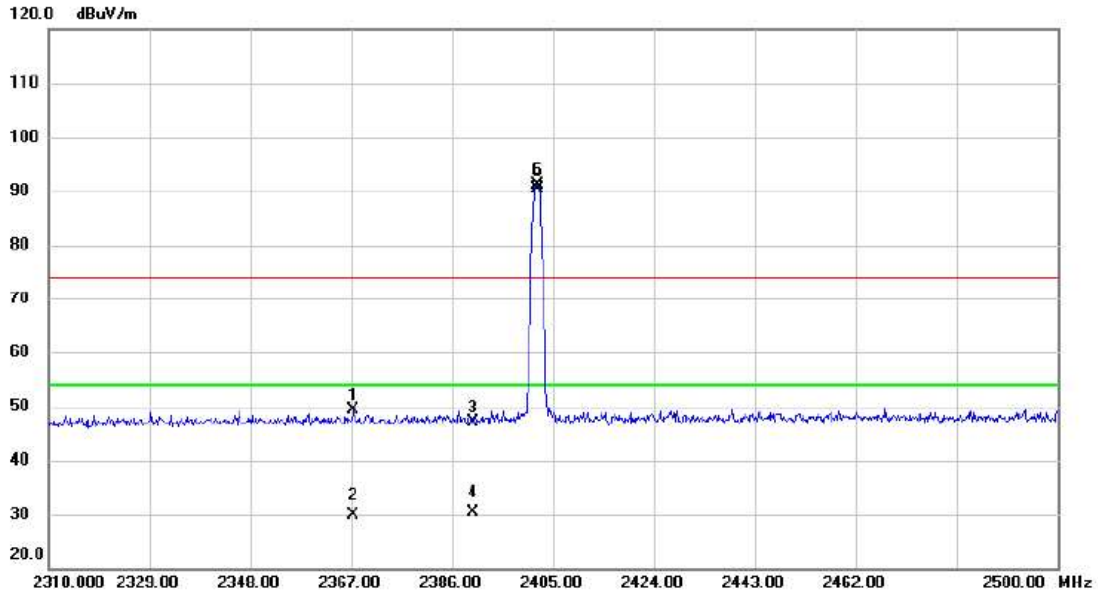


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV		dBuV/m	dBuV/m	dB	Detector	Comment
1	*	203.6300	55.33	-19.17	36.16	43.50	-7.34	peak	
2		241.4600	52.63	-17.40	35.23	46.00	-10.77	peak	
3		300.1450	45.78	-15.36	30.42	46.00	-15.58	peak	
4		320.0300	45.11	-14.75	30.36	46.00	-15.64	peak	
5		640.1300	39.82	-8.11	31.71	46.00	-14.29	peak	
6		959.7450	33.46	-3.94	29.52	46.00	-16.48	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.
(3) The peak infinite value requires that the QP measurement is < the peak measurement, so the actual value is less than the listed value

APPENDIX D - RADIATED EMISSION - ABOVE 1000 MHZ

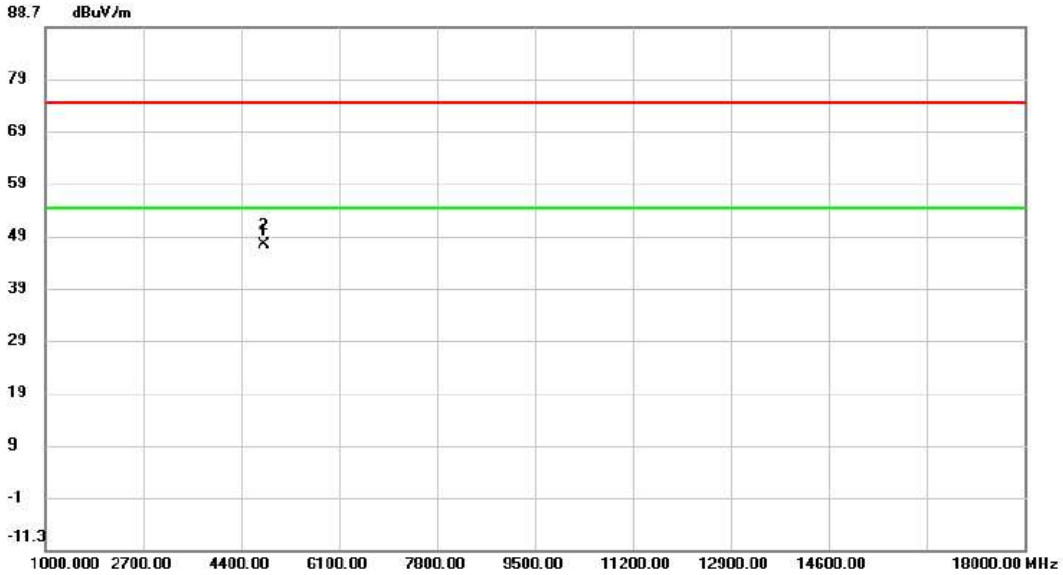
Test Mode	TX 2402 MHz _CH00_1Mbps	Polarization	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV		dBuV/m	dBuV/m	dB	Detector	Comment
1		2367.380	17.05	32.28	49.33	74.00	-24.67	peak	
2		2367.380	-2.33	32.28	29.95	54.00	-24.05	AVG	
3		2390.000	14.83	32.37	47.20	74.00	-26.80	peak	
4		2390.000	-1.97	32.37	30.40	54.00	-23.60	AVG	
5	X	2402.150	58.77	32.42	91.19	74.00	17.19	peak	
6	*	2402.150	57.89	32.42	90.31	54.00	36.31	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

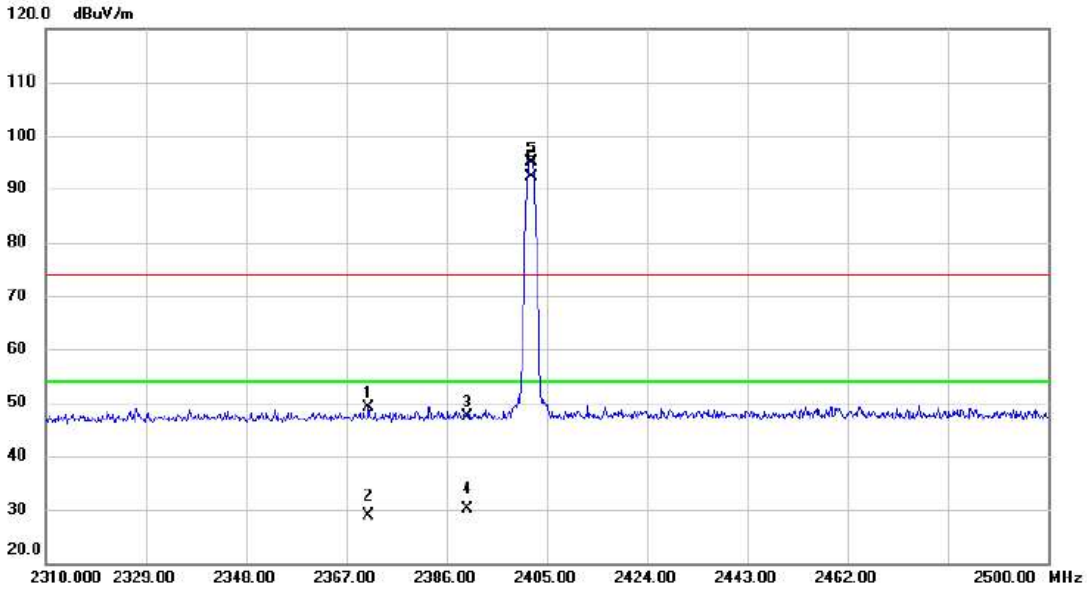
Test Mode	TX 2402 MHz _CH00_1Mbps	Polarization	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV		dBuV/m	dBuV/m	dB	Detector	Comment
1		4804.000	56.27	-9.11	47.16	74.00	-26.84	peak	
2	*	4804.000	56.27	-9.11	47.16	54.00	-6.84	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

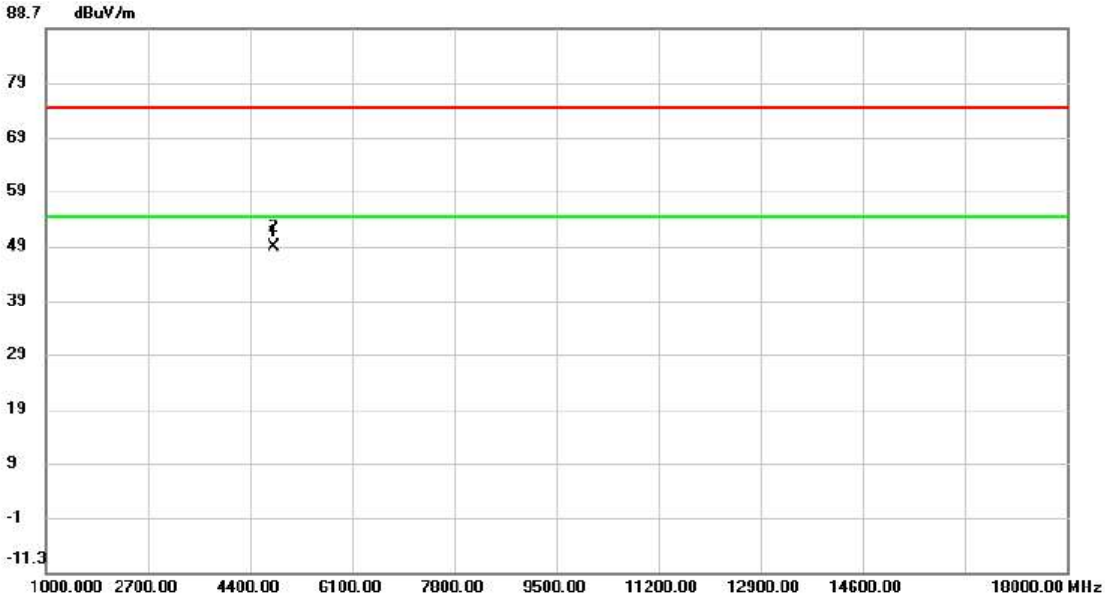
Test Mode	TX 2402 MHz _CH00_1Mbps	Polarization	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV		dBuV/m	dBuV/m	dB	Detector	Comment
1		2371.275	16.82	32.29	49.11	74.00	-24.89	peak	
2		2371.275	-3.30	32.29	28.99	54.00	-25.01	AVG	
3		2390.000	14.93	32.37	47.30	74.00	-26.70	peak	
4		2390.000	-2.29	32.37	30.08	54.00	-23.92	AVG	
5	X	2402.055	62.43	32.42	94.85	74.00	20.85	peak	
6	*	2402.055	59.81	32.42	92.23	54.00	38.23	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

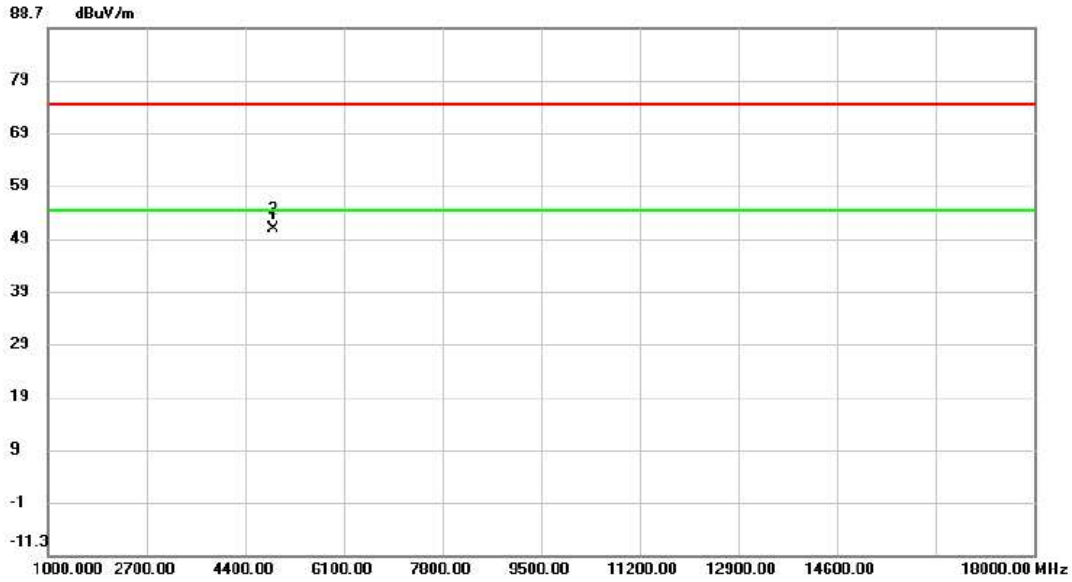
Test Mode	TX 2402 MHz _CH00_1Mbps	Polarization	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV		dBuV/m	dBuV/m	dB	Detector	Comment
1		4804.600	57.61	-9.10	48.51	74.00	-25.49	peak	
2	*	4804.600	57.61	-9.10	48.51	54.00	-5.49	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

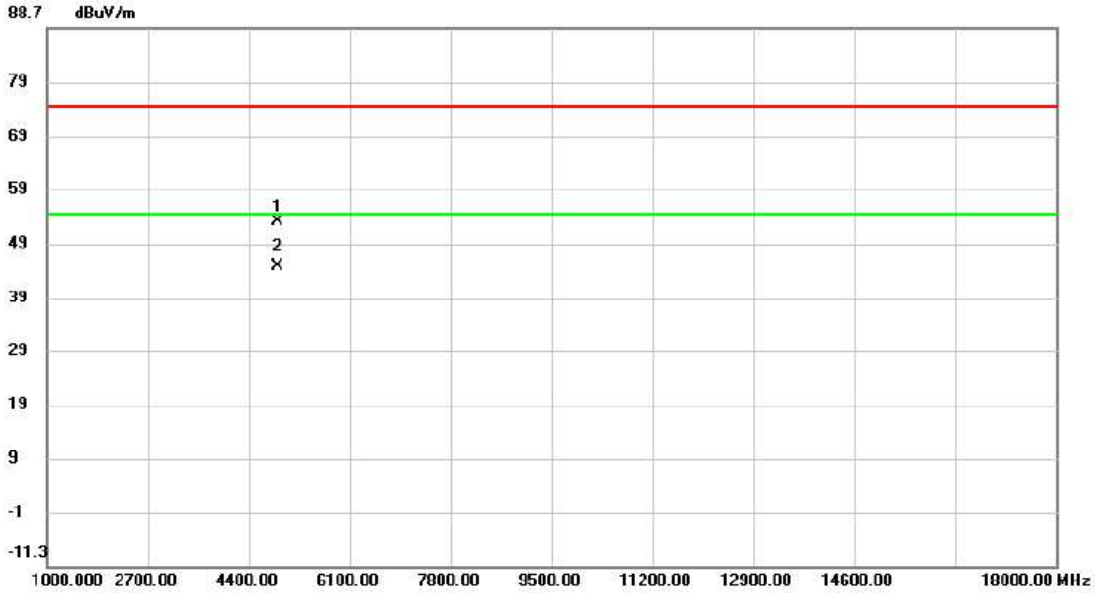
Test Mode	TX 2440 MHz _CH19_1Mbps	Polarization	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV		dBuV/m	dBuV/m	dB	Detector	Comment
1		4880.250	59.21	-8.62	50.59	74.00	-23.41	peak	
2	*	4880.250	59.21	-8.62	50.59	54.00	-3.41	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

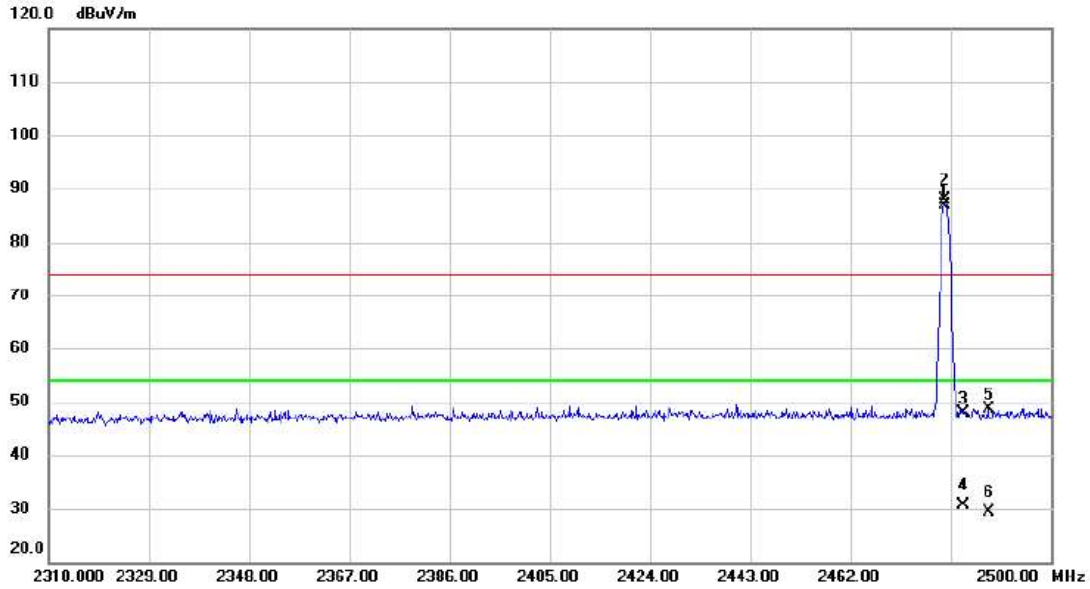
Test Mode	TX 2440 MHz _CH19_1Mbps	Polarization	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV		dBuV/m	dBuV/m	dB	Detector	Comment
1		4880.250	61.43	-8.62	52.81	74.00	-21.19	peak	
2	*	4880.250	53.11	-8.62	44.49	54.00	-9.51	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

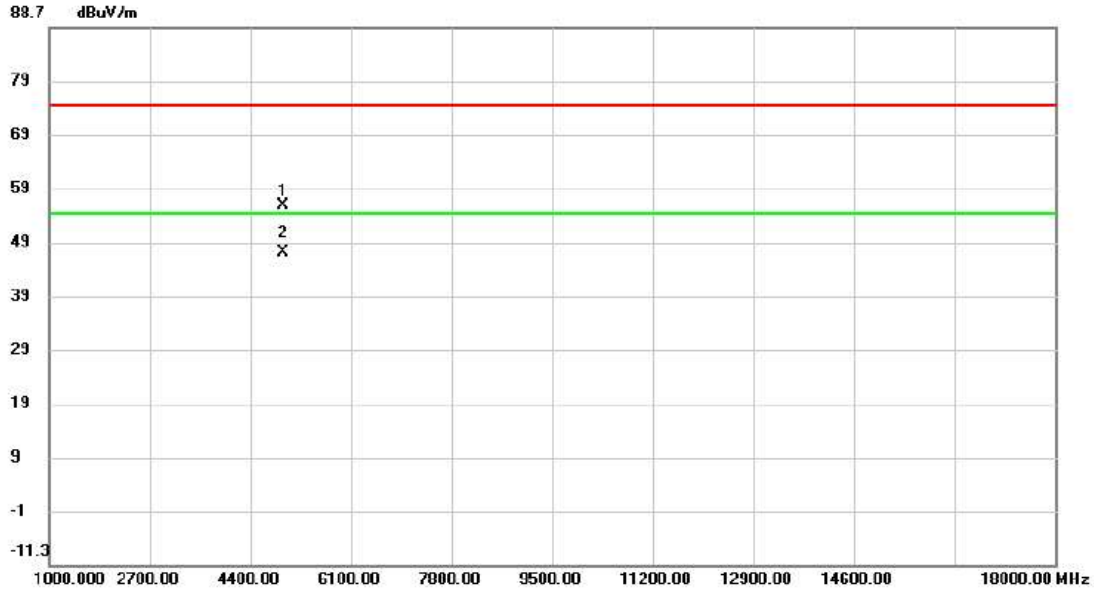
Test Mode	TX 2480 MHz _CH39_1Mbps	Polarization	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV		dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2479.765	54.26	32.73	86.99	74.00	12.99	peak	
2	*	2479.765	55.07	32.73	87.80	54.00	33.80	AVG	
3		2483.500	15.18	32.75	47.93	74.00	-26.07	peak	
4		2483.500	-2.15	32.75	30.60	54.00	-23.40	AVG	
5		2488.125	15.91	32.76	48.67	74.00	-25.33	peak	
6		2488.125	-3.27	32.76	29.49	54.00	-24.51	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

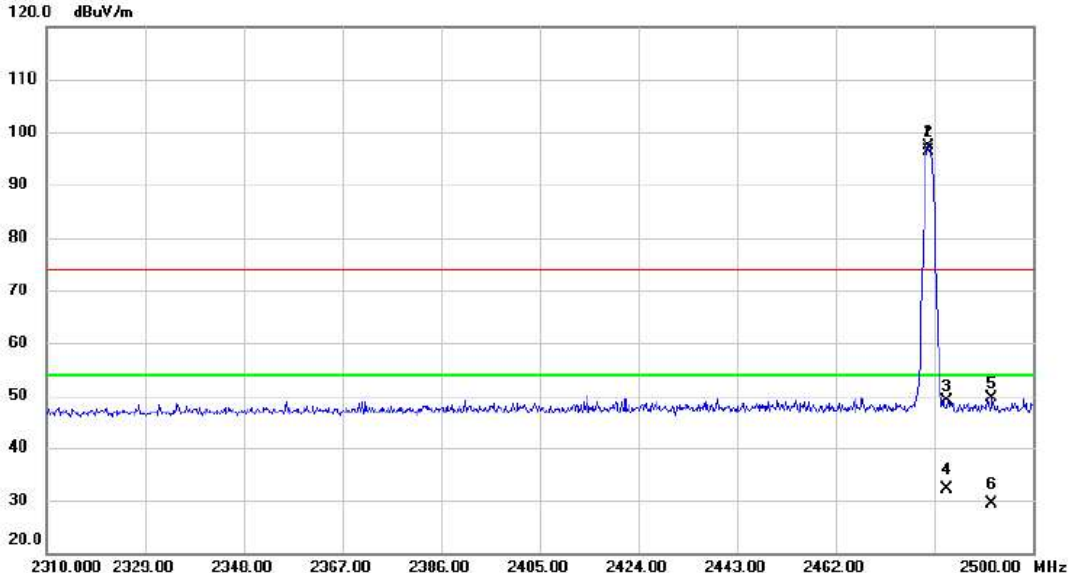
Test Mode	TX 2480 MHz _CH39_1Mbps	Polarization	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV		dBuV/m	dBuV/m	dB	Detector	Comment
1		4961.000	63.73	-8.10	55.63	74.00	-18.37	peak	
2	*	4961.000	55.04	-8.10	46.94	54.00	-7.06	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

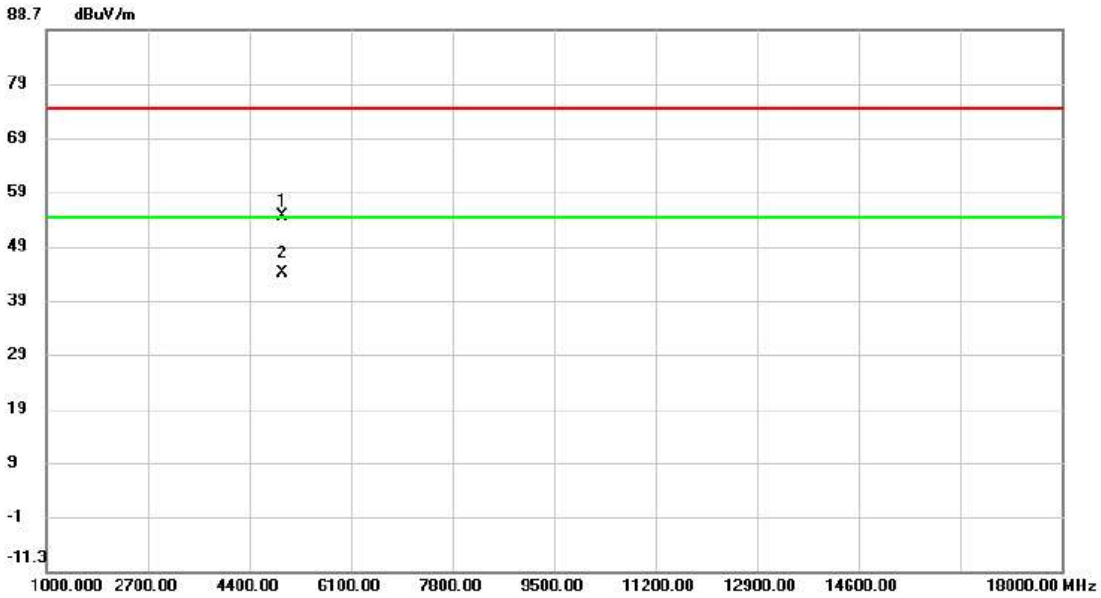
Test Mode	TX 2480 MHz _CH39_1Mbps	Polarization	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV		dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2479.955	64.73	32.73	97.46	74.00	23.46	peak	
2	*	2479.955	63.77	32.73	96.50	54.00	42.50	AVG	
3		2483.500	16.35	32.75	49.10	74.00	-24.90	peak	
4		2483.500	-0.53	32.75	32.22	54.00	-21.78	AVG	
5		2492.115	16.90	32.78	49.68	74.00	-24.32	peak	
6		2492.115	-3.35	32.78	29.43	54.00	-24.57	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX 2480 MHz _CH39_1Mbps	Polarization	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV		dBuV/m	dBuV/m	dB	Detector	Comment
1		4959.300	62.36	-8.11	54.25	74.00	-19.75	peak	
2	*	4959.300	51.85	-8.11	43.74	54.00	-10.26	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX Mode_1Mbps Channel 19	Polarization	Vertical

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV		dBuV/m	dBuV/m	dB	Detector	Comment
1	*	34788.200	53.40	-1.04	52.36	74.00	-21.64	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX Mode_1Mbps Channel 19	Polarization	Horizontal

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV		dBuV/m	dBuV/m	dB	Detector	Comment
1	*	29819.500	53.08	-3.11	49.97	74.00	-24.03	peak	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

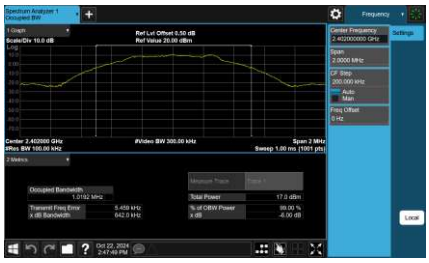
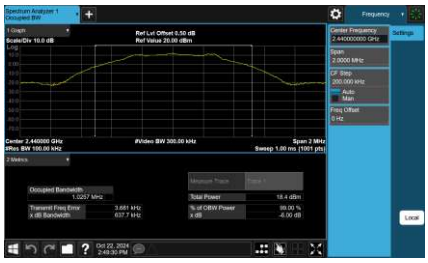
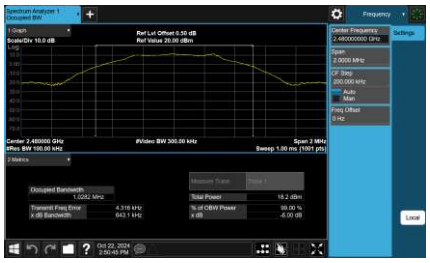
APPENDIX E - BANDWIDTH

Test Mode	TX Mode _1Mbps

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99 % Occupied Bandwidth (MHz)	6 dB Bandwidth Min. Limit (MHz)	Test Result
00	2402	0.642	1.018	0.5	Pass
19	2440	0.638	1.022	0.5	Pass
39	2480	0.643	1.023	0.5	Pass

CH00 **CH19** **CH39**

6 dB Bandwidth

99 % Occupied Bandwidth

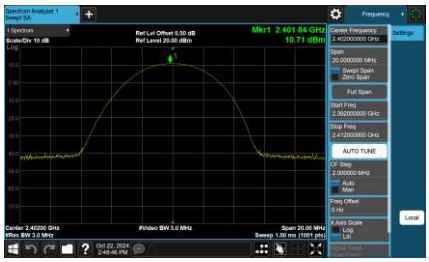


APPENDIX F - MAXIMUM OUTPUT POWER

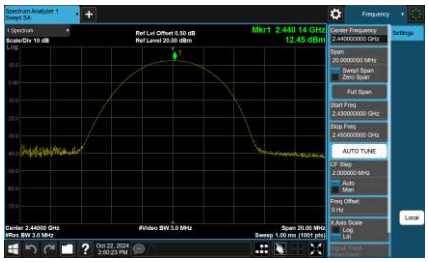
Test Mode	TX Mode _1Mbps

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
2402	10.71	0.0118	30.00	1.0000	Pass
2440	12.45	0.0176	30.00	1.0000	Pass
2480	12.03	0.0160	30.00	1.0000	Pass

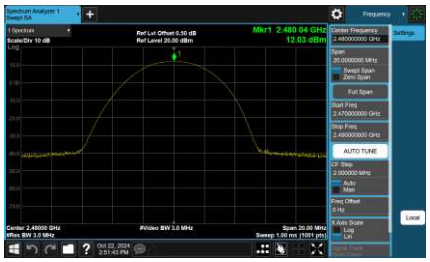
CH00



CH19



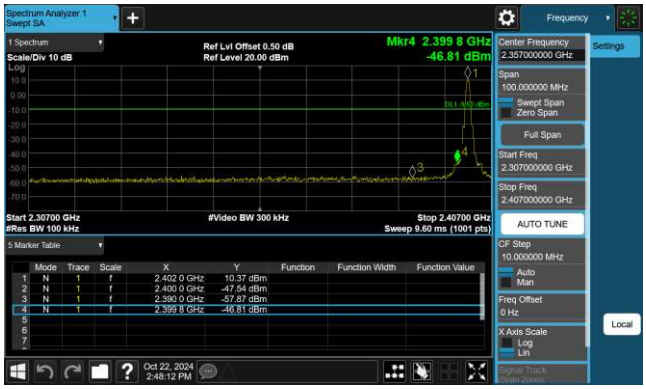
CH39



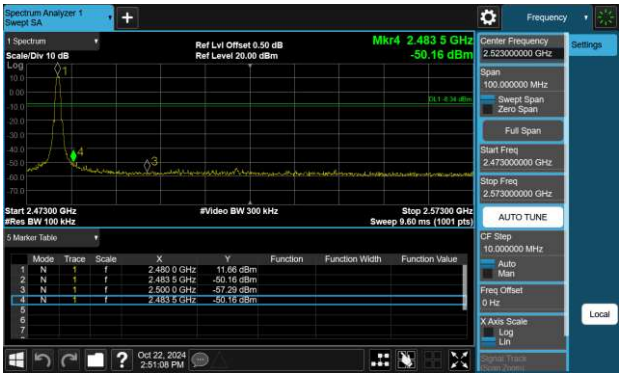
APPENDIX G - CONDUCTED SPURIOUS EMISSION

Test Mode	TX Mode _1Mbps

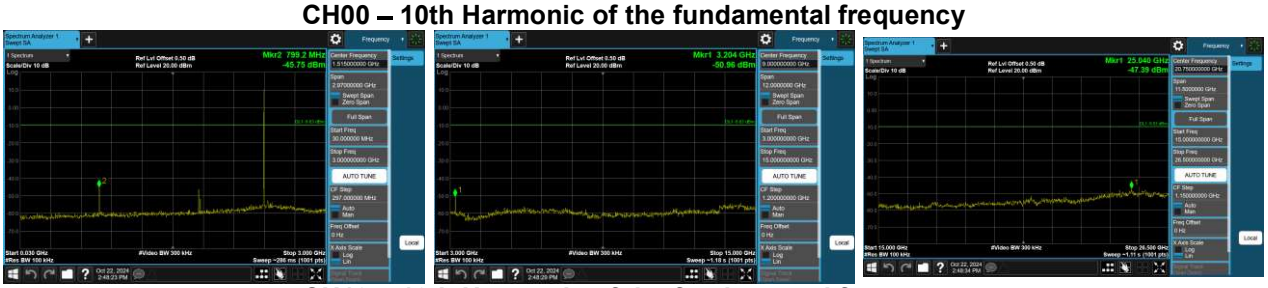
Bandedge CH00 (Lower)



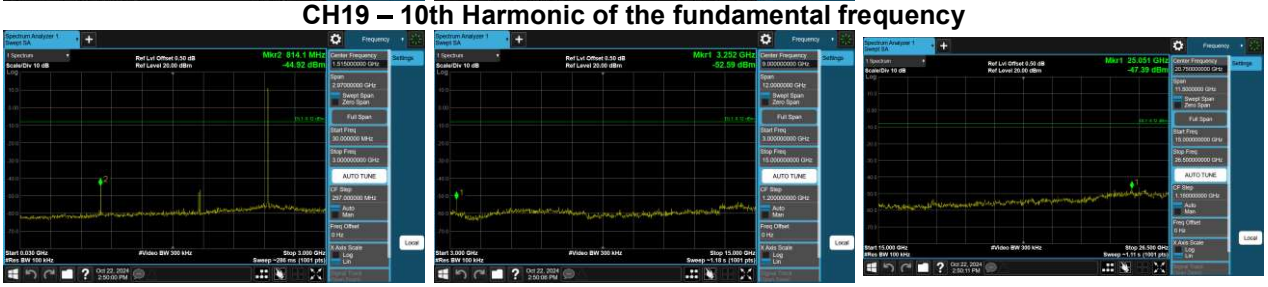
Bandedge CH39 (Upper)



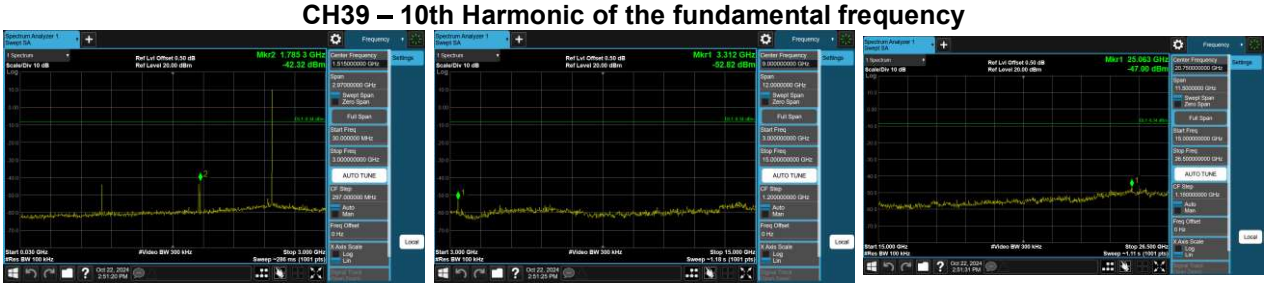
CH00 – 10th Harmonic of the fundamental frequency



CH19 – 10th Harmonic of the fundamental frequency



CH39 – 10th Harmonic of the fundamental frequency

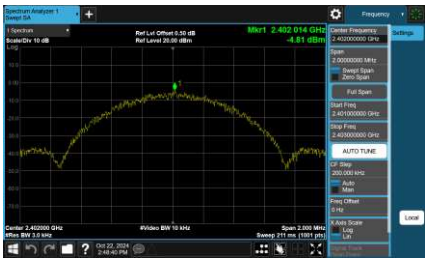


APPENDIX H - POWER SPECTRAL DENSITY

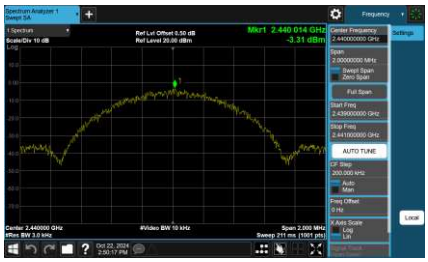
Test Mode	TX Mode _1Mbps

Channel	Frequency (MHz)	Power Spectral Density (dBm/3 kHz)	Max. Limit (dBm/3 kHz)	Test Result
00	2402	-4.81	8.00	Pass
19	2440	-3.31	8.00	Pass
39	2480	-3.50	8.00	Pass

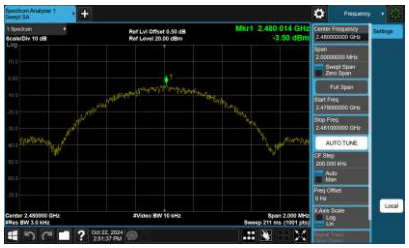
CH00



CH19



CH39



End of Test Report