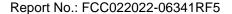


Product Name: Power Station	Report No: FCC022022-06341RF5
Product Model: PN0430A	Security Classification: Open
Version: V1.0	Total Page: 80

TIRT Testing Report



Prepared By:	Checked By:	Approved By:	chnology Se
Stone Tang	Randy Lv	Daniel Chen	Secret File
Stone Tang	Randy LV	Daniel Chen	Shenzhen Co.





FCC Radio Test Report

FCC ID: 2AOK9-PN0430A

This report concerns: Original Grant

Project No. : 2022-06341 Equipment : Power Station

Brand Name : 70mai
Test Model : PN0430A
Series Model : N/A

Applicant: 70mai Co.,Ltd.

Address : Room 2220, building 2, No. 588, Zixing road, MinHang District,

Shanghai. CHINA

Manufacturer : 70mai Co.,Ltd.

Address : Room 2220, building 2, No. 588, Zixing road, MinHang District,

Shanghai. CHINA

Date of Receipt : Dec. 16, 2022

Date of Test : Dec. 19, 2022~Dec. 28, 2022

Issued Date : Dec. 30, 2022

Report Version : V1.0

Test Sample : Engineering Sample No.: 20221213021569 Standard(s) : FCC CFR Title 47, Part 15, Subpart C

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

ANSI C63.10-2013

• The test result referred exclusively to the presented test model /sample.

 Without written approval of TIRT Inc. the test report shall not reproduced except in full.

Lab: Beijing TIRT Technology Service Co.,Ltd Shenzhen

Add: 101, 3 # Factory Building, Gongjin Electronics Shatin Community, Kengzi Street, Pingshan

District, Shenzhen, China

TEL: +86-0755-27087573



Table of Contents	Page
REPORT ISSUED HISTORY	6
1 . SUMMARY OF TEST RESULTS	7
1.1 TEST FACILITY	8
1.2 MEASUREMENT UNCERTAINTY	8
1.3 TEST ENVIRONMENT CONDITIONS	9
2. GENERAL INFORMATION	10
2.1 GENERAL DESCRIPTION OF EUT	10
2.2 DESCRIPTION OF TEST MODES	12
2.3 PARAMETERS OF TEST SOFTWARE	13
2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	14
2.5 SUPPORT UNITS	14
3 . AC POWER LINE CONDUCTED EMISSIONS	15
3.1 LIMIT	15
3.2 TEST PROCEDURE	15
3.3 DEVIATION FROM TEST STANDARD	15
3.4 TEST SETUP	16
3.5 EUT OPERATING CONDITIONS	16
3.6 TEST RESULTS	16
4 . RADIATED EMISSIONS	17
4.1 LIMIT	17
4.2 TEST PROCEDURE	19
4.3 DEVIATION FROM TEST STANDARD	20
4.4 TEST SETUP	20
4.5 EUT OPERATING CONDITIONS	22
4.6 TEST RESULT - 9 KHZ TO 30 MHZ	22
4.7 TEST RESULT - 30 MHZ TO 1000 MHZ	22
4.8 TEST RESULT - ABOVE 1000 MHZ	22
5 . BANDWIDTH	23
5.1 LIMIT	23
5.2 TEST PROCEDURE	23
5.3 DEVIATION FROM STANDARD	23
5.4 TEST SETUP	23



Table of Contents	Page
5.5 EUT OPERATION CONDITIONS	23
5.6 TEST RESULTS	23
6 . MAXIMUM OUTPUT POWER	24
6.1 LIMIT	24
6.2 TEST PROCEDURE	24
6.3 DEVIATION FROM STANDARD	24
6.4 TEST SETUP	24
6.5 EUT OPERATION CONDITIONS	24
6.6 TEST RESULTS	24
7. CONDUCTED SPURIOUS EMISSION	25
7.1 LIMIT	25
7.2 TEST PROCEDURE	25
7.3 DEVIATION FROM STANDARD	25
7.4 TEST SETUP	25
7.5 EUT OPERATION CONDITIONS	25
7.6 TEST RESULTS	25
8 . POWER SPECTRAL DENSITY	26
8.1 LIMIT	26
8.2 TEST PROCEDURE	26
8.3 DEVIATION FROM STANDARD	26
8.4 TEST SETUP	26
8.5 EUT OPERATION CONDITIONS	26
8.6 TEST RESULTS	26
9 . MEASUREMENT INSTRUMENTS LIST	27
10 . EUT TEST PHOTO	28
APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS	29
APPENDIX B - RADIATED EMISSION - 9 KHZ TO 30 MHZ	32
APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ	34
APPENDIX D - RADIATED EMISSION - ABOVE 1000 MHZ	37
APPENDIX E - BANDWIDTH	58
APPENDIX F - MAXIMUM OUTPUT POWER	65



Table of Contents	Page
APPENDIX G - CONDUCTED SPURIOUS EMISSION	69
APPENDIX H - POWER SPECTRAL DENSITY	77



REPORT ISSUED HISTORY

Report No.	Version	Description	Issued Date	Note
FCC022022-06341RF5	V1.0	Original Report.	2022.12.30	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) &}quot;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

Company:	Beijing TIRT Technology Service Co.,Ltd Shenzhen
Address:	101, 3 # Factory Building, Gongjin Electronics Shatin Community, Kengzi Street, Pingshan District, Shenzhen, China
CNAS Registration Number:	CNAS L14158
A2LA Registration Number:	6049.01
FCC Accredited Lab. Designation Number:	CN1309
FCC Test Firm Registration Number:	825524
Telephone:	+86-0755-27087573

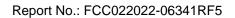
1.2 MEASUREMENT UNCERTAINTY

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 TIRT measurement uncertainty as below table:

Uncertainty	
Parameter	Uncertainty
Occupied Channel Bandwidth	±142.12 kHz
RF power conducted	±0.74 dB
RF power radiated	±3.25dB
Spurious emissions, conducted	±1.78dB
Spurious emissions, radiated (30MHz~1GHz)	±4.6dB
Spurious emissions, radiated (1GHz~18GHz)	±4.9dB
Conduction Emissions(150kHz~30MHz)	±3.1 dB
Humidity	±4.6%
Temprature	±0.7°C
Time	±1.25%

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	48%	AC 120V/60Hz	Stone Tang
Radiated Emissions-9 kHz to 30 MHz	23.9°C	51%	AC 120V/60Hz	Stone Tang
Radiated Emissions-30 MHz to 1000 MHz	23.9°C	51%	AC 120V/60Hz	Stone Tang
Radiated Emissions-Above 1000 MHz	23.7°C	50%	AC 120V/60Hz	Stone Tang
Bandwidth	25°C	49%	AC 120V/60Hz	Stone Tang
Maximum Output Power	25°C	49%	AC 120V/60Hz	Stone Tang
Conducted Spurious Emission	25°C	49%	AC 120V/60Hz	Stone Tang
Power Spectral Density	25°C	49%	AC 120V/60Hz	Stone Tang



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Power Station
Brand Name	70mai
Test Model	PN0430A
Series Model	N/A
Model Difference(s)	N/A
Software Version	N/A
Hardware Version	N/A
Power Source	1# Supplied from DC INPUT port 2# Supplied from Type-C port 3# Supplied from SOLAR INPUT port
Power Rating	1# DC 12-24V, 100W 2# 5-20V===5A, 100W 3# DC 12-24V, 120W
Operation Frequency	2402 MHz ~ 2480 MHz
Modulation Type	GFSK
Bit Rate of Transmitter	1Mbps, 2Mbps
Max. Output Power	1Mbps: 7.31 dBm (0.005383 W)

Note:

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



2. Channel List:

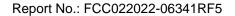
Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	20	2442
01	2404	21	2444
02	2406	22	2446
03	2408	23	2448
04	2410	24	2450
05	2412	25	2452
06	2414	26	2454
07	2416	27	2456
08	2418	28	2458
09	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
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	PCB	N/A	0.5

Note:

The antenna gain is provided by the manufacturer.
 The antenna is for testing purposes only.





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	est Mode Description	
Mode 1	TX Mode_1Mbps Channel 00/19/39	
Mode 2	TX Mode_2Mbps Channel 00/19/39	
Mode 3	TX Mode_2Mbps Channel 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 3 TX Mode_2Mbps Channel 39			

Radiated emissions test - Below 1GHz			
Final Test Mode Description			
Mode 3	TX Mode_2Mbps Channel 39		

Radiated emissions test - Above 1GHz			
Final Test Mode Description			
Mode 1	TX Mode_1Mbps Channel 00/19/39		
Mode 2	TX Mode_2Mbps Channel 00/19/39		

Conducted test			
Final Test Mode Description			
Mode 1	TX Mode_1Mbps Channel 00/19/39		
Mode 2	TX Mode_2Mbps Channel 00/19/39		

Note:

- (1) For radiated emission above 1 GHz test, the spurious points of 1GHz~26.5GHz have been pre-tested and in this report only recorded the worst case. The remaining spurious points are all below the limit value of 20dB.
- (2) For AC power line conducted emissions and radiated emissions below 1 GHz test, the 2Mbps Channel 39 is found to be the worst case and recorded.



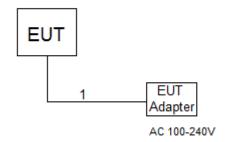
2.3 PARAMETERS OF TEST SOFTWARE

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	sscom5.13.1		
Frequency (MHz)	2402	2440	2480
1Mbps	default	default	default
2Mbps	default	default	default



2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.5 SUPPORT UNITS

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	DC	N/A	N/A	1M



3. AC POWER LINE CONDUCTED EMISSIONS

3.1 LIMIT

Fraguency of Emission (MHz)	Limit (dBμV)		
Frequency of Emission (MHz)	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:

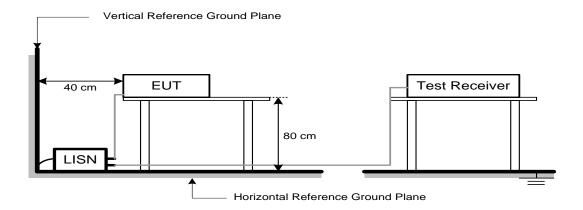
the remarking terminal terminal and the second seco				
Receiver Parameters	Setting			
Start Frequency	0.15 MHz			
Stop Frequency	30 MHz			
IF Bandwidth	9 kHz			

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 <code>Note</code>. 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	Field Strength	Measurement Distance
(MHz)	(microvolts/meter)	(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)		
r requericy (Wir12)	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	1 MHz / 3 MHz for PK value
(Emission in restricted band)	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

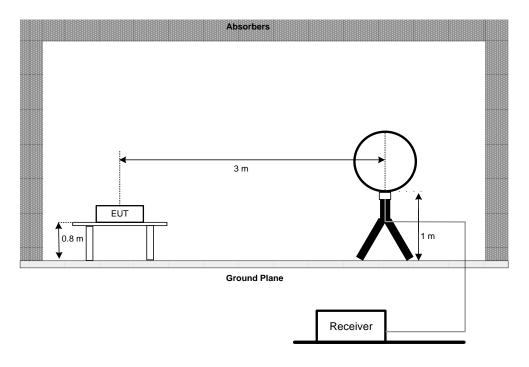


4.3 DEVIATION FROM TEST STANDARD

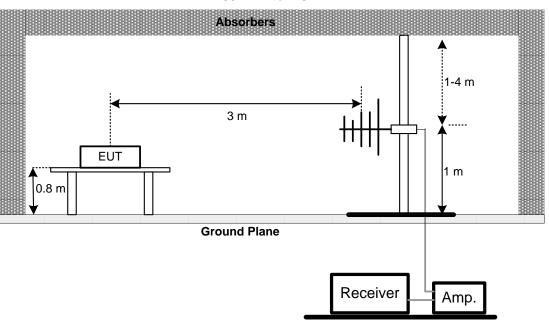
No deviation.

4.4 TEST SETUP

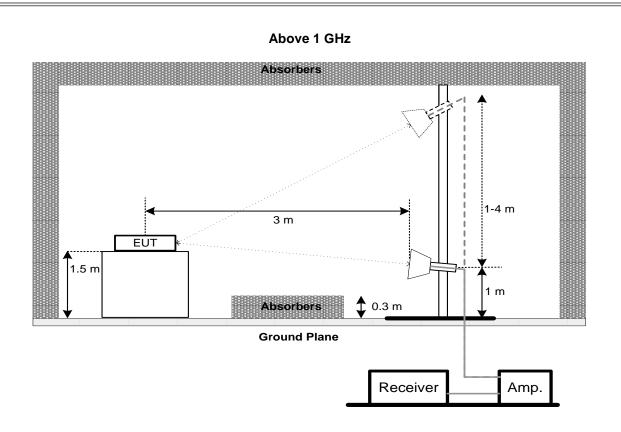
9 kHz to 30 MHz

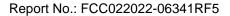


30 MHz to 1 GHz











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:

For 99% Emission Bandwidth:

1 01 33 /0 LITISSION Dandwidti	1.
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) / 4 MHz (2 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

No.	Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMI Receiver	Rohde&Schwarz	ESCI	1166.5950.03	2023/10/14
2	AMN	Rohde&Schwarz	ENV216	3560.6550.05	2023/10/14
3	AMN	Schwarzbeck	NSLK8127	#829	2023/10/14
4	ECSI RF IN RF Cable	Rohde&Schwarz	RP-X1	\	2023/10/14
5	ECSI RF IN RF Cable	Rohde&Schwarz	Sapre sm	\	2023/10/14
6	EMI Receiver	Rohde&Schwarz	ESR7	102013	2023/10/14
7	Spectrum analyzer	Rohde&Schwarz	FSV30	103741	2023/10/17
8	EMI receiver	Rohde&Schwarz	ESU	100184	2023/07/20
9	Spectrum analyzer	KEYSIGHT	N9010A-44	MY51440158	2023/10/17
10	Loop Antenna*	Schwarzbeck	FMZB1519B	00029	2025/07/03
11	Integral Antenna	Schwarzbeck	VULB 9163	VULB 9163-361	2023/10/20
12	Integral Antenna	Schwarzbeck	BBHA 9120D	BBHA 9120D 1201	2023/10/15
13	Integral Antenna	Schwarzbeck	BBHA 9170	9170#685	2023/10/15
14	Preamplifier	CD Systems Inc	PAP-03036- 30	85060000	2023/10/15
15	Preamplifier	Schwarzbeck	BBV9721	9721-019	2023/10/15
16	Preamplifier	emci	EMC012645 SE	980417	2023/10/16
17	ECSI RF IN RF Cable	Rohde&Schwarz	AP-X1	\	2023/10/16
18	Spectrum Analyzer	Agilent	N9010A	MY52221119	2023/10/17
19	Power Collection Unit	Tonscend	JS0806-2	188060134	2023/10/16
20	Tonscend Test System	Tonscend	2.6.77.0518	N/A	N/A
21	10dB Attenuator	Tonscend	10dB	N/A	N/A
22	Temp&Humidity Recorder	Anymetre	JR900	N/A	2023/10/16
23	Temp&Humidity Chamber	ETOMA	NTH1100-30 A	16080628	2023/10/16
24	Filter	STI	STI15-9845	N/A	N/A
25	Filter	STI	5.1G	N/A	N/A
26	Filter	STI	STI15-9845	N/A	N/A
27	Testing Software	EZ-EMC	TW-03A2	N/A	N/A

Remark: "N/A" denotes no model name, serial no. or calibration specified.

"*" calibration period of equipment list is three year.

Except * item, all calibration period of equipment list is one year.



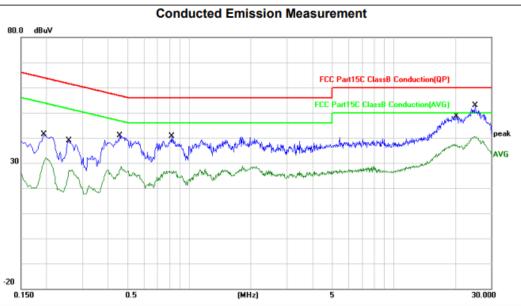
10. EUT TEST PHOTO	
	Please refer to the APPENDIX_TEST SETUP



APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS	





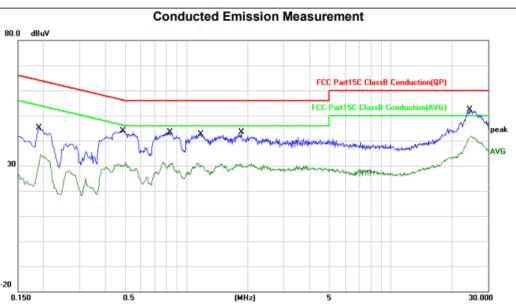


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1940	18.98	19.88	38.86	63.86	-25.00	QP	
2		0.1940	11.27	19.88	31.15	53.86	-22.71	AVG	
3		0.2580	15.32	19.88	35.20	61.50	-26.30	QP	
4		0.2580	6.61	19.88	26.49	51.50	-25.01	AVG	
5		0.4580	17.22	19.88	37.10	56.73	-19.63	QP	
6		0.4580	7.31	19.88	27.19	46.73	-19.54	AVG	
7		0.8180	16.41	19.88	36.29	56.00	-19.71	QP	
8		0.8180	6.92	19.88	26.80	46.00	-19.20	AVG	
9		25.0580	25.21	20.11	45.32	60.00	-14.68	QP	
10	*	25.0580	19.08	20.11	39.19	50.00	-10.81	AVG	
11		20.3260	21.58	20.06	41.64	60.00	-18.36	QP	
12		20.3260	15.49	20.06	35.55	50.00	-14.45	AVG	

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







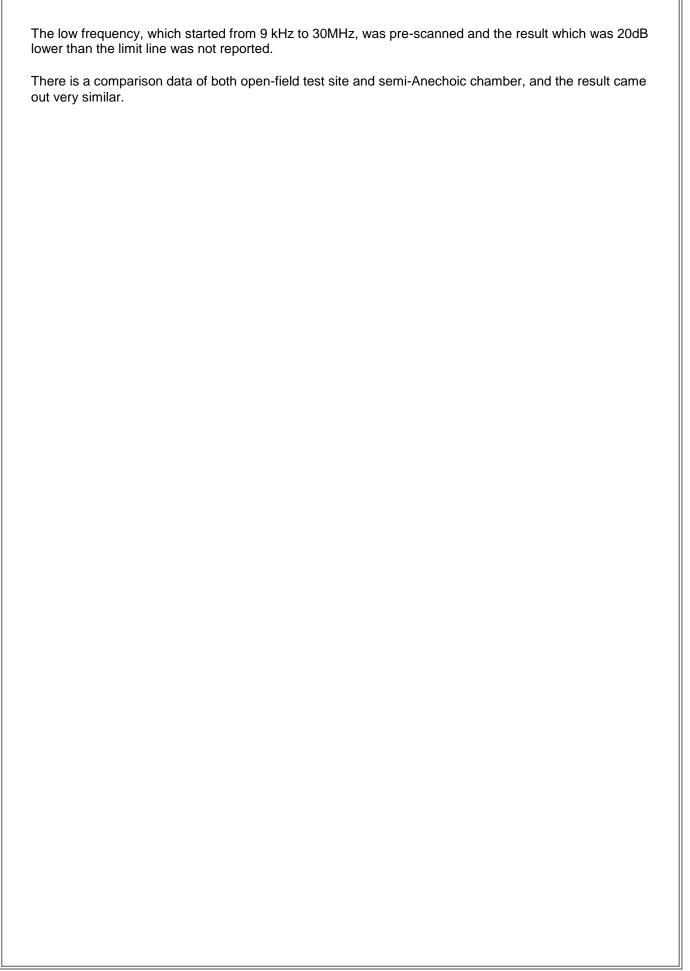
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1900	21.02	19.88	40.90	64.04	-23.14	QP	
2		0.1900	12.14	19.88	32.02	54.04	-22.02	AVG	
3		0.4900	21.75	19.88	41.63	56.17	-14.54	QP	
4		0.4900	10.50	19.88	30.38	46.17	-15.79	AVG	
5		0.8340	20.03	19.88	39.91	56.00	-16.09	QP	
6		0.8340	10.94	19.88	30.82	46.00	-15.18	AVG	
7		1.1820	18.59	19.89	38.48	56.00	-17.52	QP	
8		1.1820	9.64	19.89	29.53	46.00	-16.47	AVG	
9		1.8620	17.60	19.90	37.50	56.00	-18.50	QP	
10		1.8620	10.30	19.90	30.20	46.00	-15.80	AVG	
11		24.4700	25.66	20.10	45.76	60.00	-14.24	QP	
12	*	24.4700	19.98	20.10	40.08	50.00	-9.92	AVG	

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



APPENDIX B - RADIATED EMISSION - 9 KHZ TO 30 MHZ

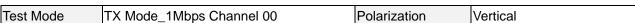


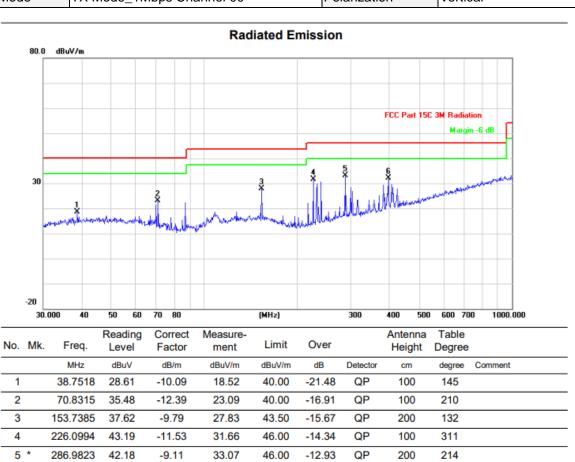




APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ







6

396.2415

(1) Measurement Value = Reading Level + Correct Factor.

-6.27

32.25

46.00

-13.75

200

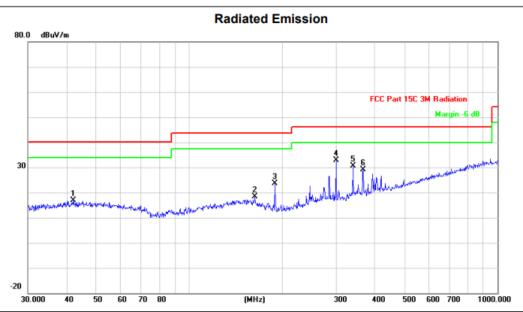
256

(2) Margin Level = Measurement Value - Limit Value.

38.52







No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		42.1542	26.81	-9.96	16.85	40.00	-23.15	QP	100	63	
2		163.1818	28.38	-9.97	18.41	43.50	-25.09	QP	100	122	
3		189.7385	35.82	-12.13	23.69	43.50	-19.81	QP	100	236	
4	*	299.3158	41.64	-8.85	32.79	46.00	-13.21	QP	200	203	
5		339.5888	38.45	-7.76	30.69	46.00	-15.31	QP	100	198	
6		366.8231	36.04	-7.03	29.01	46.00	-16.99	QP	200	264	

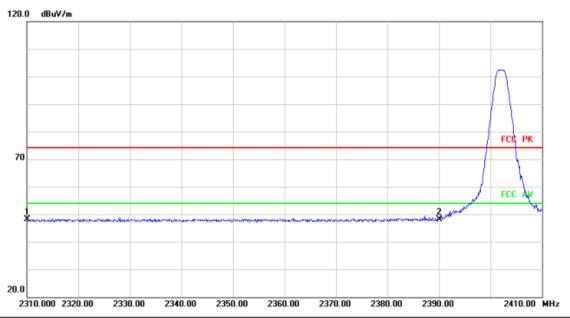
- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.



APPENDIX D - RADIATED EMISSION - ABOVE 1000 MHZ





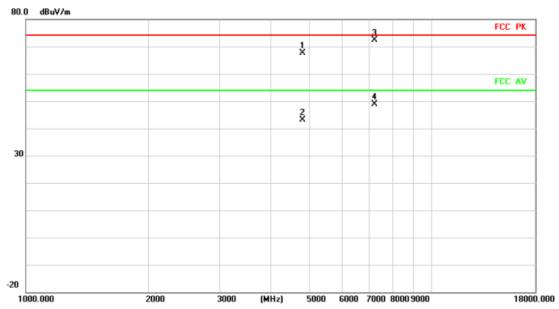


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2310.000	50.10	-1.92	48.18	74.00	-25.82	peak			
2		2390.000	49.70	-1.67	48.03	74.00	-25.97	peak			

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





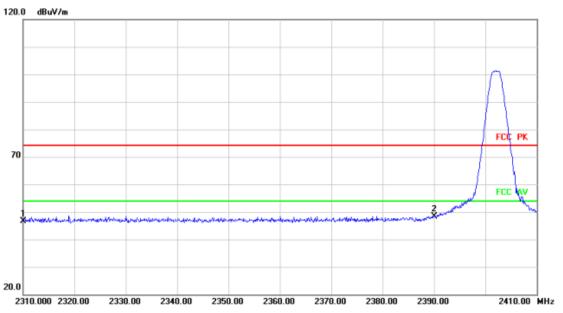


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		4804.000	69.70	-1.99	67.71	74.00	-6.29	peak			
2		4804.000	45.22	-1.99	43.23	54.00	-10.77	AVG			
3	*	7206.000	68.51	3.87	72.38	74.00	-1.62	peak			
4		7206.000	45.02	3.87	48.89	54.00	-5.11	AVG			

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





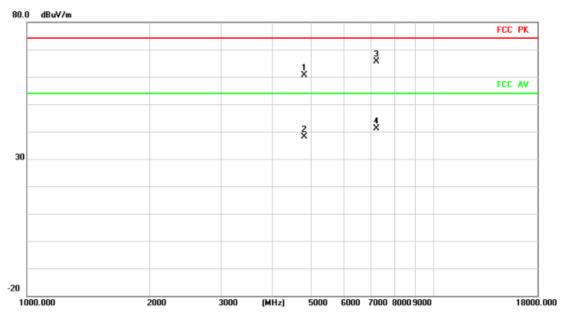


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2310.000	48.55	-1.92	46.63	74.00	-27.37	peak			
2	*	2390.000	50.11	-1.67	48.44	74.00	-25.56	peak			-

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





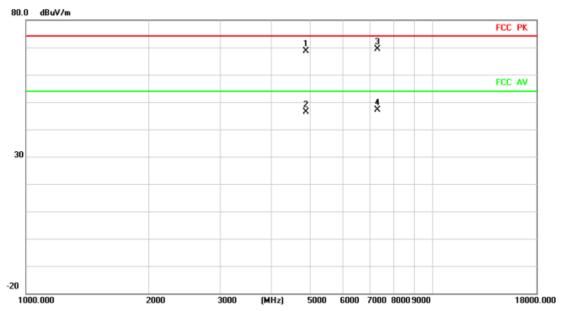


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		4804.000	62.52	-1.99	60.53	74.00	-13.47	peak			
2		4804.000	40.24	-1.99	38.25	54.00	-15.75	AVG			
3	*	7206.000	61.66	3.87	65.53	74.00	-8.47	peak			
4		7206.000	37.15	3.87	41.02	54.00	-12.98	AVG			

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



Test Mode	TX 2440 MHz _CH19_1Mbps	Polarization	Vertical

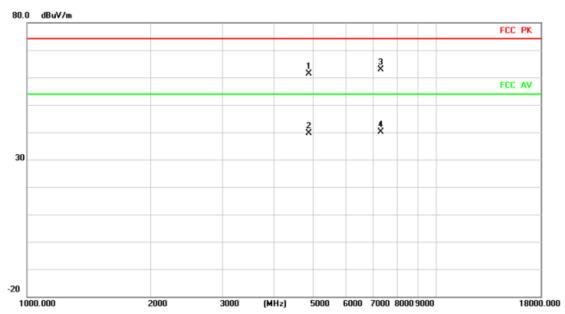


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		4880.000	70.14	-1.56	68.58	74.00	-5.42	peak			
2		4880.000	47.88	-1.56	46.32	54.00	-7.68	AVG			
3	*	7320.000	65.29	4.03	69.32	74.00	-4.68	peak			
4		7320.000	43.22	4.03	47.25	54.00	-6.75	AVG			

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



Test Mode	TX 2440 MHz _CH19_1Mbps	Polarization	Horizontal

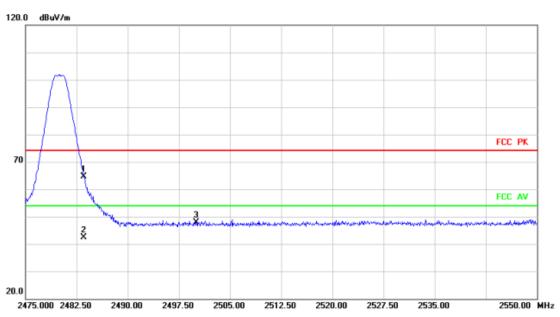


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		4880.000	62.96	-1.56	61.40	74.00	-12.60	peak			
2		4880.000	41.21	-1.56	39.65	54.00	-14.35	AVG			
3	*	7320.000	58.95	4.03	62.98	74.00	-11.02	peak			
4		7320.000	36.10	4.03	40.13	54.00	-13.87	AVG			

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



Test Mode	TX 2480 MHz _CH39_1Mbps	Polarization	Vertical

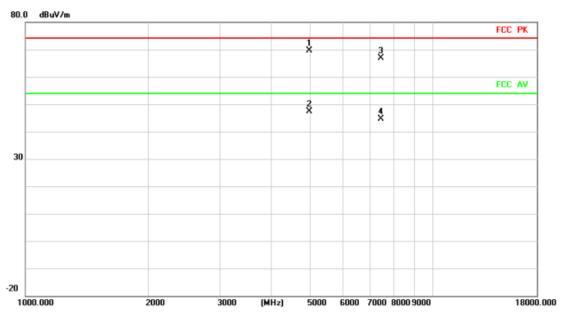


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2483.500	65.85	-1.28	64.57	74.00	-9.43	peak			
2		2483.500	43.61	-1.28	42.33	54.00	-11.67	AVG			
3		2500.000	49.03	-1.21	47.82	74.00	-26.18	peak			

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



Test Mode	TX 2480 MHz _CH39_1Mbps	Polarization	Vertical

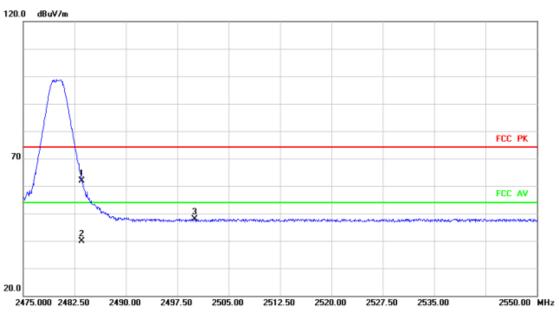


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4960.000	70.85	-1.10	69.75	74.00	-4.25	peak			
2		4960.000	48.43	-1.10	47.33	54.00	-6.67	AVG			
3		7440.000	62.69	4.18	66.87	74.00	-7.13	peak			
4		7440.000	40.45	4.18	44.63	54.00	-9.37	AVG			

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





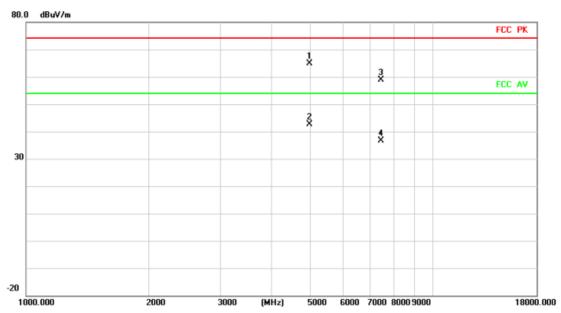


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2483.500	63.28	-1.28	62.00	74.00	-12.00	peak			
2		2483.500	41.15	-1.28	39.87	54.00	-14.13	AVG			
3		2500.000	48.97	-1.21	47.76	74.00	-26.24	peak			

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



Test Mode	TX 2480 MHz	CH39_1Mbps	Polarization	Horizontal

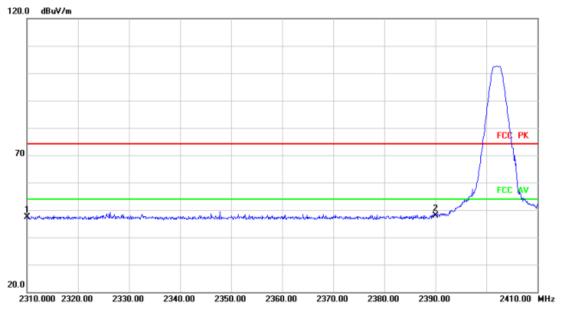


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4960.000	65.96	-1.10	64.86	74.00	-9.14	peak			
2		4960.000	43.73	-1.10	42.63	54.00	-11.37	AVG			
3		7440.000	54.80	4.18	58.98	74.00	-15.02	peak			
4		7440.000	32.36	4.18	36.54	54.00	-17.46	AVG			

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





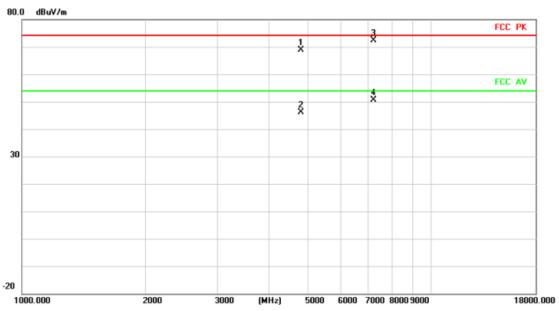


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2310.000	49.35	-1.92	47.43	74.00	-26.57	peak			
2	*	2390.000	49.61	-1.67	47.94	74.00	-26.06	peak			

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





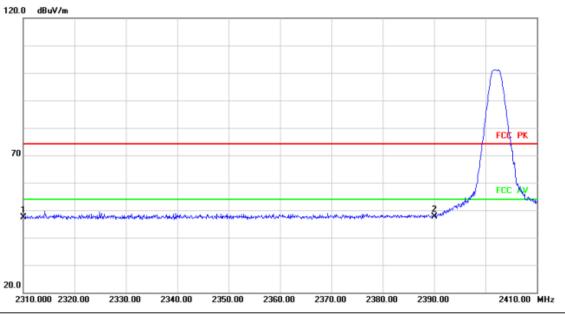


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		4804.000	70.80	-1.99	68.81	74.00	-5.19	peak			
2		4804.000	48.13	-1.99	46.14	54.00	-7.86	AVG			
3	*	7206.000	68.45	3.87	72.32	74.00	-1.68	peak			
4		7206.000	46.70	3.87	50.57	54.00	-3.43	AVG			

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





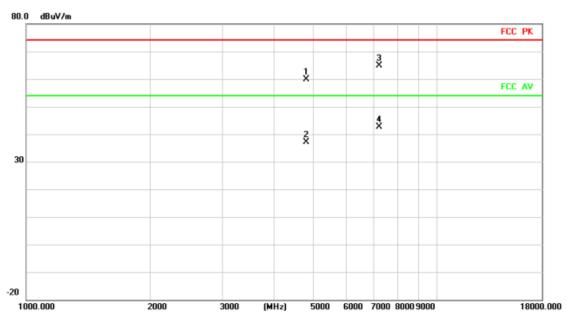


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2310.000	49.30	-1.92	47.38	74.00	-26.62	peak			
2	*	2390.000	49.19	-1.67	47.52	74.00	-26.48	peak			-

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





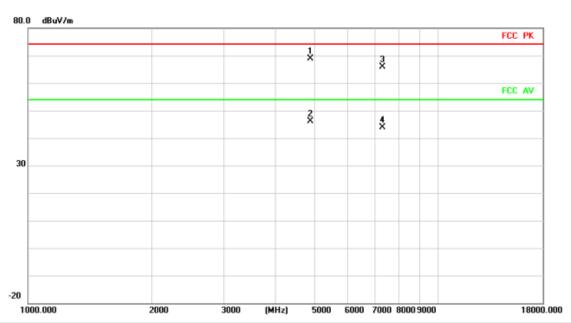


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		4804.000	61.96	-1.99	59.97	74.00	-14.03	peak			
2		4804.000	39.24	-1.99	37.25	54.00	-16.75	AVG			
3	*	7206.000	61.08	3.87	64.95	74.00	-9.05	peak			
4		7206.000	38.76	3.87	42.63	54.00	-11.37	AVG			

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



Test Mode	TX 2440 MHz _CH19_2Mbp	os Polarization	Vertical

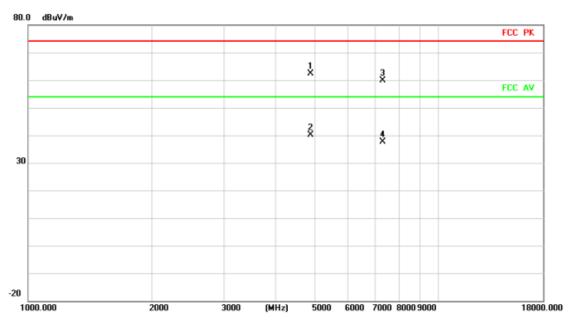


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4880.000	70.52	-1.56	68.96	74.00	-5.04	peak			
2		4880.000	47.78	-1.56	46.22	54.00	-7.78	AVG			
3		7320.000	61.82	4.03	65.85	74.00	-8.15	peak			
4		7320.000	39.81	4.03	43.84	54.00	-10.16	AVG			

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



Test Mode	TX 2440 MHz _CH19_2Mbps	Polarization	Horizontal

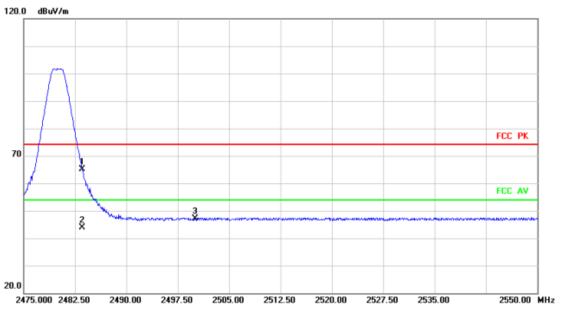


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4880.000	64.00	-1.56	62.44	74.00	-11.56	peak			
2		4880.000	41.79	-1.56	40.23	54.00	-13.77	AVG			
3		7320.000	55.87	4.03	59.90	74.00	-14.10	peak			
4		7320.000	33.51	4.03	37.54	54.00	-16.46	AVG			

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





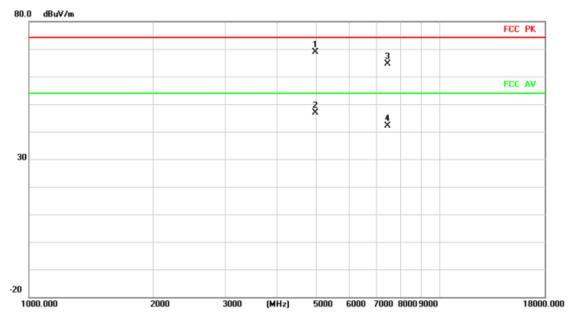


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2483.500	66.30	-1.28	65.02	74.00	-8.98	peak			
2		2483.500	45.12	-1.28	43.84	54.00	-10.16	AVG			
3		2500.000	48.36	-1.21	47.15	74.00	-26.85	peak			

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



Test Mode	TX 2480 MHz _CH39_2Mbps	Polarization	Vertical

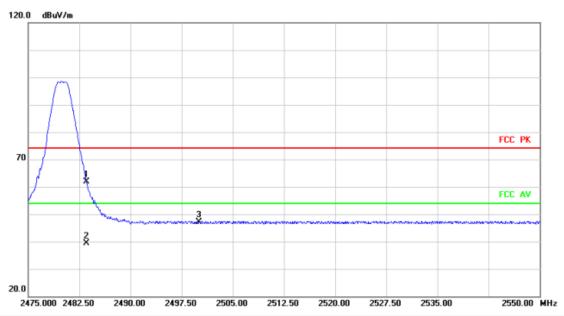


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4960.000	69.90	-1.10	68.80	74.00	-5.20	peak			
2		4960.000	47.95	-1.10	46.85	54.00	-7.15	AVG			
3		7440.000	60.45	4.18	64.63	74.00	-9.37	peak			
4		7440.000	37.85	4.18	42.03	54.00	-11.97	AVG			

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





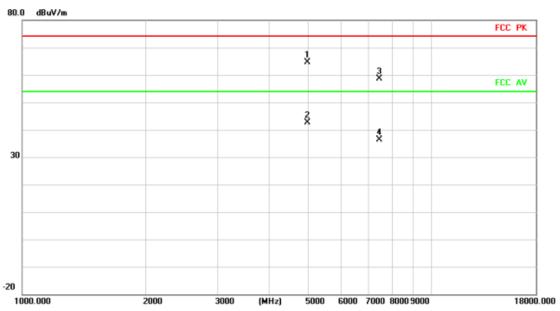


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2483.500	63.26	-1.28	61.98	74.00	-12.02	peak			
2		2483.500	40.63	-1.28	39.35	54.00	-14.65	AVG			
3		2500.000	48.26	-1.21	47.05	74.00	-26.95	peak			

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







No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	4960.000	65.79	-1.10	64.69	74.00	-9.31	peak			
2		4960.000	43.64	-1.10	42.54	54.00	-11.46	AVG			
3		7440.000	54.39	4.18	58.57	74.00	-15.43	peak			
4		7440.000	32.12	4.18	36.30	54.00	-17.70	AVG			

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



APPENDIX E - BANDWIDTH



DTS Bandwidth

Test Mode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
		2402	0.684	2401.624	2402.308	0.5	PASS
BLE_1M	Ant1	2440	0.696	2439.616	2440.312	0.5	PASS
		2480	0.688	2479.620	2480.308	0.5	PASS
		2402	1.128	2401.416	2402.544	0.5	PASS
BLE_2M	Ant1	2440	1.124	2439.416	2440.540	0.5	PASS
		2480	1.128	2479.412	2480.540	0.5	PASS

Test Graphs













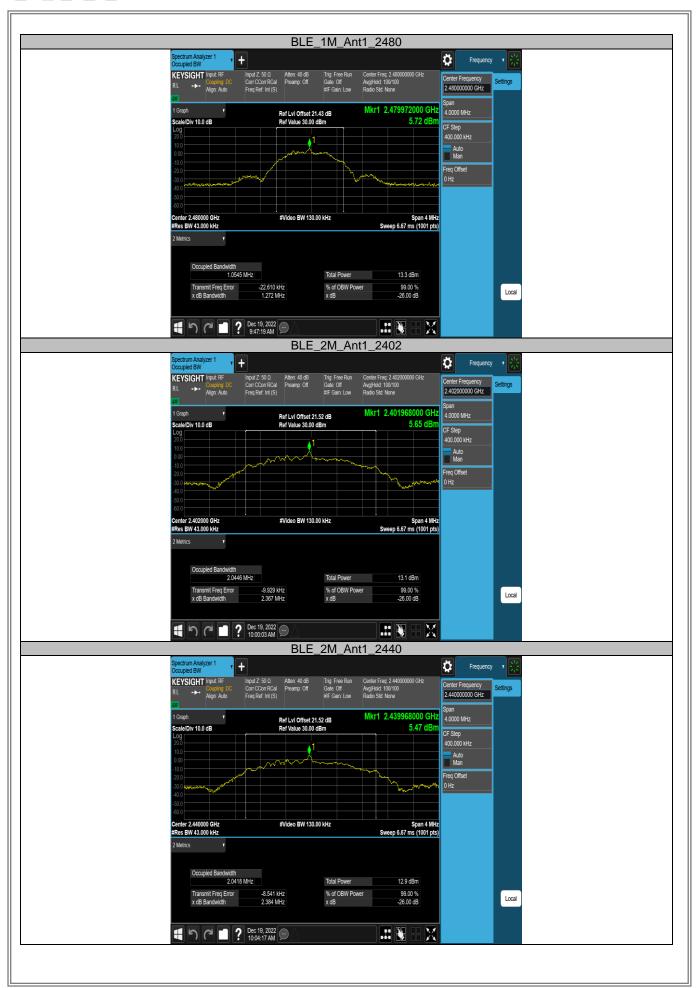
Occupied Channel Bandwidth

Test Mode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
		2402	1.0483	2401.4542	2402.5025		
BLE_1M	Ant1	2440	1.0516	2439.4533	2440.5049		
		2480	1.0545	2479.4501	2480.5046		
		2402	2.0446	2400.9678	2403.0124		
BLE_2M	Ant1	2440	2.0418	2438.9706	2441.0124		
		2480	2.0487	2478.9655	2481.0142		

Test Graphs











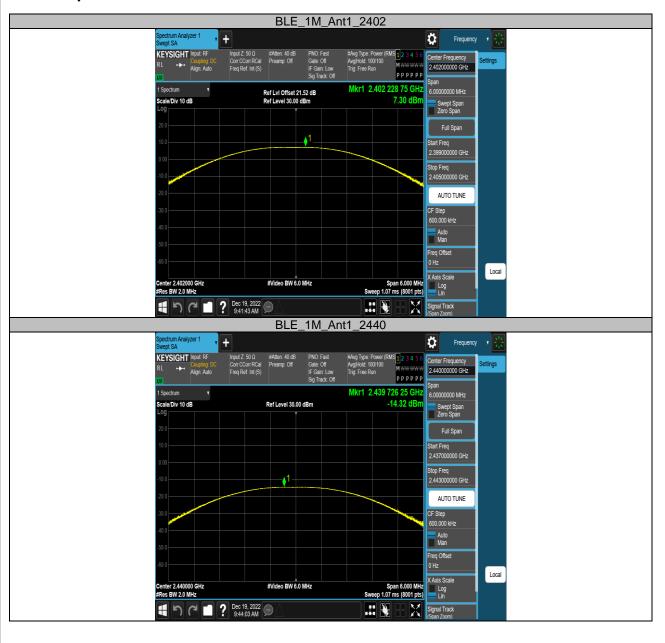


A	PPENDIX F - MAXIMUM OUTPUT POWER

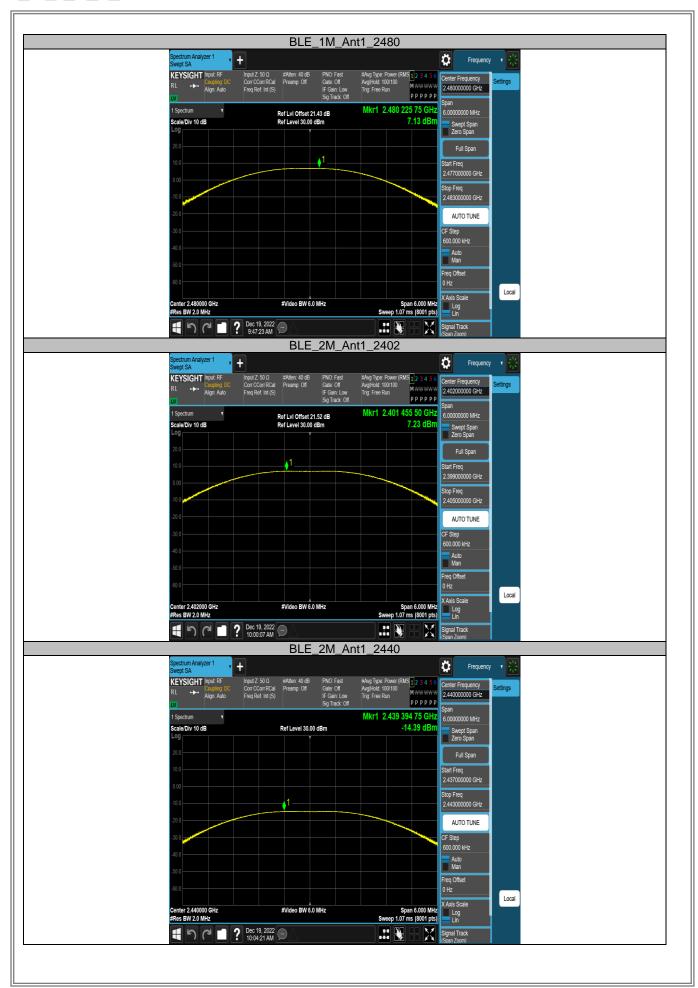


TestMode	Antenna	Channel	Conducted Peak Powert[dBm]	Conducted Limit[dBm]	EIRP[dBm]	EIRP Limit[dBm]	Verdict
		2402	7.31	≤30	7.81	≤36	PASS
BLE_1M	Ant1	2440	-14.32	≤30	-13.82	≤36	PASS
		2480	7.13	≤30	7.63	≤36	PASS
		2402	7.23	≤30	7.73	≤36	PASS
BLE_2M	Ant1	2440	-14.39	≤30	-13.89	≤36	PASS
		2480	7.05	≤30	7.55	≤36	PASS

Test Graphs Peak













APPENDIX G - CONDUCTED SPURIOUS EMISSION

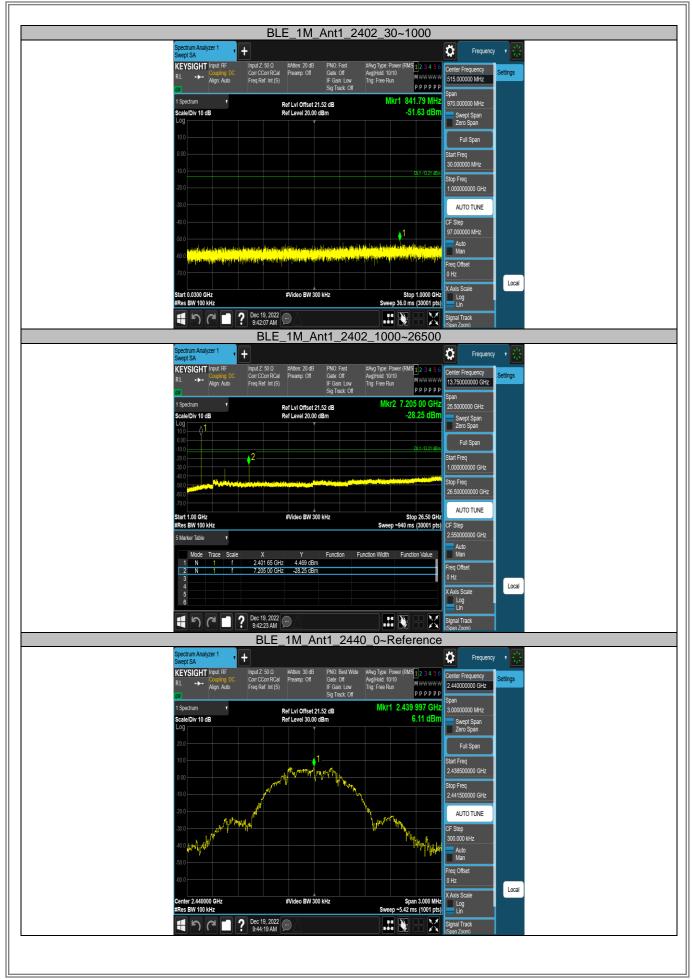


Test Mode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
			Reference	6.79	6.79		PASS
		2402	30~1000	6.79	-51.63	≤-13.21	PASS
			1000~26500	6.79	-28.25	≤-13.21	PASS
			Reference	6.11	6.11		PASS
BLE_1M	Ant1	2440	30~1000	6.11	-52.15	≤-13.89	PASS
			1000~26500	6.11	-28.16	≤-13.89	PASS
		2480	Reference	6.60	6.60		PASS
			30~1000	6.60	-51.64	≤-13.4	PASS
			1000~26500	6.60	-28.96	≤-13.4	PASS
		2402	Reference	6.41	6.41		PASS
			30~1000	6.41	-52.07	≤-13.59	PASS
			1000~26500	6.41	-27.84	≤-13.59	PASS
			Reference	6.66	6.66		PASS
BLE_2M	Ant1	2440	30~1000	6.66	-51.28	≤-13.34	PASS
			1000~26500	6.66	-30.35	≤-13.34	PASS
		2480	Reference	6.52	6.52		PASS
			30~1000	6.52	-50.88	≤-13.48	PASS
			1000~26500	6.52	-28.12	≤-13.48	PASS

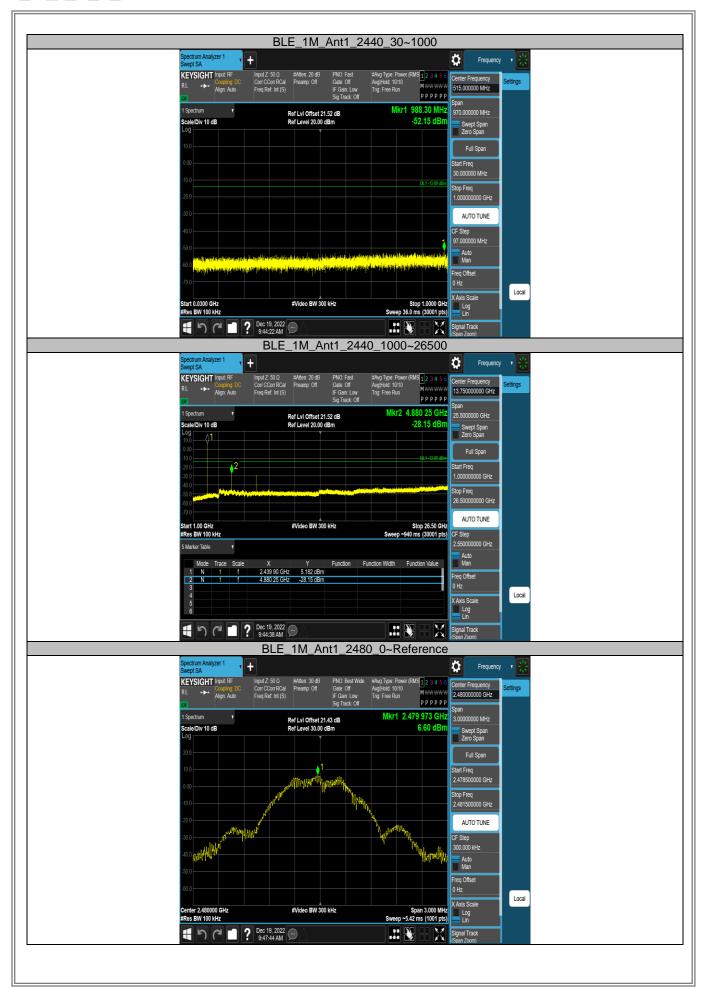
Test Graphs



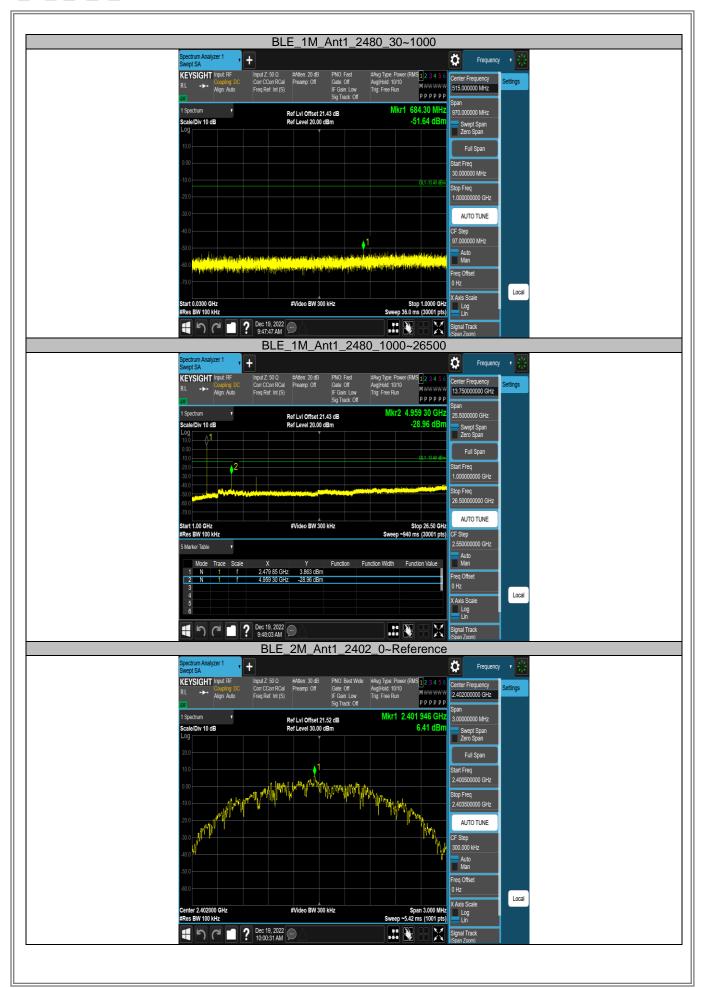




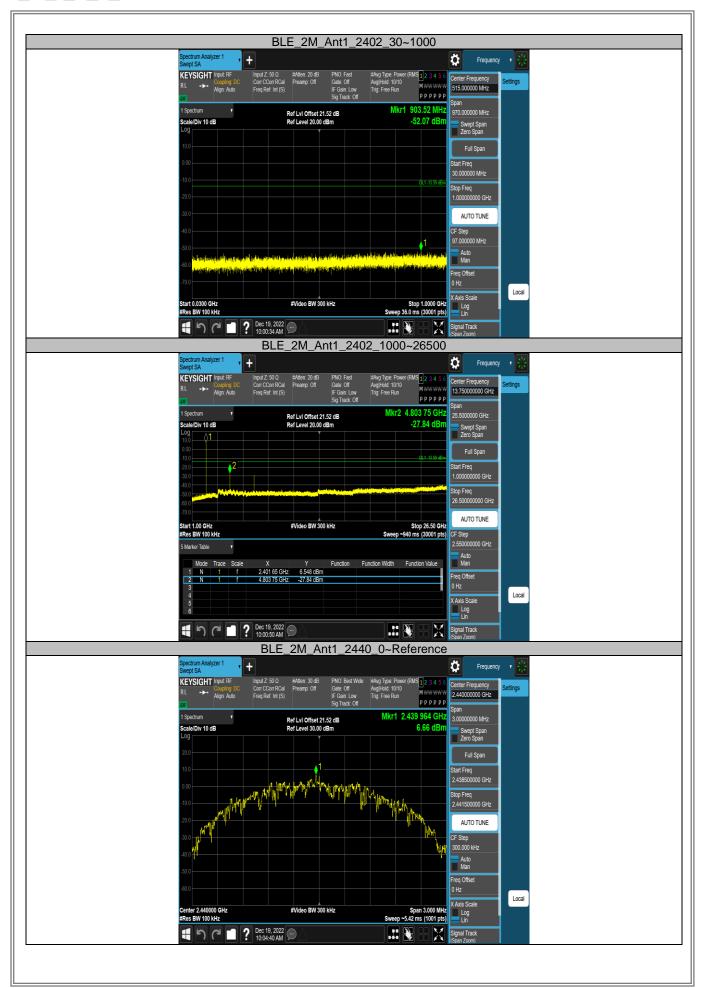




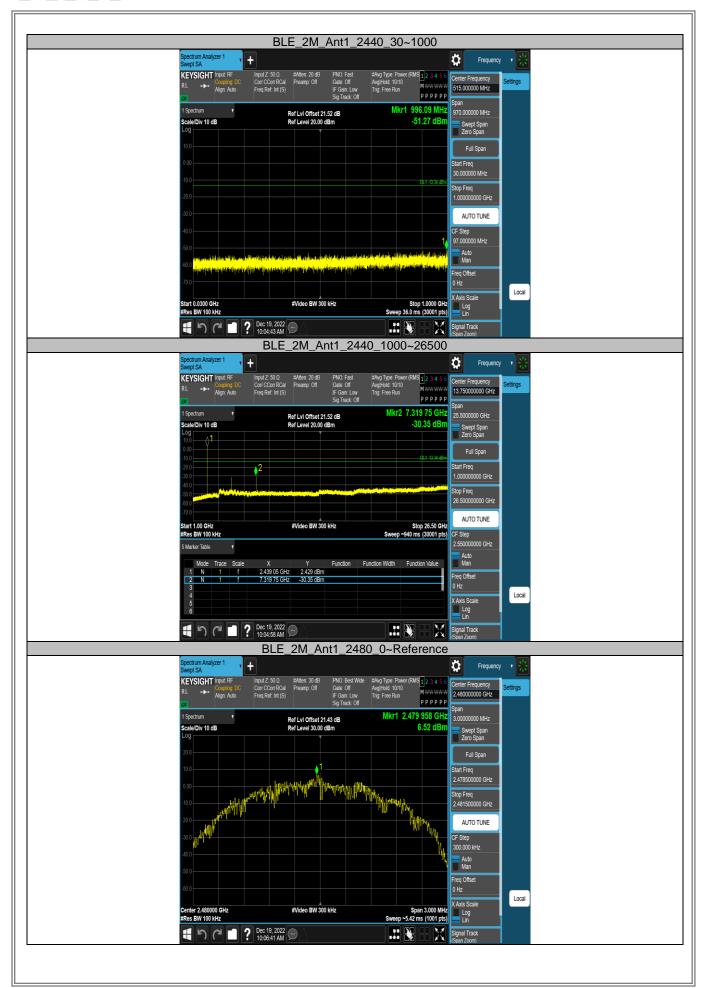




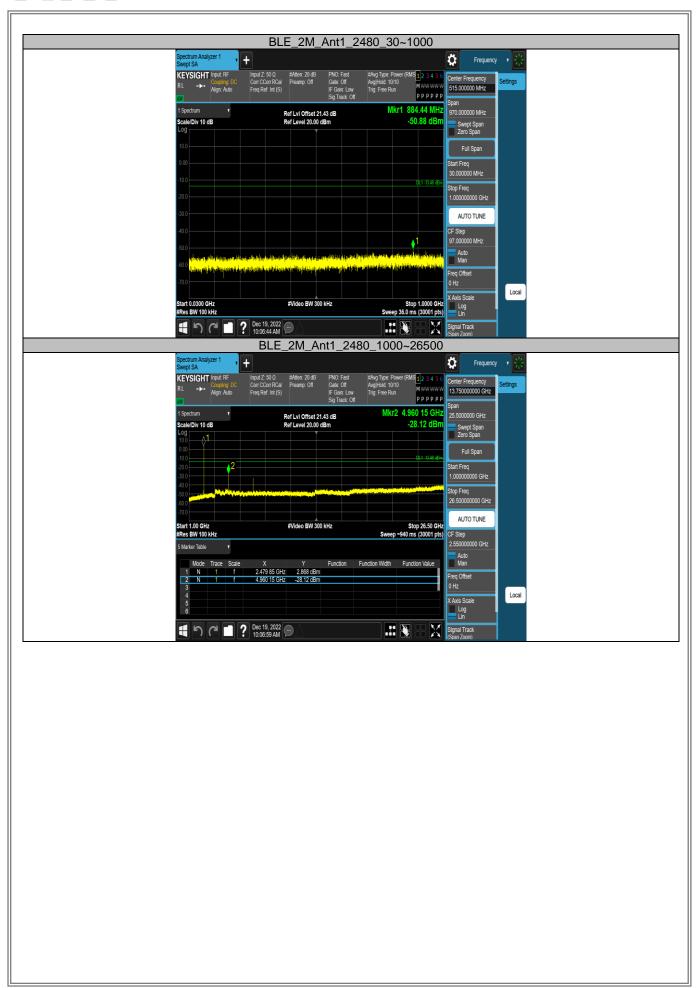












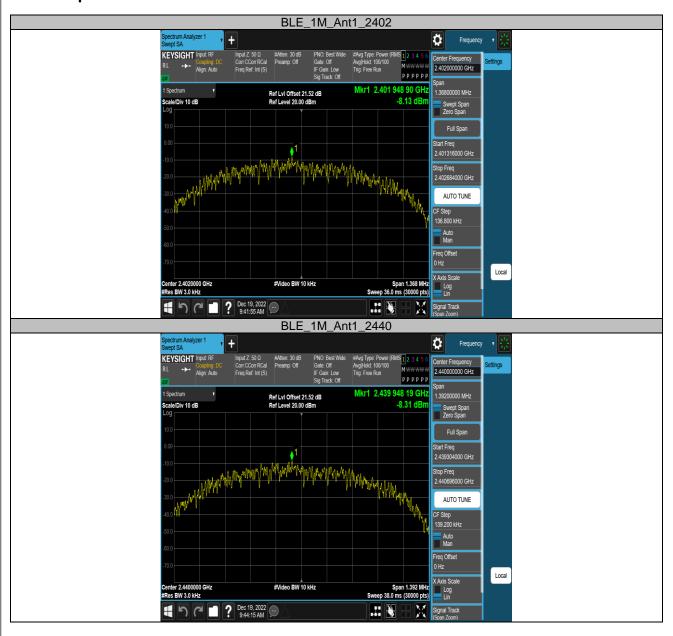


APPENDIX H - POWER SPECTRAL DENSITY

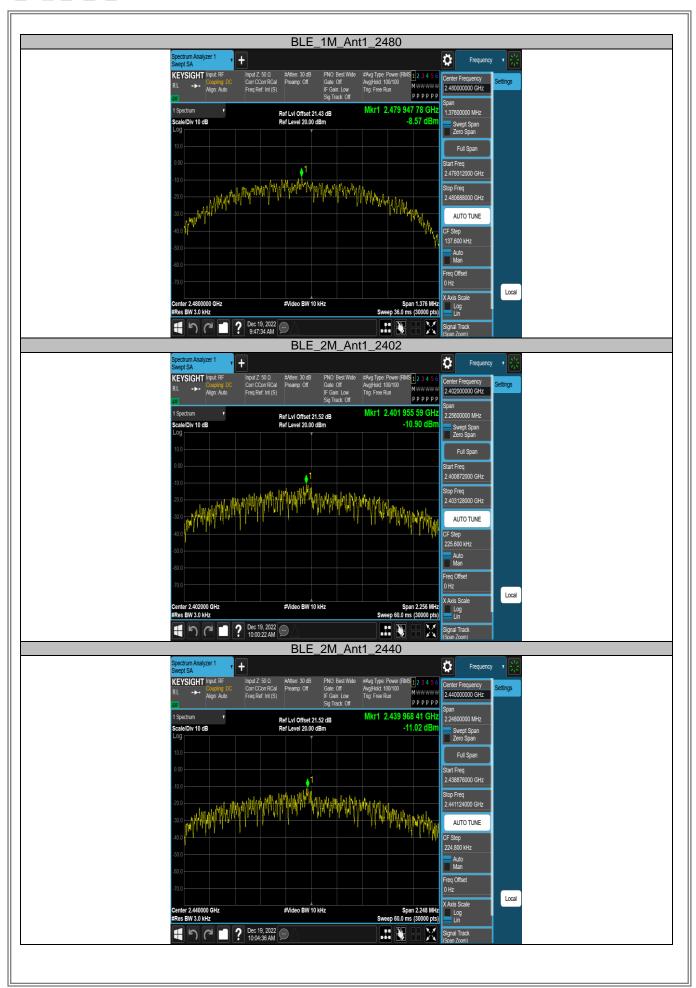


Test Mode	Antenna	Channel	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
		2402	-8.13	≤8.00	PASS
BLE_1M	Ant1	2440	-8.31	≤8.00	PASS
		2480	-8.57	≤8.00	PASS
		2402	-10.9	≤8.00	PASS
BLE_2M		2440	-11.02	≤8.00	PASS
		2480	-11.19	≤8.00	PASS

Test Graphs











End of Test Report