TEST REPORT

Product Name	:	Smart Mini Pro Projector
Brand Mark	:	N/A
Model No.	:	M1200S
FCC ID	:	2AW96-M1200S
Report Number	:	BLA-EMC-202012-A1502
Date of Sample Receipt	:	2020/12/3
Date of Test	:	2020/12/3 to 2020/12/17
Date of Issue	:	2021/01/15
Test Standard	:	47 CFR Part 15, Subpart C 15.247
Test Result	:	Pass

Prepared for:

Telstar USA LLC

9817 Valley View Road, Eden Prairie, MN, US

Prepared by:

BlueAsia of Technical Services(Shenzhen) Co.,Ltd.

Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province, China

TEL: +86-755-23059481

Compiled by: Ben Zong

Review by: Sweet Liang

Approved by:

Date: 2021/01/15

REPORT REVISE RECORD

Version No.	Date	Description
00	2021/01/15	Original

TABLE OF CONTENTS

1 TEST SUMMARY

Test item	Test Requirement	Test Method	Class/Severity	Result
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.8	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.6	47 CFR Part 15, Subpart C 15.247(d)	Pass
Dwell Time	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.4	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass
Hopping Channel Number	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.3	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass
Carrier Frequencies Separation	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.2	47 CFR Part 15, Subpart C 15.247a(1)	Pass
20dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.5	47 CFR Part 15, Subpart C 15.247(b)(1)	Pass
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	Pass

2 GENERAL INFORMATION

Applicant	Telstar USA LLC
Address	9817 Valley View Road,Eden Prairie, MN, US
Manufacturer	Telstar USA LLC
Address	9817 Valley View Road,Eden Prairie, MN, US
Factory	N/A
Address	N/A
Product Name	Smart Mini Pro Projector
Test Model No.	M1200S

3 GENERAL DESCRIPTION OF E.U.T.

Hardware Version	N/A
Software Version	N/A

Operation Frequency:	2402MHz~2480MHz
Modulation Type:	GFSK, π/4 DQPSK, 8DPSK
Channel Spacing:	1MHz
Number of Channels:	79
Antenna Type:	Internal Antenna
Antenna Gain:	3dBi（Provided by the customer）

4 TEST ENVIRONMENT

Environment	Temperature	Voltage
Normal	+25°C	19Vdc

5 TEST MODE

TEST MODE	TEST MODE DESCRIPTION
Transmitting mode	Keep the EUT in continuously transmitting mode with modulation. (hopping and non hopping mode all have been tested, non hopping mode is worse case for RE)
Remark: *Full battery is used during all test except ac conducted emission, DH1,DH3, DH5 all have been tested, during the test, GFSK, Pi/4QPSK, 8-DPSK modulation were all pre-scanned Only the GFSK, Pi/4QPSK 8DPSK of the worst mode would be recorded in this report.*	

6 MEASUREMENT UNCERTAINTY

Parameter	Expanded Uncertainty (Confidence of 95%)
Radiated Emission(9kHz-30MHz)	±4.34dB
Radiated Emission(30Mz-1000MHz)	±4.24dB
Radiated Emission(1GHz-18GHz)	±4.68dB
AC Power Line Conducted Emission(150kHz-30MHz)	±3.45dB

7 DESCRIPTION OF SUPPORT UNIT

Device Type	Manufacturer	Model Name	Serial No.	Remark
PC	HASEE	K610D	N/A	N/A

8 LABORATORY LOCATION

All tests were performed at:
BlueAsia of Technical Services(Shenzhen) Co., Ltd.
Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province, China
Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673
No tests were sub-contracted.

9 TEST INSTRUMENTS LIST

Test Equipment Of Radiated Spurious Emissions					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Chamber	SKET	966	N/A	5/8/2018	5/7/2021
Spectrum	R&S	FSP40	100817	7/1/2020	6/30/2021
Receiver	R&S	ESR7	101199	4/20/2020	4/19/2021
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	7/14/2018	7/13/2021
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	7/14/2018	7/13/2021
Amplifier	SKET	PA-000318G-45	N/A	7/1/2020	6/30/2021
EMI software	EZ	EZ-EMC	N/A	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	2/14/2019	2/13/2022
Controller	SKET	N/A	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-01	N/A	N/A	N/A

Test Equipment Of Radiated Emissions which fall in the restricted bands					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Chamber	SKET	966	N/A	5/8/2018	5/7/2021
Spectrum	R&S	FSP40	100817	7/1/2020	6/30/2021
Receiver	R&S	ESR7	101199	4/20/2020	4/19/2021
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	7/14/2018	7/13/2021
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	7/14/2018	7/13/2021

Amplifier	SKET	PA-000318G-45	N/A	7/1/2020	6/30/2021
EMI software	EZ	EZ-EMC	N/A	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	2/14/2019	2/13/2022
Controller	SKET	N/A	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-01	N/A	N/A	N/A

Test Equipment Of Conducted Spurious Emissions					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Spectrum	R&S	FSP40	100817	7/1/2020	6/30/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020
Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020
Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021

Test Equipment Of Conducted Band Edges Measurement					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Spectrum	R&S	FSP40	100817	7/1/2020	6/30/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020
Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020
Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021

Test Equipment Of Dwell Time					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Spectrum	R&S	FSP40	100817	7/1/2020	6/30/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020

Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020
Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021

Test Equipment Of Hopping Channel Number					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Spectrum	R&S	FSP40	100817	7/1/2020	6/30/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020
Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020
Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021

Test Equipment Of Carrier Frequencies Separation					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Spectrum	R&S	FSP40	100817	7/1/2020	6/30/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020
Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020
Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021

Test Equipment Of 20dB Bandwidth					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Spectrum	R&S	FSP40	100817	7/1/2020	6/30/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020
Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020
Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021

Test Equipment Of Conducted Peak Output Power

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	7/1/2020	6/30/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020
Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020
Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021

Test Equipment Of Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal.Date**	**Cal.Due**
Shield room	SKET	833	N/A	6/10/2018	6/9/2021
Receiver	R&S	ESPI3	101082	4/20/2020	4/19/2021
LISN	R&S	ENV216	3560.6550.15	7/1/2020	6/30/2021
LISN	AT	AT166-2	AKK1806000003	12/17/2019	12/16/2020
EMI software	EZ	EZ-EMC	N/A	N/A	N/A

1 RADIATED SPURIOUS EMISSIONS

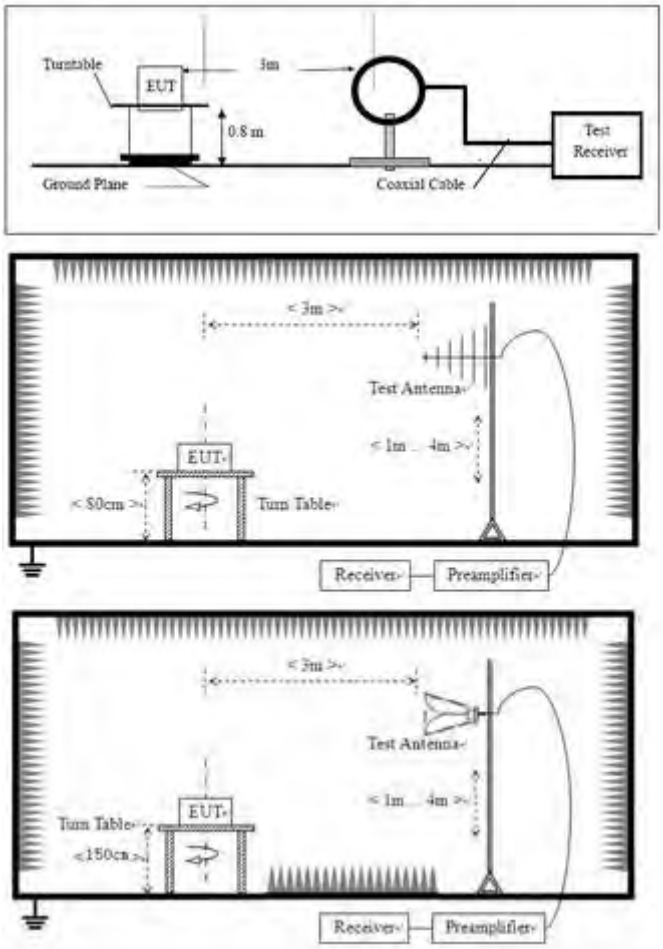
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.4,6.5,6.6
Test Mode (Pre-Scan)	TX Low channel;TX middle channel;TX high channel
Test Mode (Final Test)	TX Low channel;TX middle channel;TX high channel
Tester	Ben
Temperature	25℃
Humidity	60%

1.1 LIMITS

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

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, 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.

1.2 BLOCK DIAGRAM OF TEST SETUP



1.3 PROCEDURE

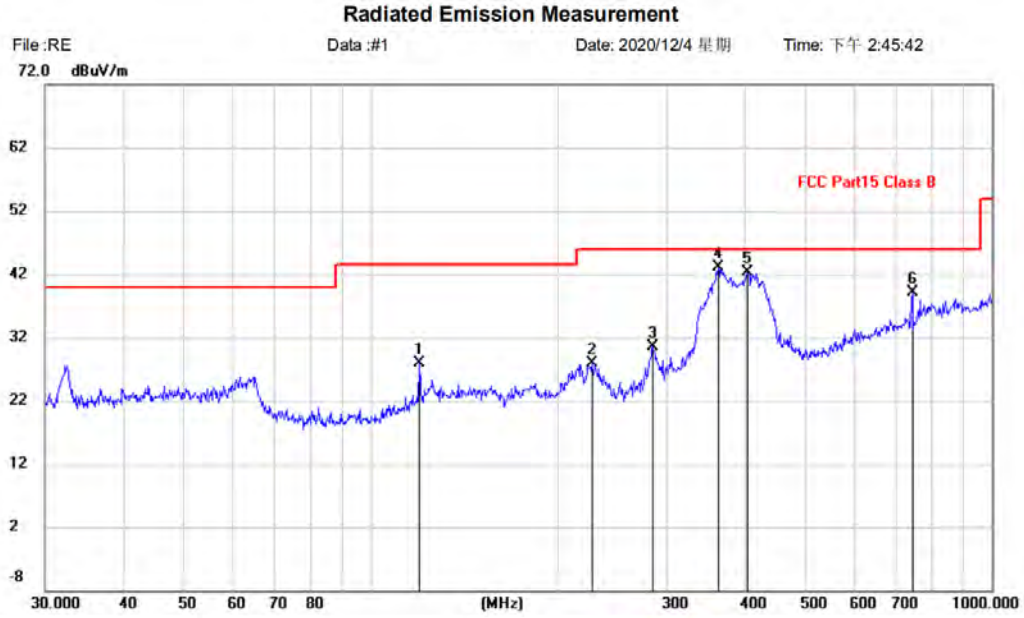
a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
d. The antenna height 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.
e. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
j. Repeat above procedures until all frequencies measured was complete.

Remark:
1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading + Antenna Factor + Cable Factor ¨C Preamplifier Factor
3) Scan from 9kHz to 25GHz, the disturbance above 12.75GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. fundamental frequency is blocked by filter, and only spurious emission is shown.
4) For frequencies above 1GHz, the field strength limits are based on average limits. 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. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

1.4 TEST DATA

[TestMode: TX Low channel]; [Polarity: Horizontal]



Site
Limit: FCC Part15 Class B
EUT:
M/N: M1200S
Mode: EDR MODE
Note:

Polarization: *Horizontal*
Power: AC120V/60Hz
Distance: 3m

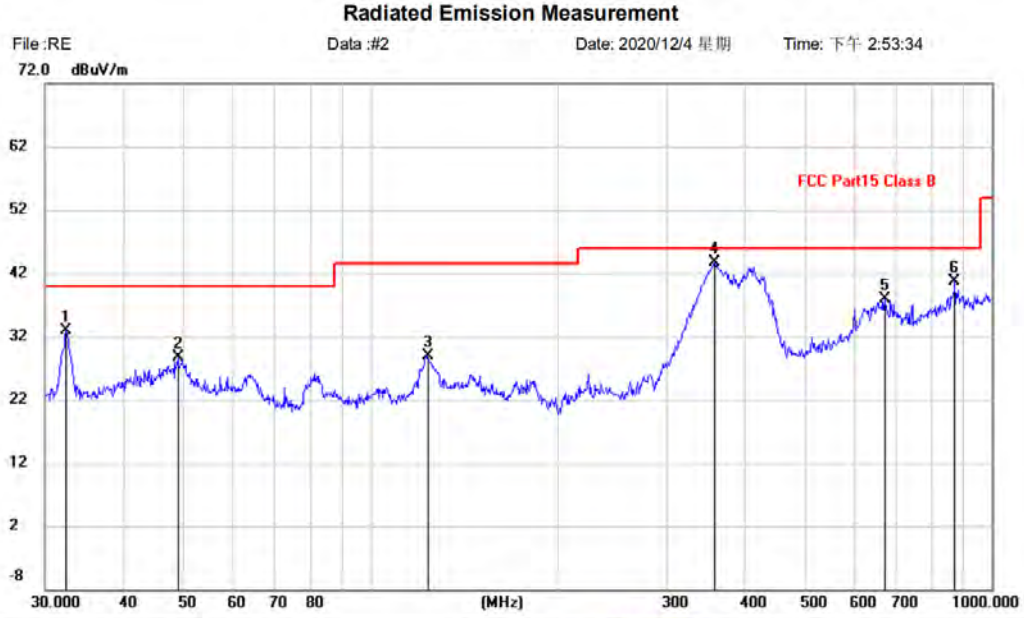
Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		119.8556	5.39	22.46	27.85	43.50	-15.65	QP			
2		227.6906	5.90	21.98	27.88	46.00	-18.12	QP			
3		284.9767	7.31	23.28	30.59	46.00	-15.41	QP			
4	*	362.9844	17.24	25.85	43.09	46.00	-2.91	QP			
5		404.6665	15.17	27.07	42.24	46.00	-3.76	QP			
6		744.8661	5.50	33.54	39.04	46.00	-6.96	QP			

*:Maximum data x:Over limit !:over margin 〈Reference Only

Test Result: Pass

[TestMode: TX Low channel]; [Polarity: Vertical]



Site
Limit: FCC Part15 Class B
EUT:
M/N: M1200S
Mode: EDR MODE
Note:

Polarization: *Vertical*
Power: AC120V/60Hz
Distance: 3m

Temperature:
Humidity: %

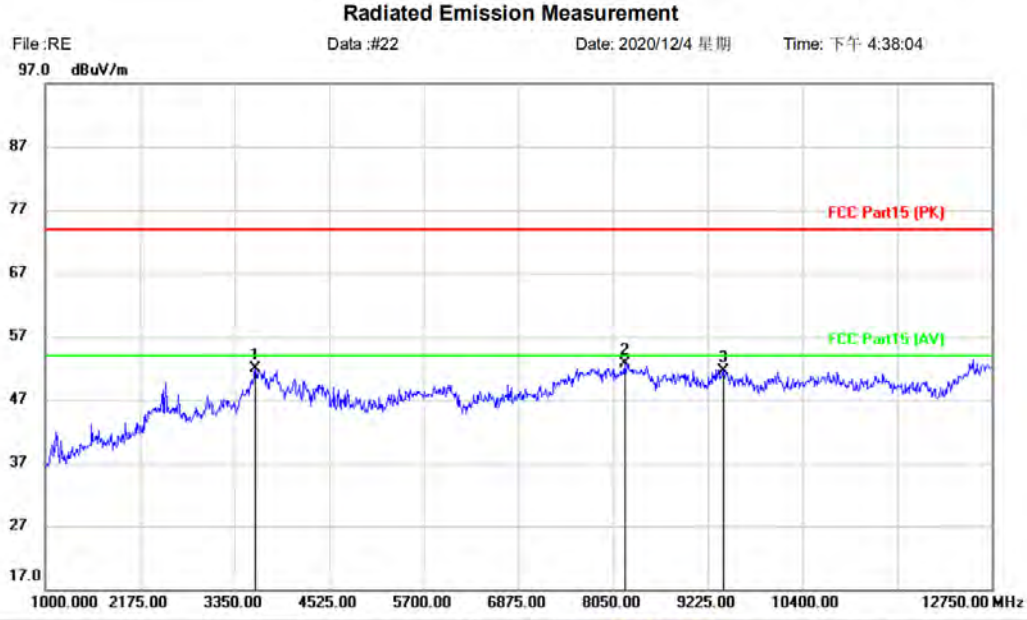
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		32.4059	10.52	22.38	32.90	40.00	-7.10	QP			
2		49.0145	4.44	24.25	28.69	40.00	-11.31	QP			
3		123.2655	6.32	22.57	28.89	43.50	-14.61	QP			
4	*	357.9287	18.05	25.70	43.75	46.00	-2.25	QP			
5		672.8444	5.47	32.40	37.87	46.00	-8.13	QP			
6		872.1832	5.47	35.18	40.65	46.00	-5.35	QP			

*:Maximum data x:Over limit !:over margin (Reference Only

Test Result: Pass

Remark: During the test, pre-scan the GFSK, Pi/4QPSK, 8-DPSK modulation, and found the GFSK modulation which it is worse case.

[TestMode: TX Low channel]; [Polarity: Horizontal]



Site
Limit: FCC Part15 (PK)
EUT:
M/N: M1200S
Mode: EDR-2402
Note:

Polarization: ***Horizontal***
Power: AC120V/60Hz
Distance: 3m

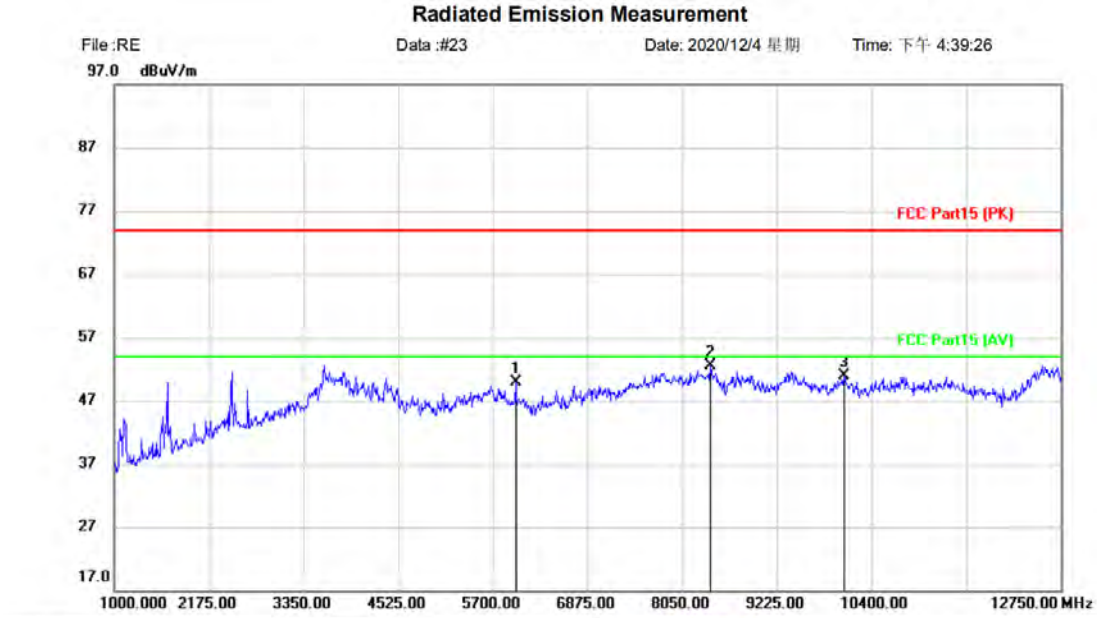
Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		3608.500	53.73	-1.78	51.95	74.00	-22.05	peak			
2	*	8191.000	52.14	0.56	52.70	74.00	-21.30	peak			
3		9413.000	50.21	1.29	51.50	74.00	-22.50	peak			

*:Maximum data x:Over limit !:over margin 〈Reference Only

Test Result: Pass

[TestMode: TX Low channel]; [Polarity: Vertical]



Site
Limit: FCC Part15 (PK)
EUT:
M/N: M1200S
Mode: EDR-2402
Note:

Polarization: *Vertical*
Power: AC120V/60Hz
Distance: 3m

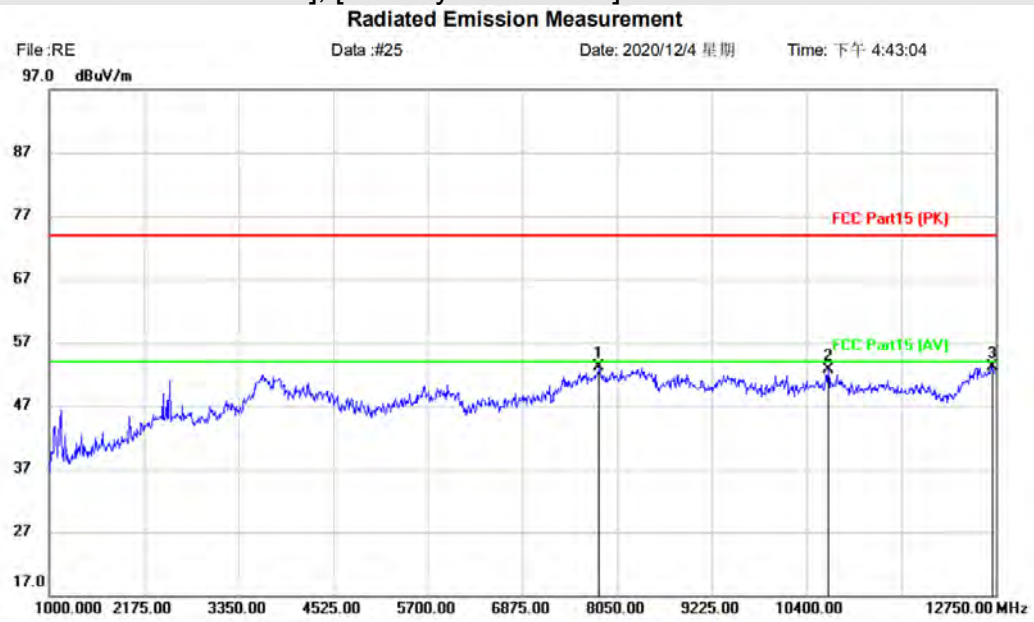
Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		5982.000	51.97	-2.15	49.82	74.00	-24.18	peak			
2	*	8402.500	51.50	0.95	52.45	74.00	-21.55	peak			
3		10059.250	49.41	1.54	50.95	74.00	-23.05	peak			

*:Maximum data x:Over limit !:over margin 〈Reference Only

Test Result: Pass

[TestMode: TX middle channel]; [Polarity: Horizontal]



Site
Limit: FCC Part15 (PK)
EUT:
M/N: M1200S
Mode: EDR-2441
Note:

Polarization: *Horizontal*
Power: AC120V/60Hz
Distance: 3m

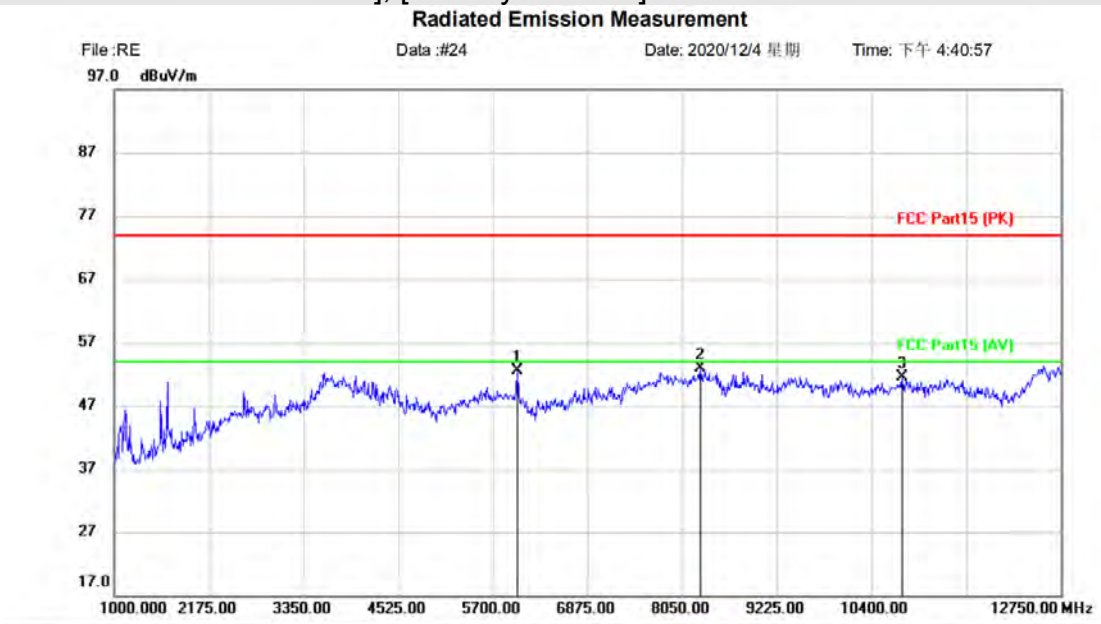
Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		7826.750	52.11	0.93	53.04	74.00	-20.96	peak			
2		10670.250	51.01	1.76	52.77	74.00	-21.23	peak			
3	*	12703.000	49.54	3.60	53.14	74.00	-20.86	peak			

*:Maximum data x:Over limit !:over margin (Reference Only

Test Result: Pass

[TestMode: TX middle channel]; [Polarity: Vertical]



Site
Limit: FCC Part15 (PK)
EUT:
M/N: M1200S
Mode: EDR-2441
Note:

Polarization: *Vertical*
Power: AC120V/60Hz
Distance: 3m

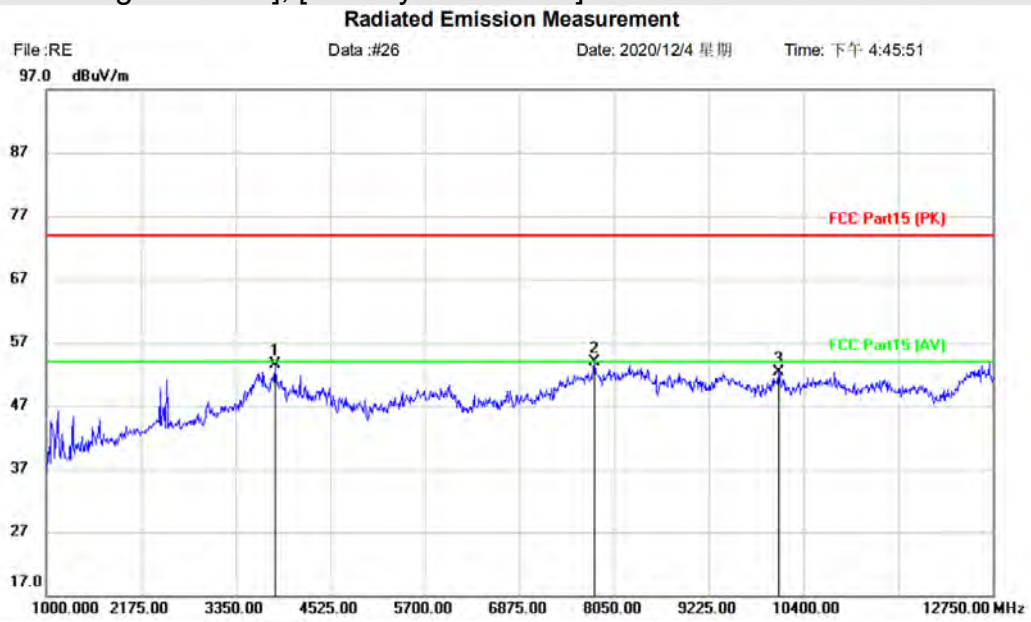
Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		6005.500	57.71	-5.26	52.45	74.00	-21.55	peak			
2	*	8273.250	52.54	0.40	52.94	74.00	-21.06	peak			
3		10776.000	49.72	1.70	51.42	74.00	-22.58	peak			

*:Maximum data x:Over limit !:over margin 〈Reference Only

Test Result: Pass

[TestMode: TX high channel]; [Polarity: Horizontal]



Site
Limit: FCC Part15 (PK)
EUT:
M/N: M1200S
Mode: EDR-2480
Note:

Polarization: *Horizontal*
Power: AC120V/60Hz
Distance: 3m

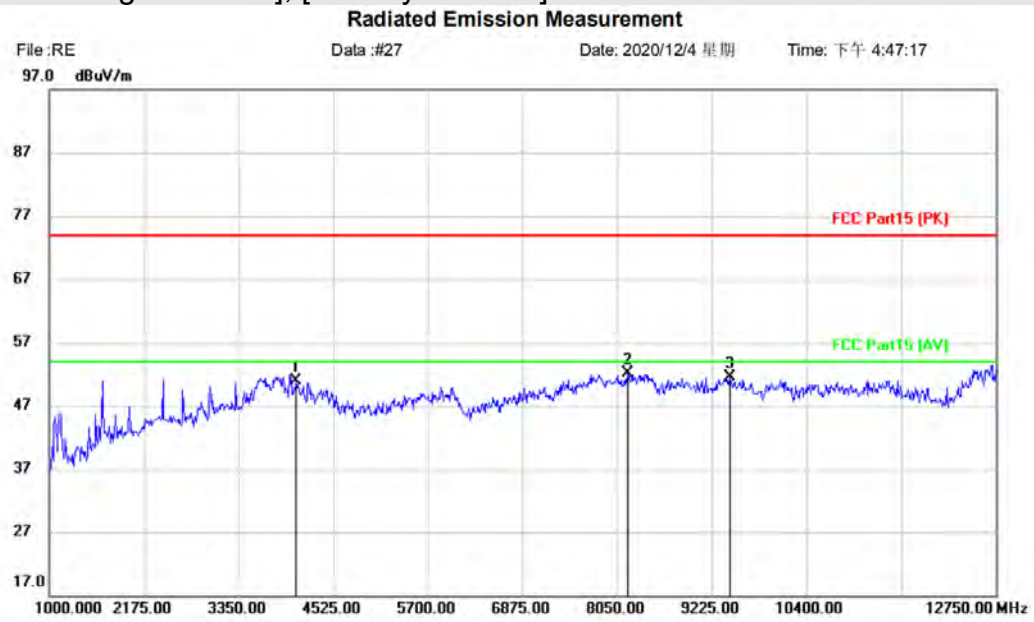
Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		3843.500	56.07	-2.66	53.41	74.00	-20.59	peak			
2	*	7803.250	52.95	1.00	53.95	74.00	-20.05	peak			
3		10094.500	50.88	1.45	52.33	74.00	-21.67	peak			

*:Maximum data x:Over limit !:over margin (Reference Only

Test Result: Pass

[TestMode: TX high channel]; [Polarity: Vertical]



Site
Limit: FCC Part15 (PK)
EUT:
M/N: M1200S
Mode: EDR-2480
Note:

Polarization: *Vertical*
Power: AC120V/60Hz
Distance: 3m

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		4066.750	54.84	-3.92	50.92	74.00	-23.08	peak			
2	*	8179.250	51.97	0.05	52.02	74.00	-21.98	peak			
3		9448.250	50.41	1.00	51.41	74.00	-22.59	peak			

*:Maximum data x:Over limit !:over margin (Reference Only

Test Result: Pass

2 RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS

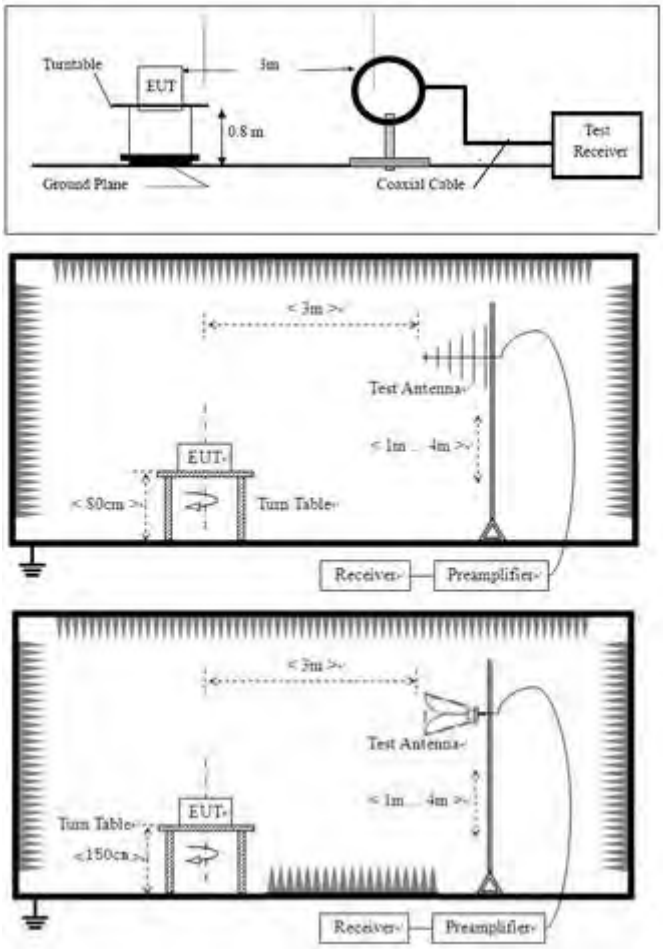
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.10.5
Test Mode (Pre-Scan)	TX Low channel;TX middle channel;TX high channel
Test Mode (Final Test)	TX Low channel;TX high channel
Tester	Ben
Temperature	25℃
Humidity	60%

2.1 LIMITS

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

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, 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.

2.2 BLOCK DIAGRAM OF TEST SETUP



2.3 PROCEDURE

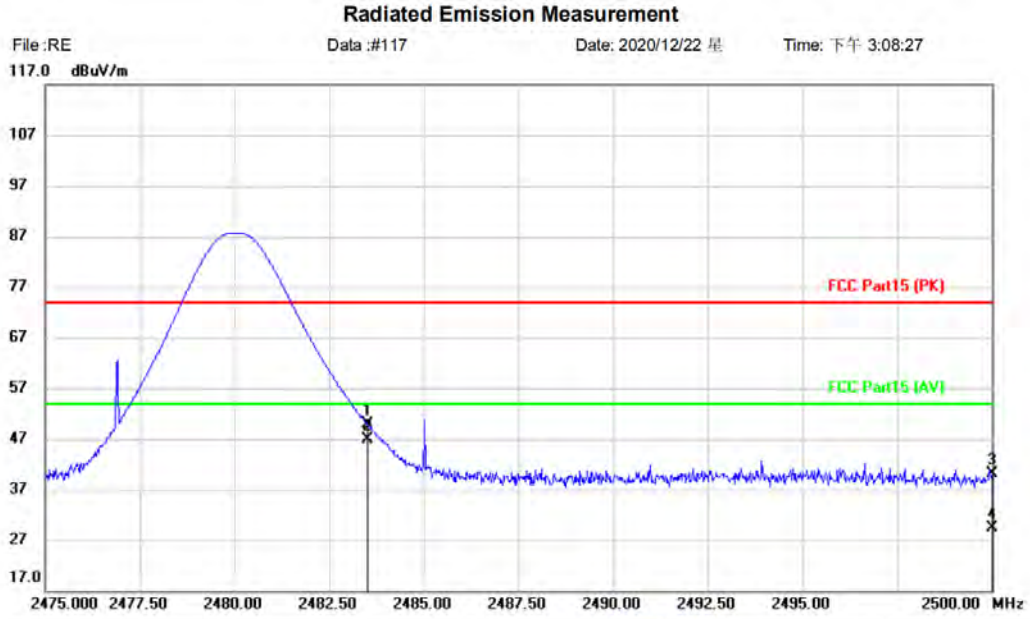
a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
d. The antenna height 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.
e. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
j. Repeat above procedures until all frequencies measured was complete.
Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. 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. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

2.4 TEST DATA

Remark: During the test, pre-scan the GFSK, Pi/4QPSK, 8-DPSK modulation, and found the GFSK modulation which it is worse case.

[TestMode: TX highest channel]; [Polarity: Horizontal]



Site
Limit: FCC Part15 (PK)
EUT:
M/N: M1200S
Mode: EDR-2480-PK
Note:

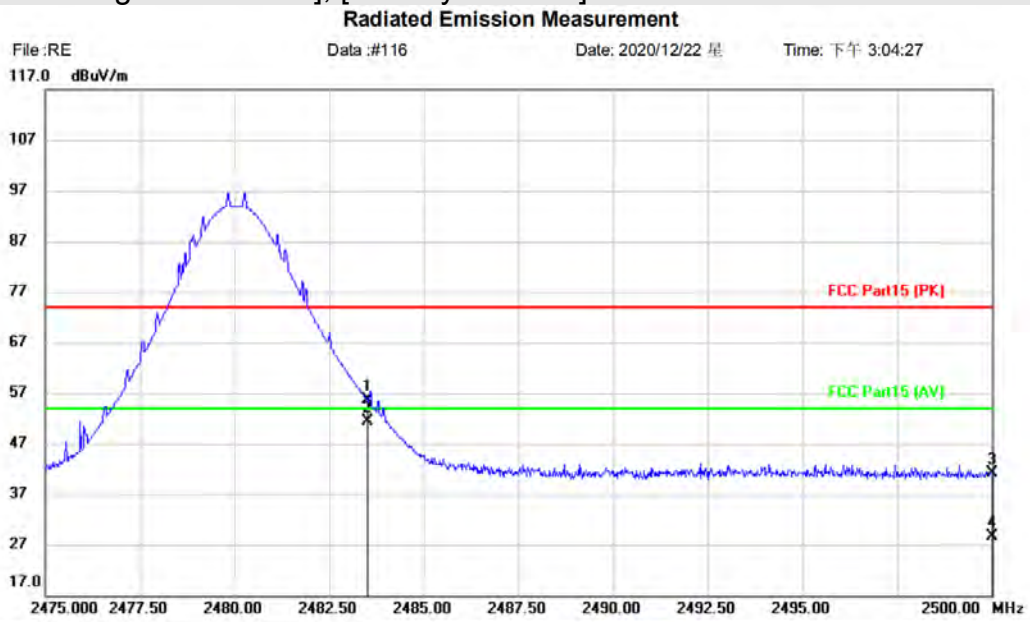
Polarization: *Horizontal*
Power: AC120V/60Hz
Distance: 3m

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.500	64.23	-14.33	49.90	74.00	-24.10	peak			
2	*	2483.500	61.16	-14.33	46.83	54.00	-7.17	AVG	150	140	
3		2500.000	54.44	-14.27	40.17	74.00	-33.83	peak			
4		2500.000	43.66	-14.27	29.39	54.00	-24.61	AVG	150	140	

Test Result: Pass

[TestMode: TX highest channel]; [Polarity: Vertical]



Site
Limit: FCC Part15 (PK)
EUT:
M/N: M1200S
Mode: EDR-2480-PK
Note:

Polarization: *Vertical*
Power: AC120V/60Hz
Distance: 3m

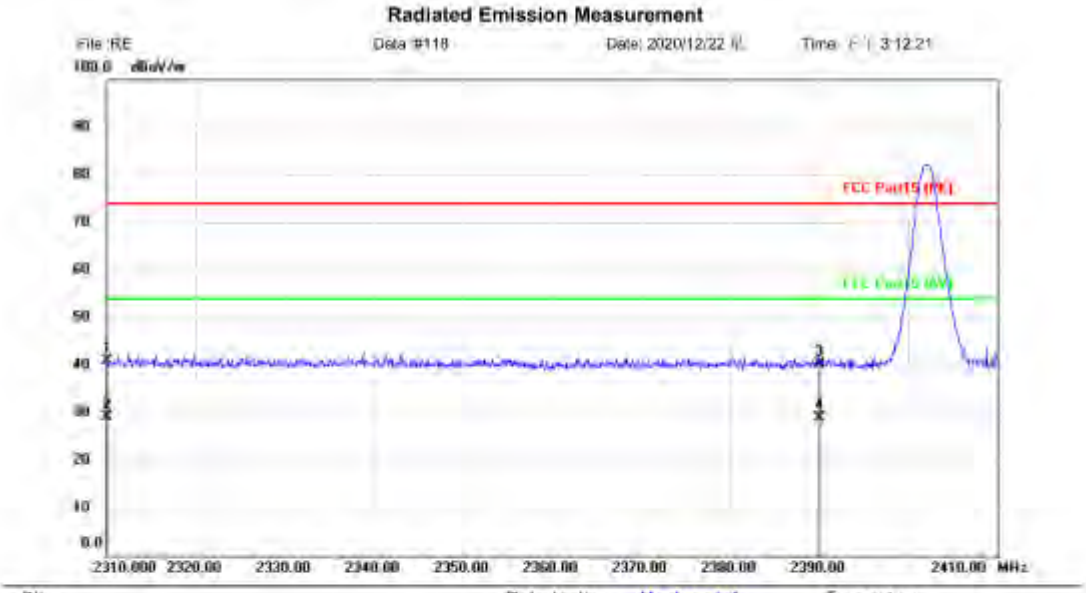
Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2483.500	70.07	-14.33	55.74	74.00	-18.26	peak			
2	*	2483.500	65.59	-14.33	51.26	54.00	-2.74	AVG	150	0	
3		2500.000	55.30	-14.27	41.03	74.00	-32.97	peak			
4		2500.000	42.98	-14.27	28.71	54.00	-25.29	AVG	150	0	

*:Maximum data x:Over limit !:over margin (Reference Only

Test Result: Pass

[TestMode: TX lowest channel]; [Polarity: Horizontal]



Site
Limit: FCC Part15 (PK)
EUT:
M/N: M1200S
Mode: EDR-2402-PK
Note:

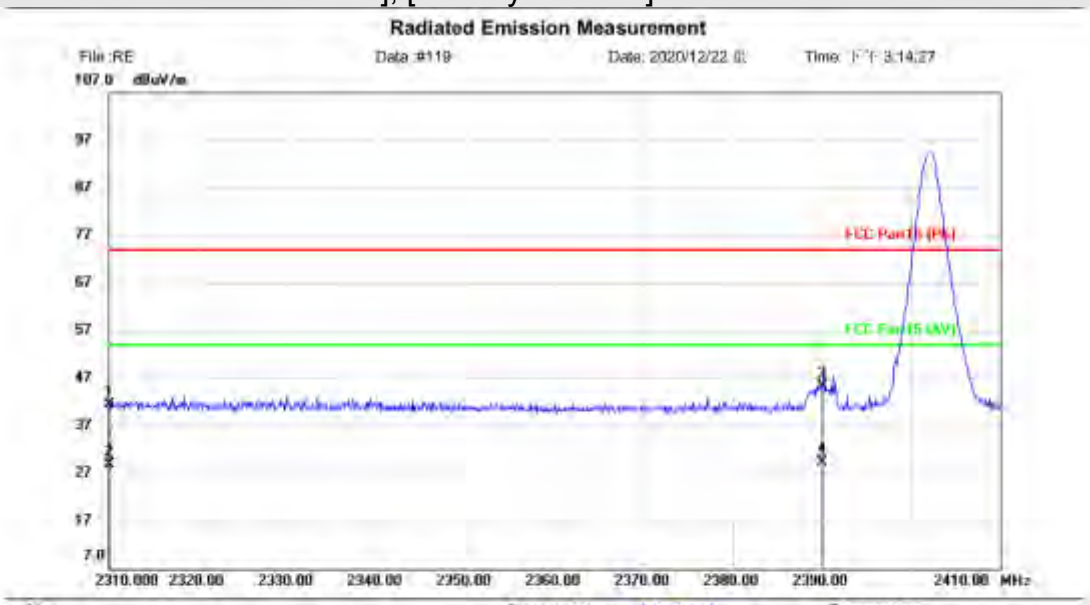
Polarization: *Horizontal*
Power: AC120V/60Hz
Distance: 3m

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2310.000	55.63	-14.84	40.79	74.00	-33.21	peak			
2	*	2310.000	43.87	-14.84	29.03	54.00	-24.97	AVG	150	140	
3		2390.000	54.65	-14.60	40.05	74.00	-33.95	peak			
4		2390.000	43.43	-14.60	28.83	54.00	-25.17	AVG	150	140	

Test Result: Pass

[TestMode: TX lowest channel]; [Polarity: Vertical]



Site
Limit: FCC Part15 (PK)
EUT:
M/N: M1200S
Mode: EDR-2402-PK
Note:

Polarization: *Vertical*
Power: AC120V/60Hz
Distance: 3m

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		2310.000	56.27	-14.84	41.43	74.00	-32.57	peak			
2		2310.000	43.72	-14.84	28.88	54.00	-25.12	AVG	150	0	
3		2390.000	59.88	-14.60	45.28	74.00	-28.72	peak			
4	*	2390.000	44.09	-14.60	29.49	54.00	-24.51	AVG	150	0	

Test Result: Pass

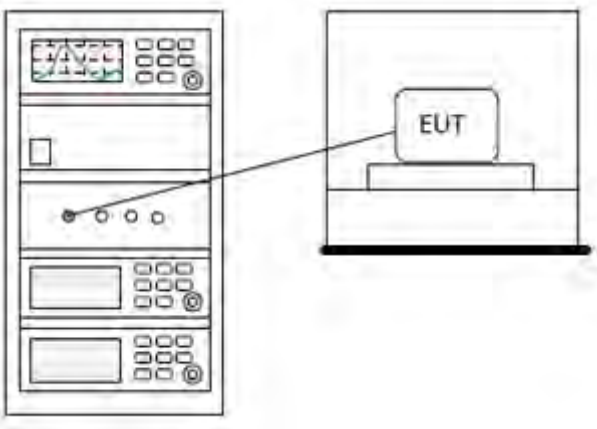
3 CONDUCTED SPURIOUS EMISSIONS

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.8
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Ben
Temperature	25℃
Humidity	60%

3.1 LIMITS

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 conducted power limits. If the transmitter complies with the conducted 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 §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

3.2 BLOCK DIAGRAM OF TEST SETUP



3.3 TEST DATA

Pass: Please Refer To Appendix: For Details

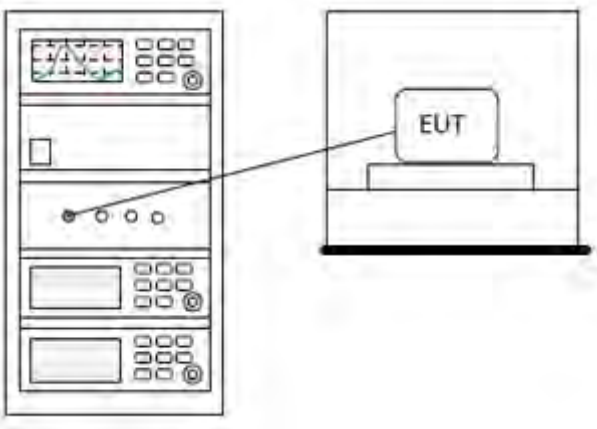
4 CONDUCTED BAND EDGES MEASUREMENT

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.6
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Ben
Temperature	25℃
Humidity	60%

4.1 LIMITS

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 conducted power limits. If the transmitter complies with the conducted 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 §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

4.2 BLOCK DIAGRAM OF TEST SETUP



4.3 TEST DATA

Pass: Please Refer To Appendix: For Details

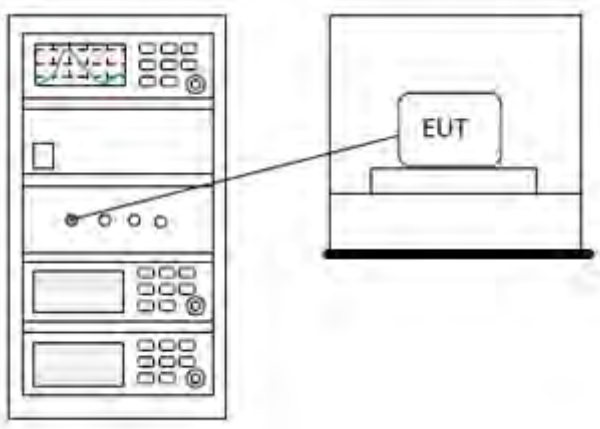
5 DWELL TIME

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.4
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Ben
Temperature	25℃
Humidity	60%

5.1 LIMITS

Frequency(MHz)	Limit
902-928	0.4S within a 20S period(20dB bandwidth<250kHz)
	0.4S within a 10S period(20dB bandwidth≥250kHz)
2400-2483.5	0.4S within a period of 0.4Smultiplied by the number of hopping channels
5725-5850	0.4S within a 30S period

5.2 BLOCK DIAGRAM OF TEST SETUP



5.3 TEST DATA

Pass: Please Refer To Appendix: For Details

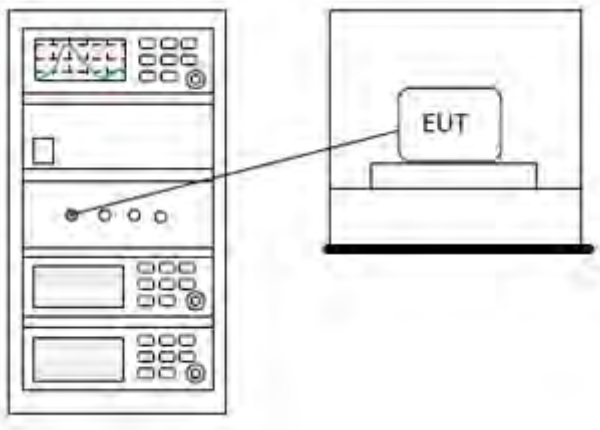
6 HOPPING CHANNEL NUMBER

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.3
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Ben
Temperature	25℃
Humidity	60%

6.1 LIMITS

Frequency range(MHz)	Number of hopping channels (minimum)
902-928	50 for 20dB bandwidth <250kHz
	25 for 20dB bandwidth ≥250kHz
2400-2483.5	15
5725-5850	75

6.2 BLOCK DIAGRAM OF TEST SETUP



6.3 TEST DATA

Pass: Please Refer To Appendix: For Details

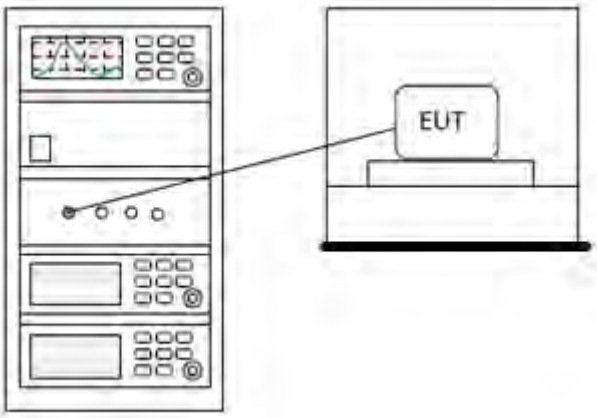
7 CARRIER FREQUENCIES SEPARATION

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Ben
Temperature	25℃
Humidity	60%

7.1 LIMITS

Limit:	2/3 of the 20dB bandwidth base on the transmission power is less than 0.125W

7.2 BLOCK DIAGRAM OF TEST SETUP



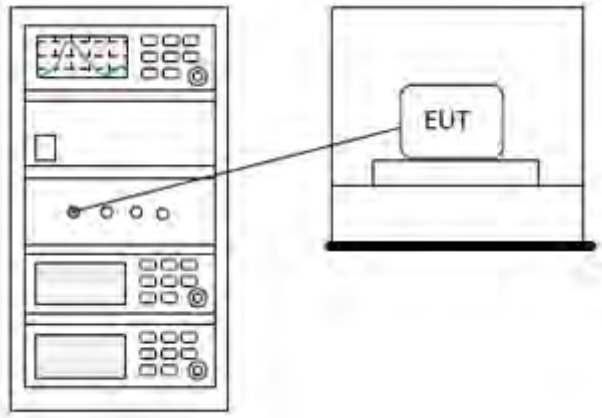
7.3 TEST DATA

Pass: Please Refer To Appendix: For Details

8 20DB BANDWIDTH

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.9
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Ben
Temperature	25℃
Humidity	60%

8.1 BLOCK DIAGRAM OF TEST SETUP



8.2 TEST DATA

Pass: Please Refer To Appendix: For Details

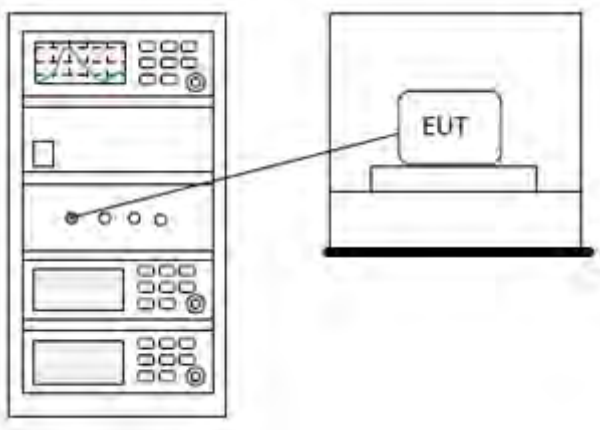
9 CONDUCTED PEAK OUTPUT POWER

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.5
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Ben
Temperature	25℃
Humidity	60%

9.1 LIMITS

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥50 hopping channels
	0.25 for 25≤ hopping channels<50
	1 for digital modulation
2400-2483.5	1 for ≥75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

9.2 BLOCK DIAGRAM OF TEST SETUP



9.3 TEST DATA

Pass: Please Refer To Appendix: For Details

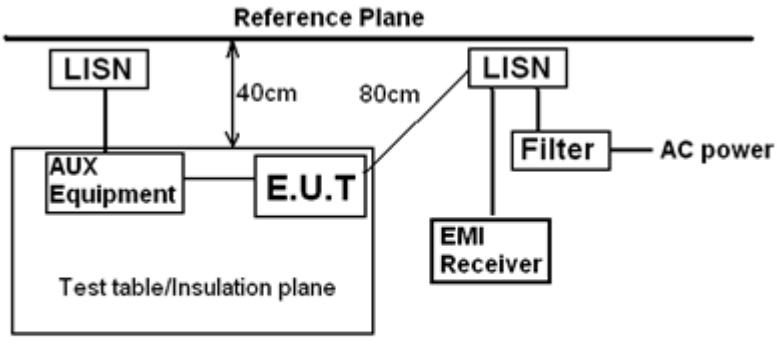
10 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Ben
Temperature	25℃
Humidity	60%

10.1 LIMITS

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency.		

10.2 BLOCK DIAGRAM OF TEST SETUP



Remark
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m

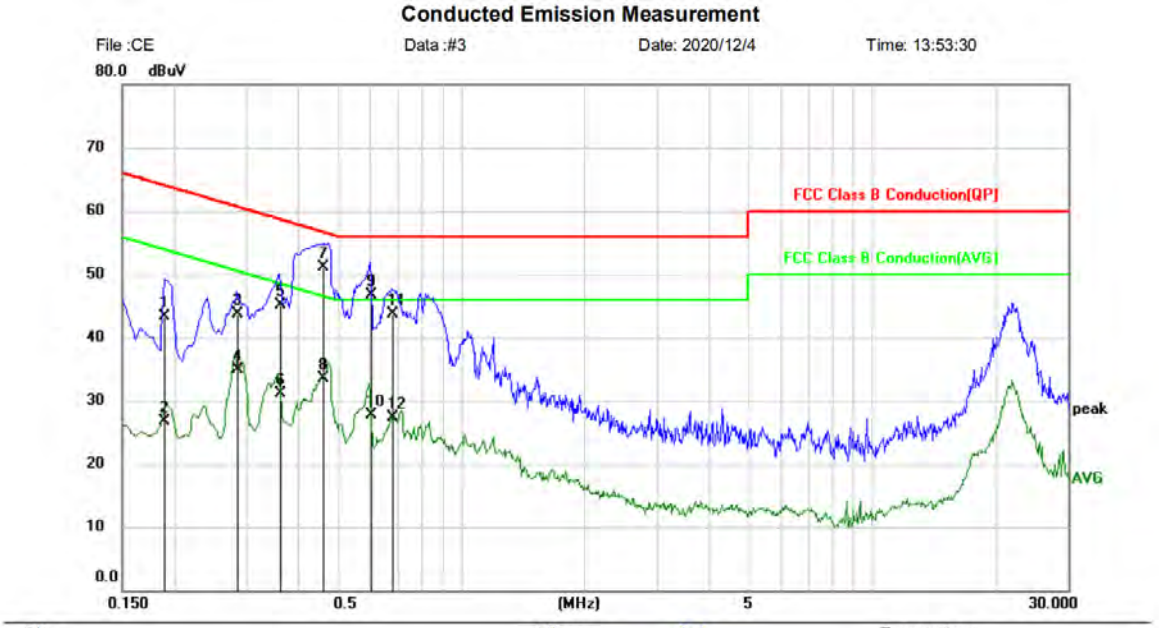
10.3 PROCEDURE

1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50?H + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as

the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.
Remark: LISN=Read Level+ Cable Loss+ LISN Factor

10.4 TEST DATA

[TestMode: TX]; [Line: Line]



Site
Limit: FCC Class B Conduction(QP)
EUT:
M/N: M1200S
Mode: EDR Mode
Note:

Phase: L1
Power: AC120V/60Hz

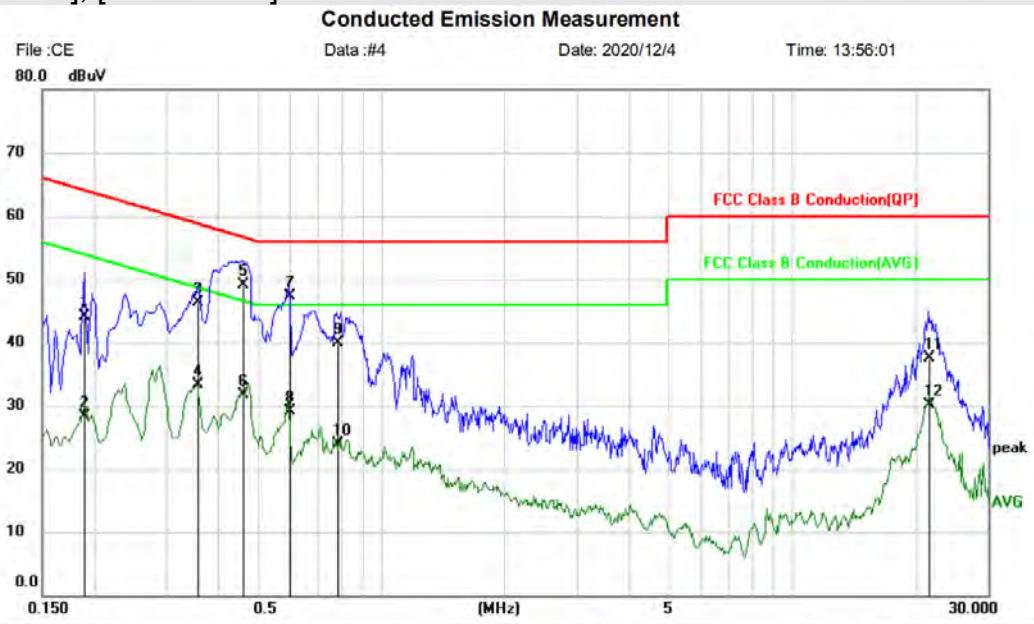
Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1900	33.44	9.88	43.32	64.04	-20.72	QP	
2		0.1900	16.92	9.88	26.80	54.04	-27.24	AVG	
3		0.2860	33.93	9.82	43.75	60.64	-16.89	QP	
4		0.2860	25.08	9.82	34.90	50.64	-15.74	AVG	
5		0.3620	35.29	9.77	45.06	58.68	-13.62	QP	
6		0.3620	21.33	9.77	31.10	48.68	-17.58	AVG	
7	*	0.4620	41.45	9.71	51.16	56.66	-5.50	QP	
8		0.4620	23.80	9.71	33.51	46.66	-13.15	AVG	
9		0.6020	36.87	9.74	46.61	56.00	-9.39	QP	
10		0.6020	17.98	9.74	27.72	46.00	-18.28	AVG	
11		0.6820	34.08	9.68	43.76	56.00	-12.24	QP	
12		0.6820	17.69	9.68	27.37	46.00	-18.63	AVG	

*:Maximum data x:Over limit !:over margin (Reference Only

Test Result: Pass

[TestMode: TX]; [Line: Nutral]



Site
Limit: FCC Class B Conduction(QP)
EUT:
M/N: M1200S
Mode: EDR Mode
Note:

Phase: N
Power: AC120V/60Hz

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1900	34.14	9.88	44.02	64.04	-20.02	QP	
2		0.1900	18.49	9.88	28.37	54.04	-25.67	AVG	
3		0.3558	36.58	9.76	46.34	58.83	-12.49	QP	
4		0.3558	23.53	9.76	33.29	48.83	-15.54	AVG	
5	*	0.4620	39.45	9.72	49.17	56.66	-7.49	QP	
6		0.4620	22.03	9.72	31.75	46.66	-14.91	AVG	
7		0.5980	37.53	9.74	47.27	56.00	-8.73	QP	
8		0.5980	19.39	9.74	29.13	46.00	-16.87	AVG	
9		0.7820	30.22	9.74	39.96	56.00	-16.04	QP	
10		0.7820	14.19	9.74	23.93	46.00	-22.07	AVG	
11		21.4980	27.38	10.04	37.42	60.00	-22.58	QP	
12		21.4980	20.14	10.04	30.18	50.00	-19.82	AVG	

*:Maximum data x:Over limit !:over margin (Reference Only

Test Result: Pass

11 ANTENNA REQUIREMENT

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	N/A

11.1 CONCLUSION

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 3dBi.

10 APPENDIX

10.1 APPENDIX:20DBEMISSION BANDWIDTH

Test Result

TestMode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH1	Ant1	2402	1.122	2401.454	2402.576	---	PASS
		2441	1.119	2440.454	2441.573	---	PASS
		2480	1.119	2479.454	2480.573	---	PASS
2DH1	Ant1	2402	1.410	2401.307	2402.717	---	PASS
		2441	1.413	2440.307	2441.720	---	PASS
		2480	1.410	2479.304	2480.714	---	PASS
3DH1	Ant1	2402	1.407	2401.313	2402.720	---	PASS
		2441	1.407	2440.313	2441.720	---	PASS
		2480	1.401	2479.316	2480.717	---	PASS

Test Graphs

DH1_Ant1_2402

DH1_Ant1_2441

DH1_Ant1_2480


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 100/100
06:53:35 PM Dec 22, 2020
Ref Offset 1.92 dB
10 dB/div
Ref 30.00 dBm
ΔMkr3 1.119 MHz
0.089 dB
Center 2.480000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 3.000 MHz
#Sweep 100.0 ms (1001 pts)
1 N 1 f 2.479 454 GHz -23.504 dBm
2 N 1 f 2.480 015 GHz -3.309 dBm
3 Δ1 f (Δ) 1.119 MHz (Δ) 0.089 dB
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.478500000 GHz
Stop Freq
2.481500000 GHz
CF Step
300.000 kHz
Auto
Man
Freq Offset
0 Hz

2DH1_Ant1_2402

2DH1_Ant1_2441

2DH1_Ant1_2480


3DH1_Ant1_2402

3DH1_Ant1_2441

3DH1_Ant1_2480

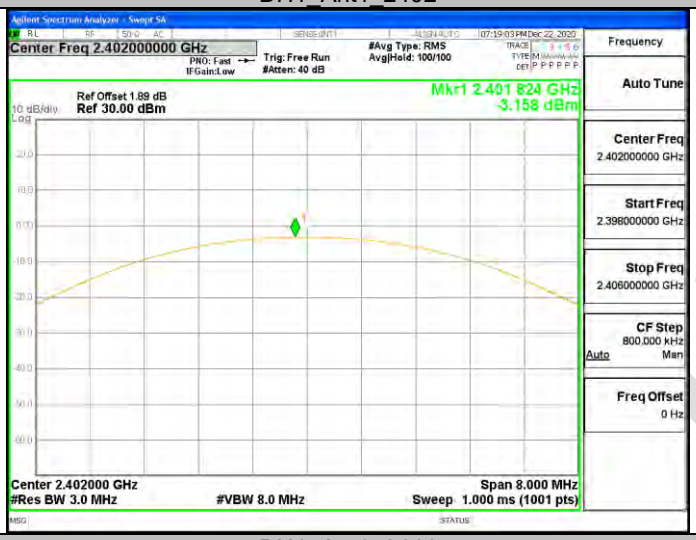

10.2 APPENDIX:MAXIMUM CONDUCTED OUTPUT POWER

Test Result

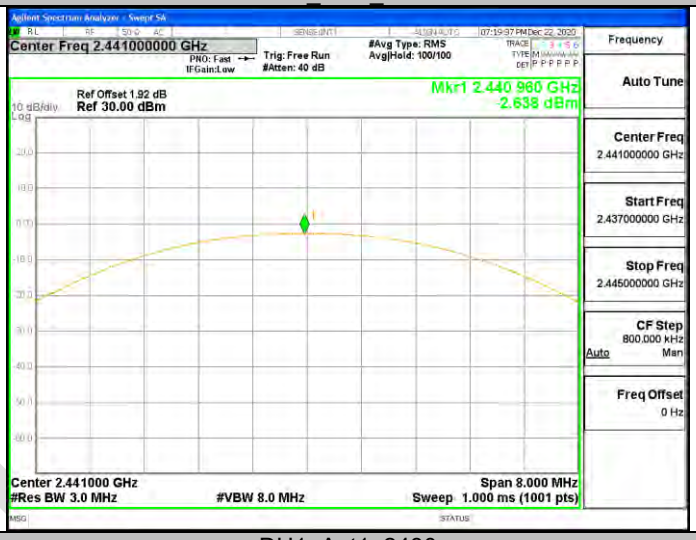
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH1	Ant1	2402	-3.16	<=20.97	PASS
		2441	-2.64	<=20.97	PASS
		2480	-2.56	<=20.97	PASS
2DH1	Ant1	2402	-4.59	<=20.97	PASS
		2441	-3.96	<=20.97	PASS
		2480	-3.87	<=20.97	PASS
3DH1	Ant1	2402	4.42	<=20.97	PASS
		2441	4.97	<=20.97	PASS
		2480	5.12	<=20.97	PASS

Test Graphs

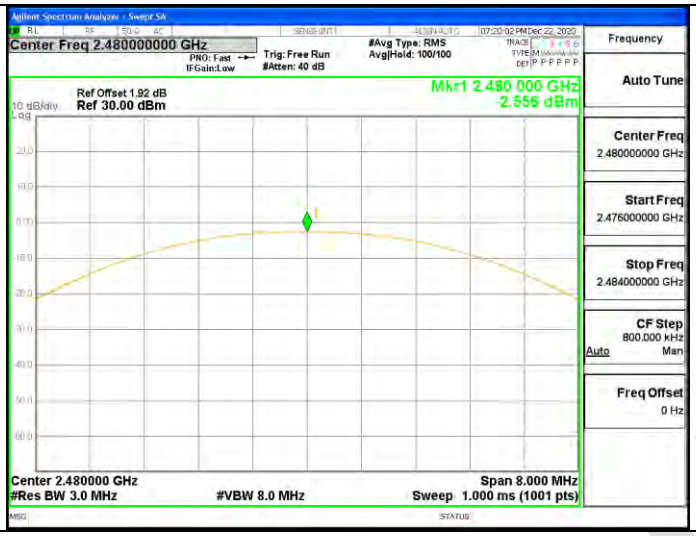
DH1_Ant1_2402

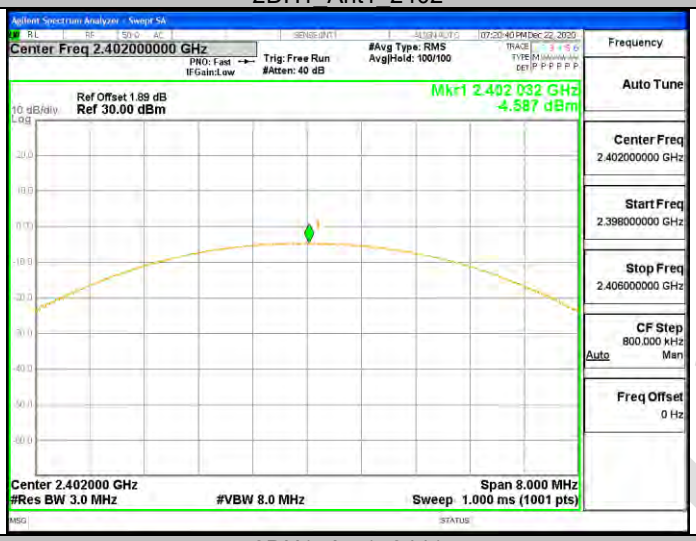
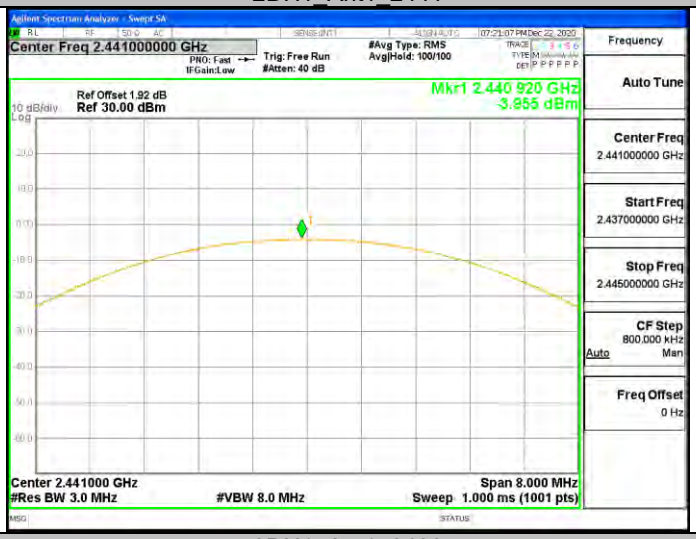
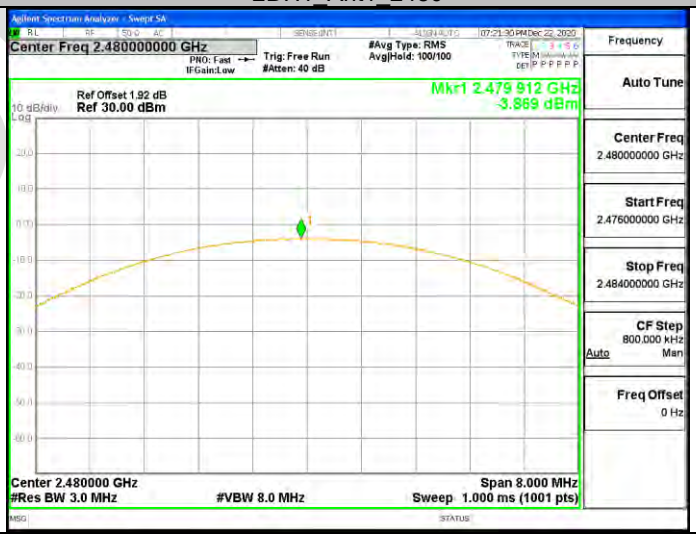


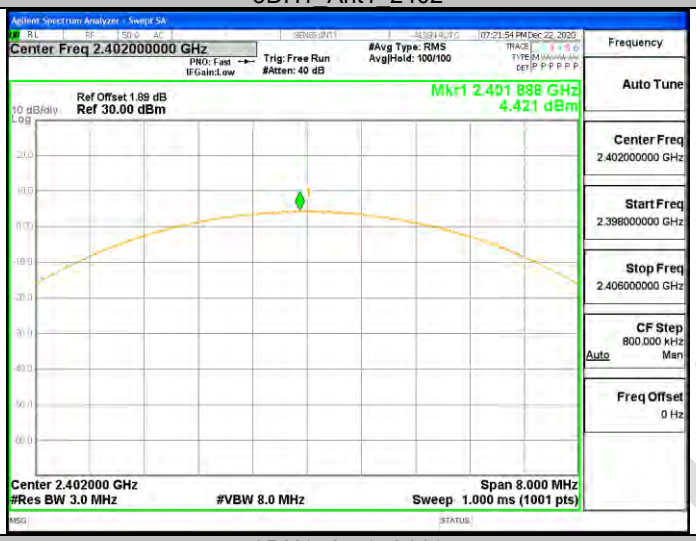
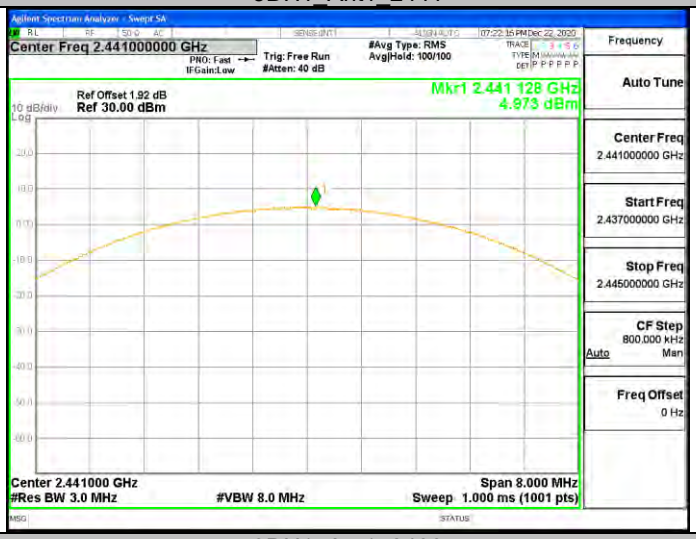
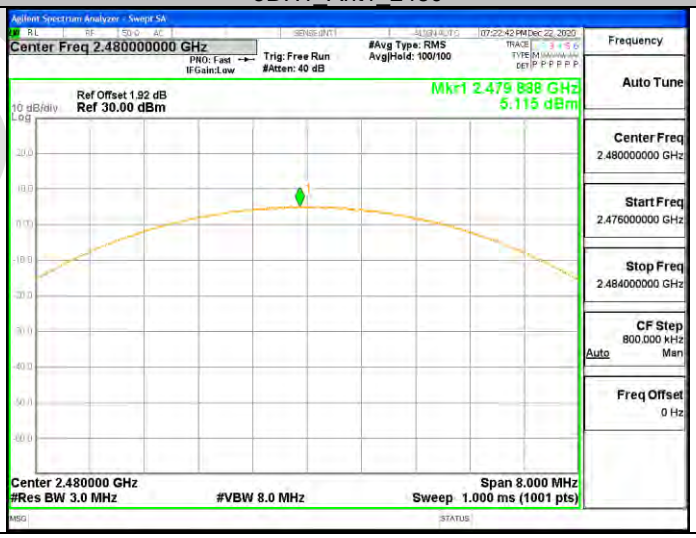
DH1_Ant1_2441



DH1_Ant1_2480


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 100/100
07:20:02 PM Dec 22, 2020
Frequency
Auto Tune
Ref Offset 1.92 dB
10 dB/div
Log
Ref 30.00 dBm
Mkr1 2.480 000 GHz
-2.555 dBm
Center Freq
2.480000000 GHz
Start Freq
2.476000000 GHz
Stop Freq
2.484000000 GHz
CF Step
800.000 kHz
Auto
Man
Freq Offset
0 Hz
Center 2.480000 GHz
#Res BW 3.0 MHz
#VBW 8.0 MHz
Span 8.000 MHz
Sweep 1.000 ms (1001 pts)
MSG
STATUS

2DH1_Ant1_2402

2DH1_Ant1_2441

2DH1_Ant1_2480


3DH1_Ant1_2402

3DH1_Ant1_2441

3DH1_Ant1_2480


10.3 APPENDIX:CARRIER FREQUENCY SEPARATION

Test Result

TestMode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH1	Ant1	Hop	0.844	>=0.748	PASS
2DH1	Ant1	Hop	1.004	>=0.942	PASS
3DH1	Ant1	Hop	0.998	>=0.938	PASS

Test Graphs

DH1_Ant1_Hop

2DH1_Ant1_Hop

3DH1_Ant1_Hop

10.4 APPENDIX:TIME OF OCCUPANCY

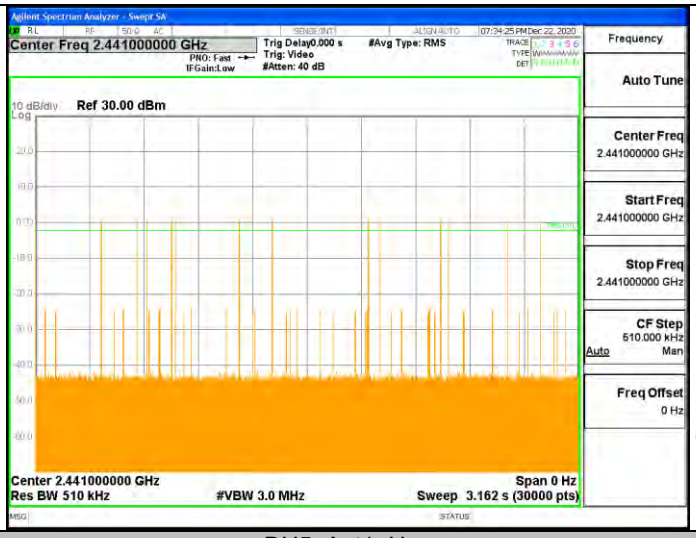
Test Result

TestMode	Antenna	Channel	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.38	330	0.125	<=0.4	PASS
DH3	Ant1	Hop	1.64	140	0.229	<=0.4	PASS
DH5	Ant1	Hop	2.88	120	0.346	<=0.4	PASS

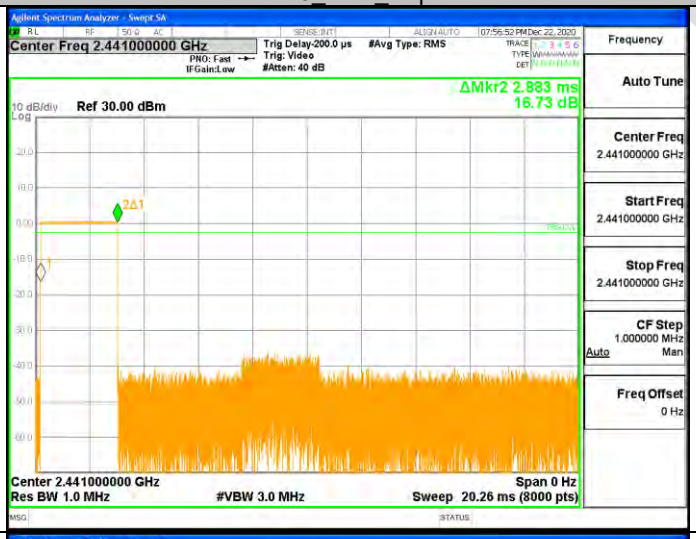
Test Graphs

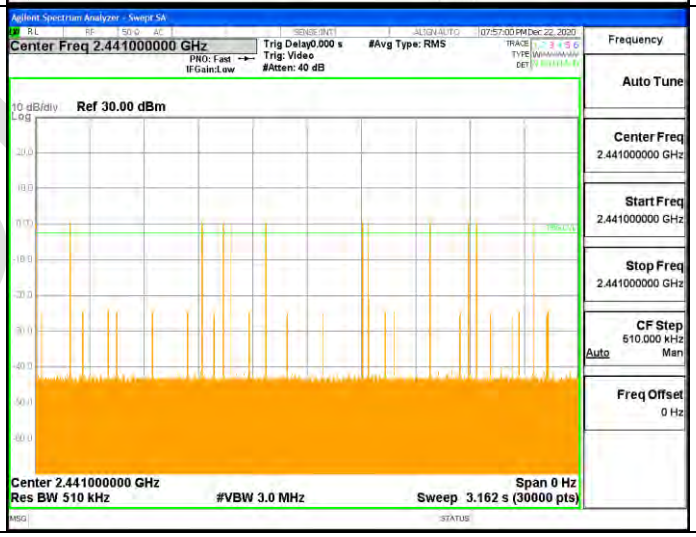
DH1_Ant1_Hop


DH3_Ant1_Hop



Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig Delay0.000 s
Trig: Video
#Atten: 40 dB
#Avg Type: RMS
07:34:25 PM Dec 22, 2020
Frequency
Auto Tune
10 dB/div
Log
Ref 30.00 dBm
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
510.000 kHz
Auto
Man
Freq Offset
0 Hz
Center 2.441000000 GHz
Res BW 510 kHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 3.162 s (30000 pts)
MSG
STATUS

DH5_Ant1_Hop


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig Delay-200.0 µs
Trig: Video
#Atten: 40 dB
#Avg Type: RMS
07:56:52 PM Dec 22, 2020
Frequency
Auto Tune
ΔMkr2 2.883 ms
16.73 dB
10 dB/div
Log
Ref 30.00 dBm
2Δ1
1
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 20.26 ms (8000 pts)
MSG
STATUS


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig Delay0.000 s
Trig: Video
#Atten: 40 dB
#Avg Type: RMS
07:57:00 PM Dec 22, 2020
Frequency
Auto Tune
10 dB/div
Log
Ref 30.00 dBm
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
510.000 kHz
Auto
Man
Freq Offset
0 Hz
Center 2.441000000 GHz
Res BW 510 kHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 3.162 s (30000 pts)
MSG
STATUS

10.5 APPENDIX:NUMBER OF HOPPING CHANNELS

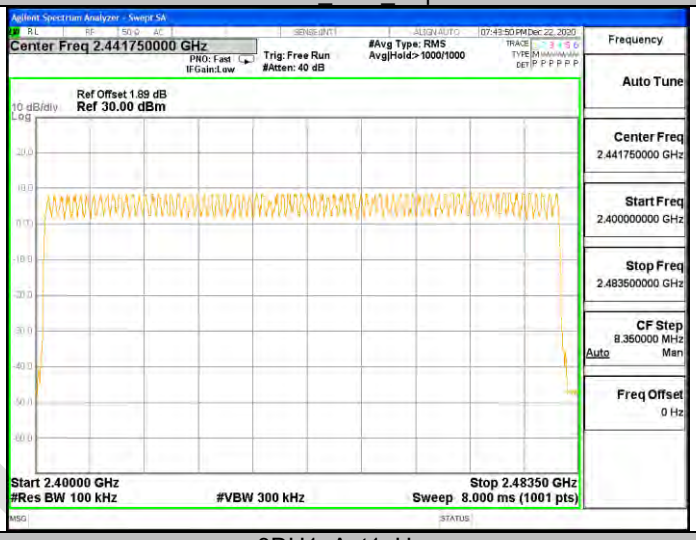
Test Result

TestMode	Antenna	Channel	Result[Num]	Limit[Num]	Verdict
DH1	Ant1	Hop	79	>=15	PASS
2DH1	Ant1	Hop	79	>=15	PASS
3DH1	Ant1	Hop	79	>=15	PASS

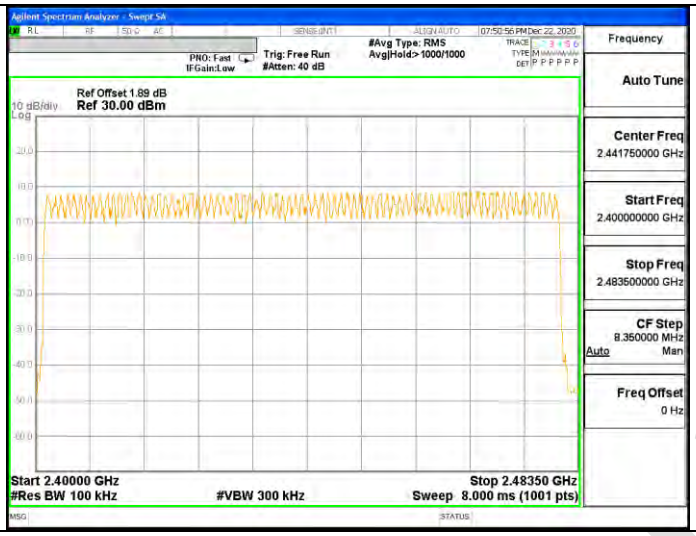
Test Graphs

DH1_Ant1_Hop

2DH1_Ant1_Hop



3DH1_Ant1_Hop



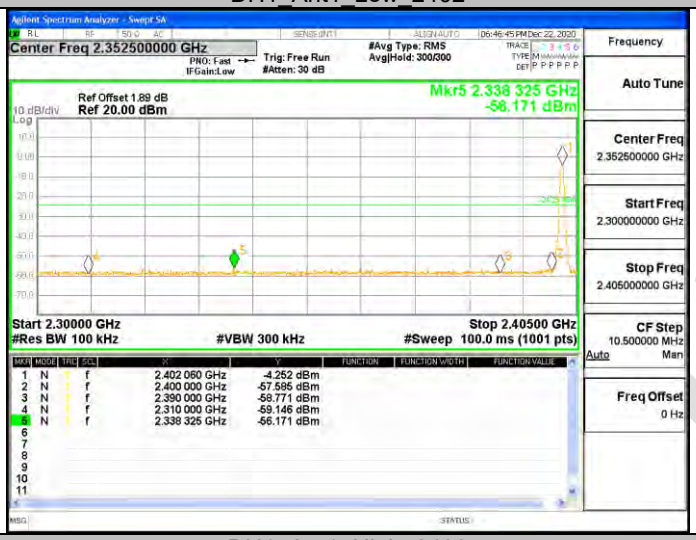
10.6 APPENDIX:BAND EDGE MEASUREMENTS

Test Result

TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH1	Ant1	Low	2402	-4.25	-56.17	<=-24.25	PASS
		High	2480	-3.33	-55.53	<=-23.33	PASS
		Low	Hop_2402	1.44	-56.49	-18.57	PASS
		High	Hop_2480	2.47	-55.14	-17.53	PASS
2DH1	Ant1	Low	2402	-8.88	-56.62	<=-28.88	PASS
		High	2480	-8.23	-55.82	<=-28.23	PASS
		Low	Hop_2402	7.46	-56.61	-12.54	PASS
		High	Hop_2480	8.67	-55.39	-11.33	PASS
3DH1	Ant1	Low	2402	-0.61	-56.14	<=-20.61	PASS
		High	2480	0.51	-55.75	<=-19.49	PASS
		Low	Hop_2402	7.24	-55.48	-12.76	PASS
		High	Hop_2480	7.87	-55.38	-12.13	PASS

Test Graphs

DH1_Ant1_Low_2402



DH1_Ant1_High_2480

DH1_Ant1_Low_Hop_2402

DH1_Ant1_High_Hop_2480


2DH1_Ant1_Low_2402

2DH1_Ant1_High_2480


2DH1_Ant1_Low_Hop_2402

2DH1_Ant1_High_Hop_2480


3DH1_Ant1_Low_2402

3DH1_Ant1_High_2480


3DH1_Ant1_Low_Hop_2402

3DH1_Ant1_High_Hop_2480

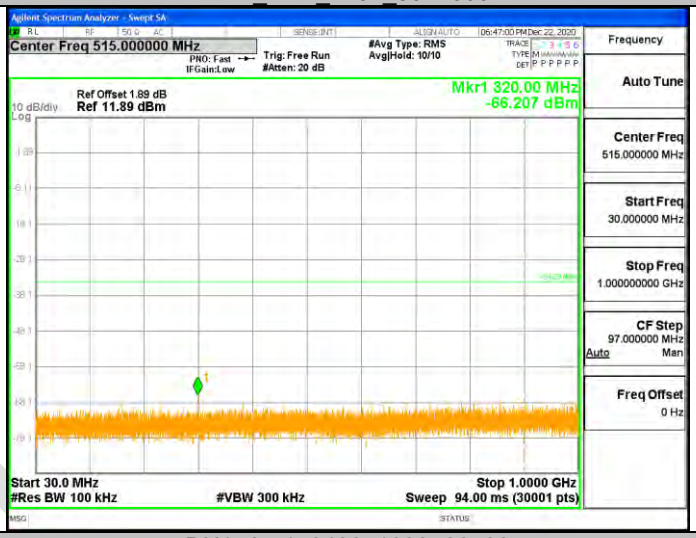

10.7 APPENDIX:CONDUCTED SPURIOUSEMISSION

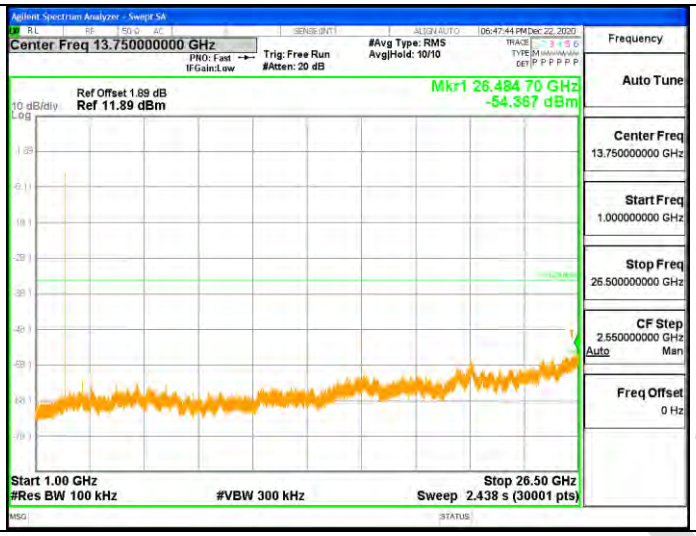
Test Result

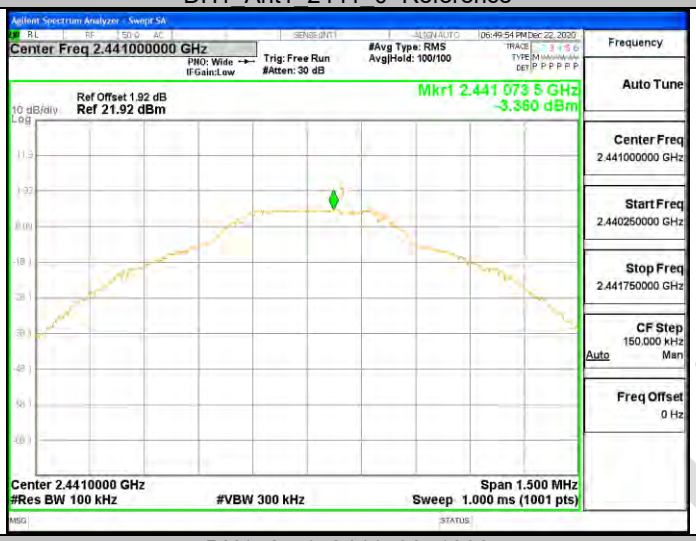
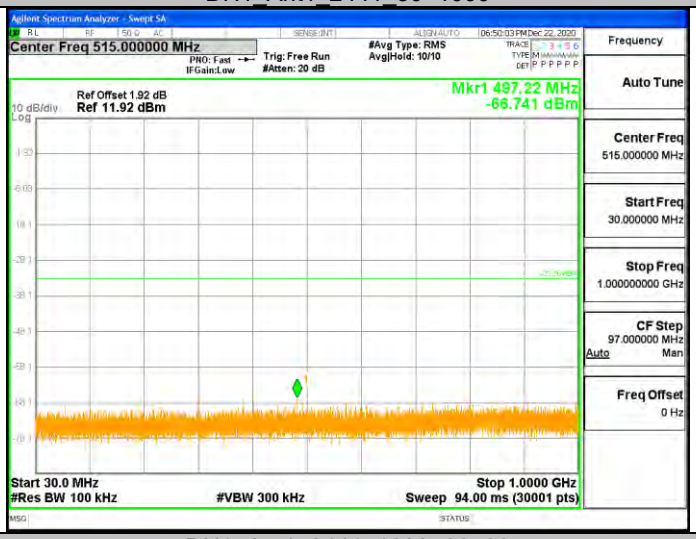
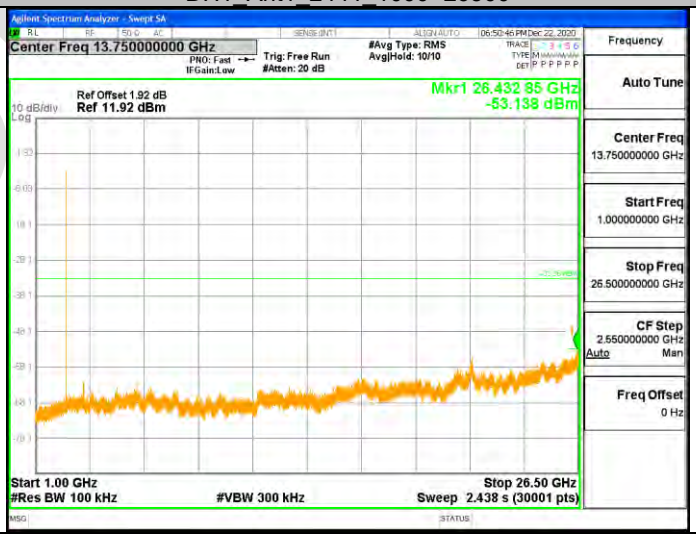
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH1	Ant1	2402	Reference	-4.29	-4.29	---	PASS
			30~1000	30~1000	-66.207	<=-34.291	PASS
			1000~26500	1000~26500	-54.367	<=-34.291	PASS
		2441	Reference	-3.36	-3.36	---	PASS
			30~1000	30~1000	-66.741	<=-33.36	PASS
			1000~26500	1000~26500	-53.138	<=-33.36	PASS
		2480	Reference	-3.33	-3.33	---	PASS
			30~1000	30~1000	-66.575	<=-33.328	PASS
			1000~26500	1000~26500	-54.334	<=-33.328	PASS
2DH1	Ant1	2402	Reference	-8.96	-8.96	---	PASS
			30~1000	30~1000	-67.355	<=-38.963	PASS
			1000~26500	1000~26500	-54.18	<=-38.963	PASS
		2441	Reference	-8.40	-8.40	---	PASS
			30~1000	30~1000	-66.551	<=-38.396	PASS
			1000~26500	1000~26500	-54.125	<=-38.396	PASS
		2480	Reference	-8.19	-8.19	---	PASS
			30~1000	30~1000	-66.379	<=-38.193	PASS
			1000~26500	1000~26500	-54.328	<=-38.193	PASS
3DH1	Ant1	2402	Reference	-0.71	-0.71	---	PASS
			30~1000	30~1000	-65.833	<=-30.712	PASS
			1000~26500	1000~26500	-54.207	<=-30.712	PASS
		2441	Reference	-0.06	-0.06	---	PASS
			30~1000	30~1000	-66.789	<=-30.06	PASS
			1000~26500	1000~26500	-53.799	<=-30.06	PASS
		2480	Reference	-0.01	-0.01	---	PASS
			30~1000	30~1000	-65.956	<=-30.012	PASS
			1000~26500	1000~26500	-53.032	<=-30.012	PASS

Test Graphs

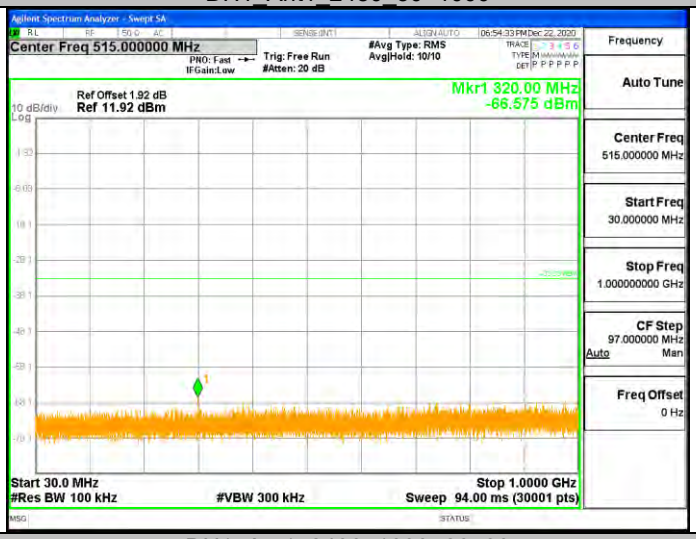
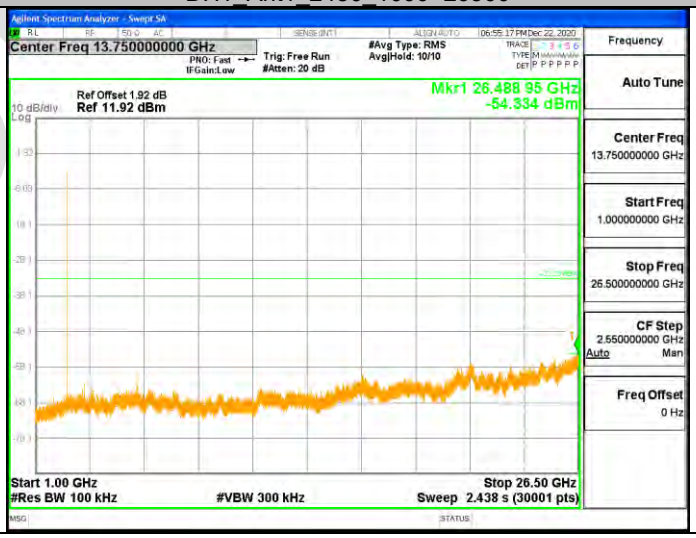
DH1_Ant1_2402_0~Reference

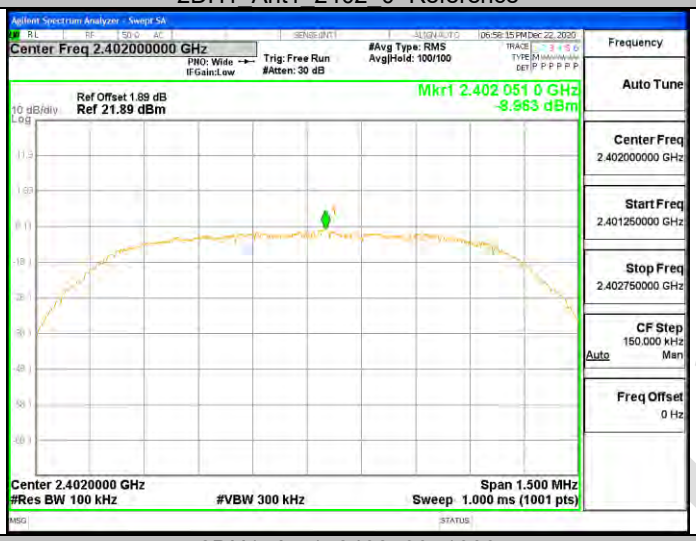
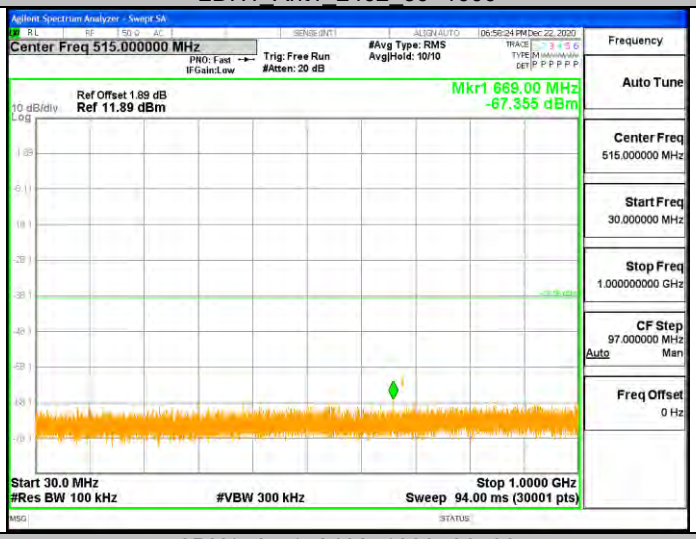
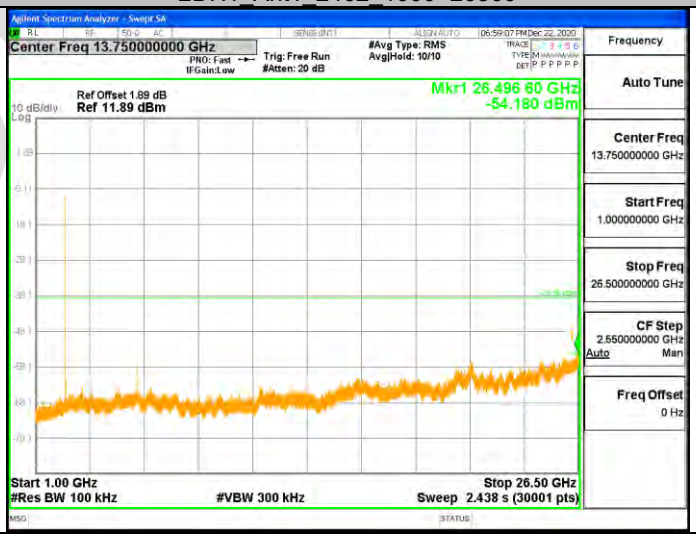
DH1_Ant1_2402_30~1000

DH1_Ant1_2402_1000~26500

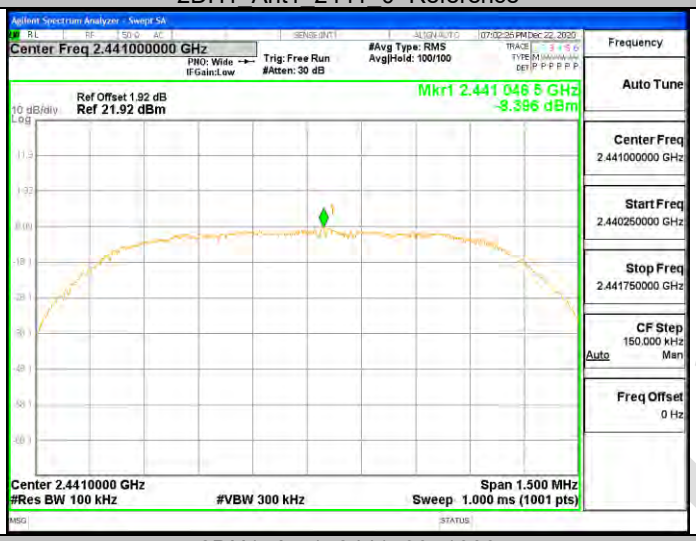
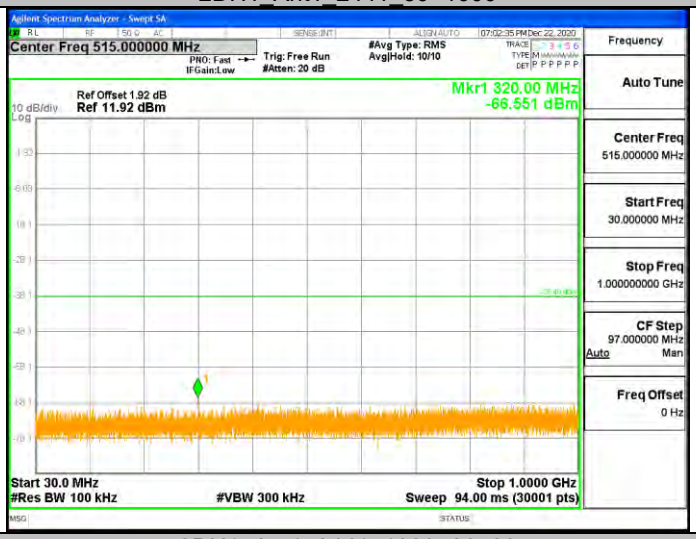
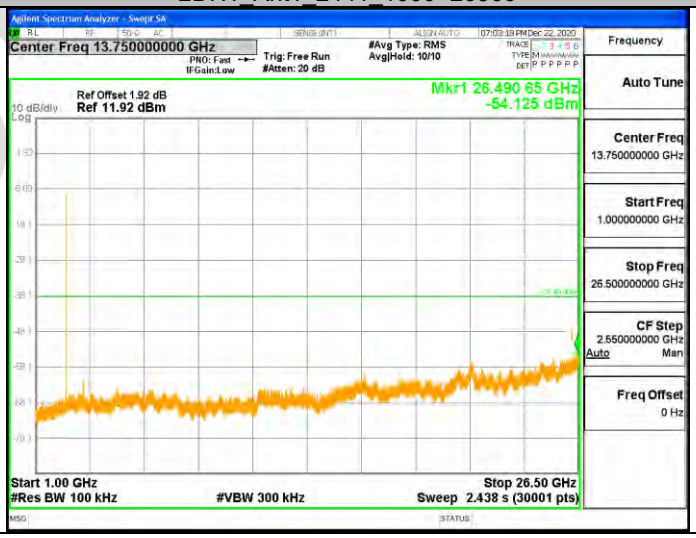

Agilent Spectrum Analyzer - Swept SA
Center Freq 13.750000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
Avg|Hold: 10/10
06:47:44 PM Dec 22, 2020
Ref Offset 1.89 dB
10 dB/div
Ref 11.89 dBm
Mkr1 26.484 70 GHz
-54.367 dBm
Start 1.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 2.438 s (30001 pts)
Frequency
Auto Tune
Center Freq
13.750000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
26.500000000 GHz
CF Step
2.550000000 GHz
Auto
Man
Freq Offset
0 Hz

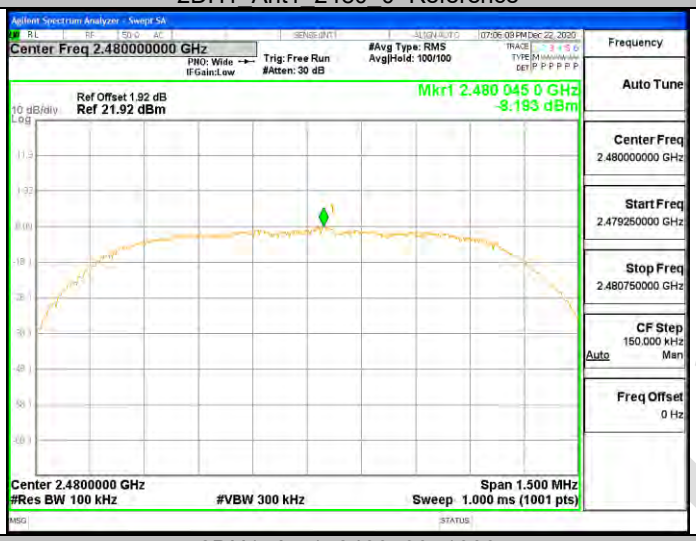
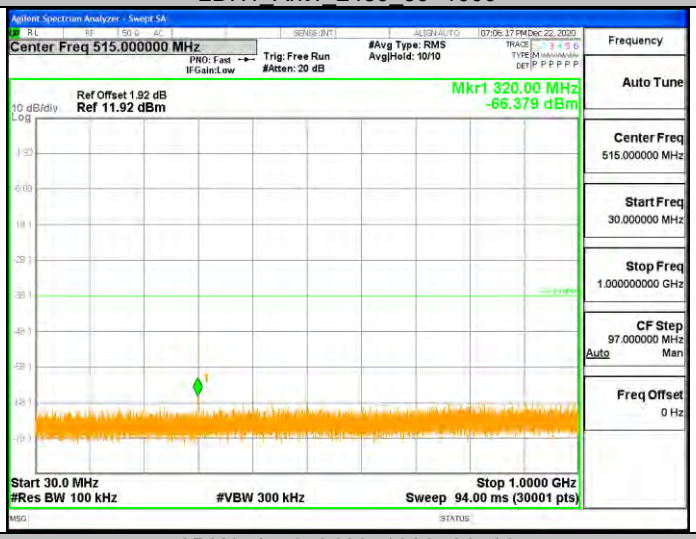
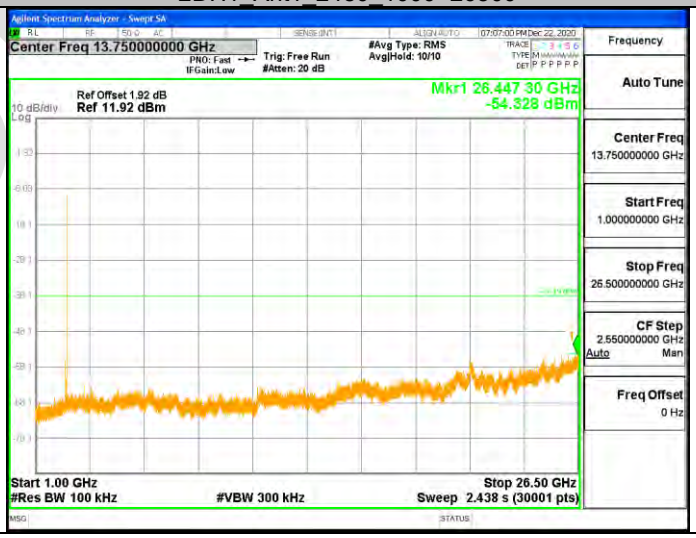
DH1_Ant1_2441_0~Reference

DH1_Ant1_2441_30~1000

DH1_Ant1_2441_1000~26500


DH1_Ant1_2480_0~Reference

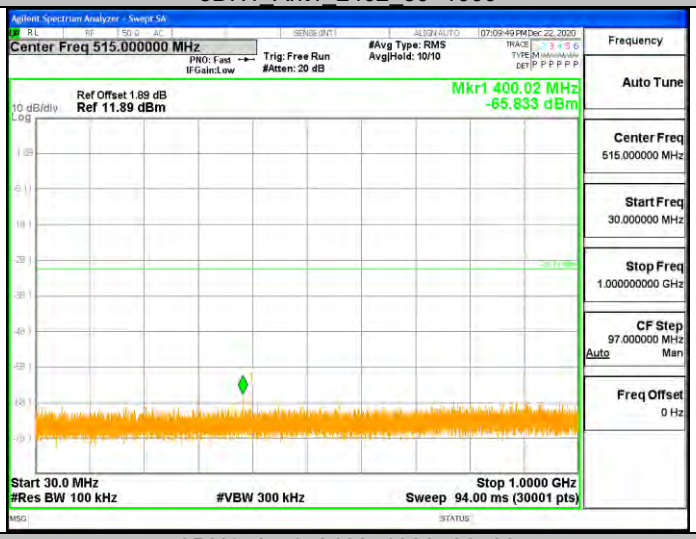
DH1_Ant1_2480_30~1000

DH1_Ant1_2480_1000~26500


2DH1_Ant1_2402_0~Reference

2DH1_Ant1_2402_30~1000

2DH1_Ant1_2402_1000~26500


2DH1_Ant1_2441_0~Reference

2DH1_Ant1_2441_30~1000

2DH1_Ant1_2441_1000~26500


2DH1_Ant1_2480_0~Reference

2DH1_Ant1_2480_30~1000

2DH1_Ant1_2480_1000~26500


3DH1_Ant1_2402_0~Reference

3DH1_Ant1_2402_30~1000

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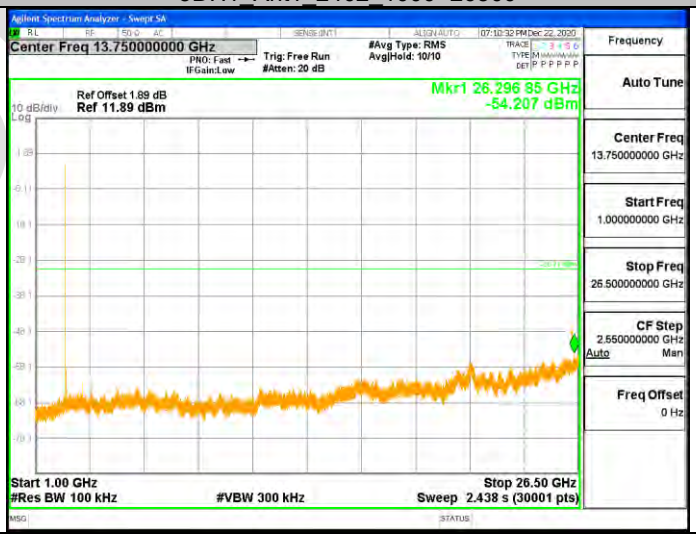
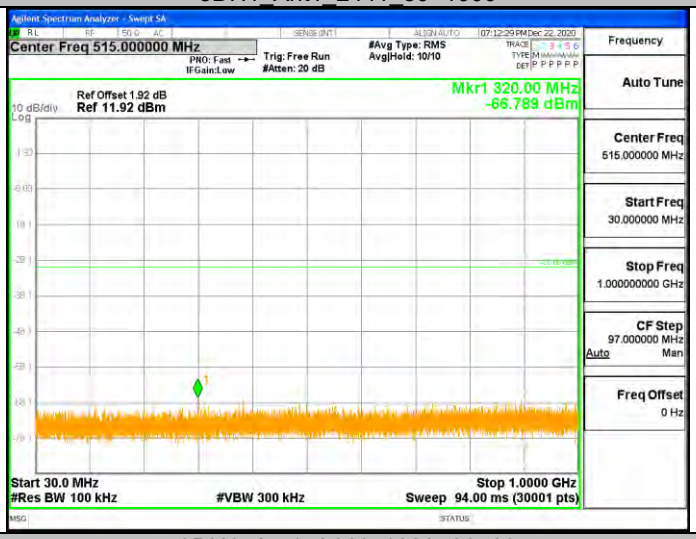


3DH1_Ant1_2441_0~Reference

3DH1_Ant1_2441_30~1000

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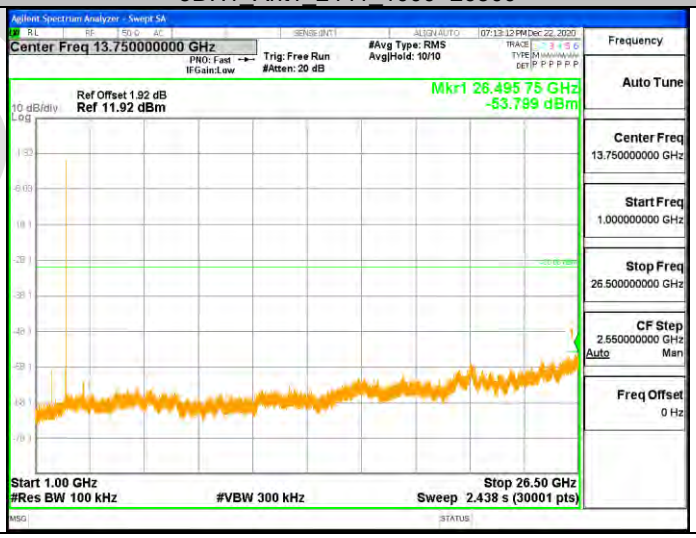
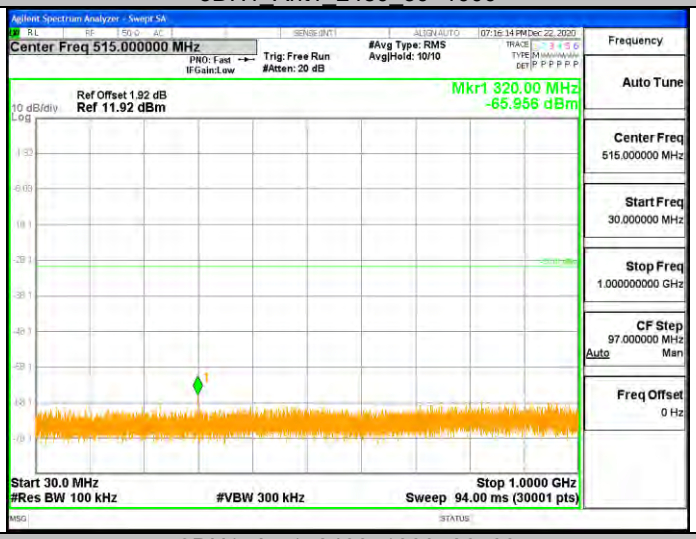
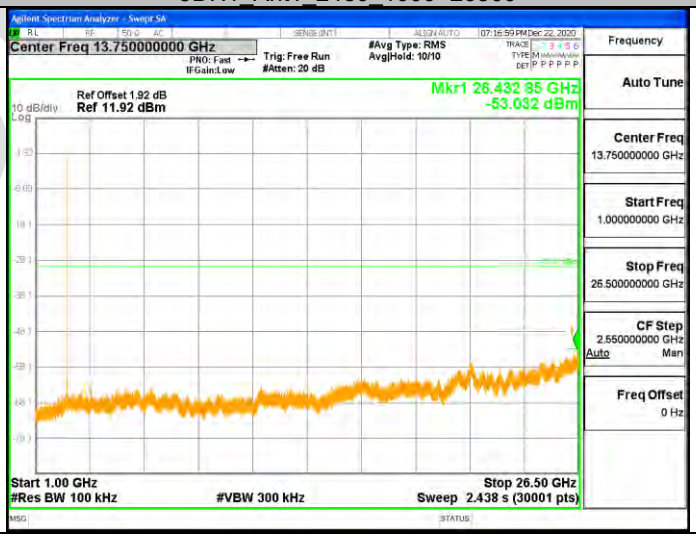
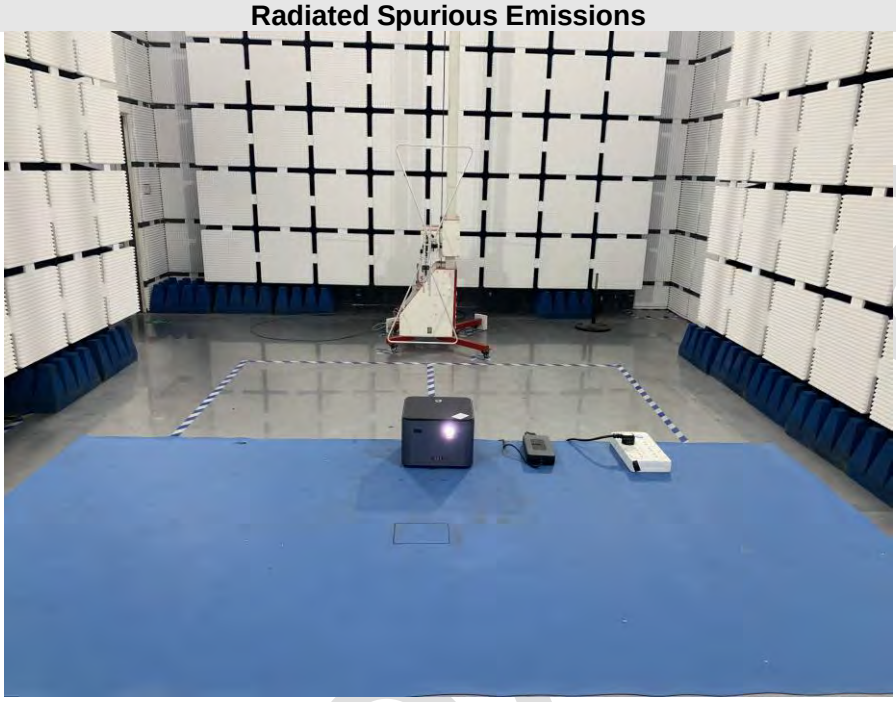


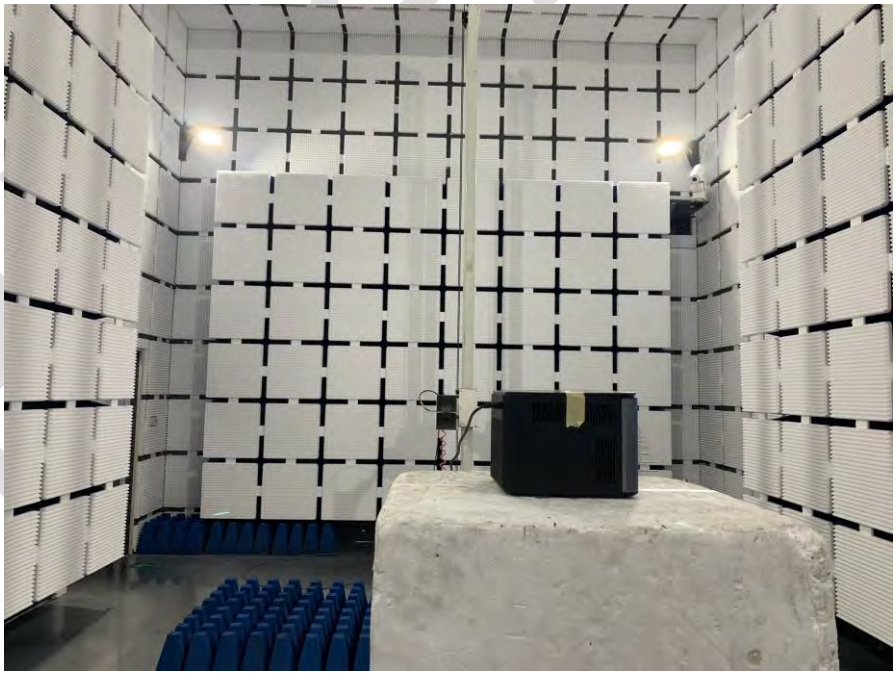
3DH1_Ant1_2480_0~Reference

3DH1_Ant1_2480_30~1000

3DH1_Ant1_2480_1000~26500


APPENDIX A: PHOTOGRAPHS OF TEST SETUP

Radiated Spurious Emissions





Conducted Emissions at AC Power Line (150kHz-30MHz)

----END OF REPORT----

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