

FCC Radio Test Report

FCC ID: 2ALSZ-CL31007P

Report No. : BTL-FCCP-1-2002T145
Equipment : Photocontroller
Model Name : iSLC3100-7P
Brand Name : CIMCON
Applicant : CIMCON Lighting, Inc.
Address : 200 Summit Drive, Suite 500, South Tower, Burlington, MA 01803
Manufacturer : CIMCON Lighting, Inc.
Address : 200 Summit Drive, Suite 500, South Tower, Burlington, MA 01803

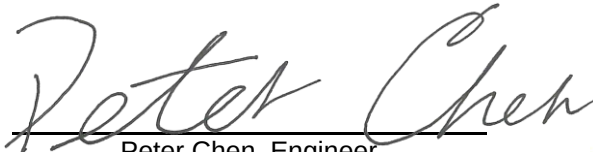
Radio Function : ZigBee

FCC Rule Part(s) : FCC Part15, Subpart C (15.247)
Measurement Procedure(s) : ANSI C63.10-2013

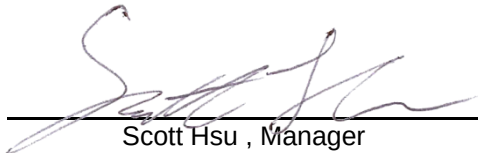
Date of Receipt : 2020/3/2
Date of Test : 2020/3/2~ 2020/4/7
Issued Date : 2020/5/12

The above equipment has been tested and found in compliance with the requirement of the above standards by BTL Inc.

Prepared by


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Declaration

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

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

The report must not be used by the client to claim product certification, approval, or endorsement by NIST, A2LA, or any agency of the U.S. Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and ourselves, the test report shall not be reproduced, except in full, without our written approval.

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

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

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

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	2020/4/8
R01	Update duty cycle data.	2020/5/8
R02	Revised Typo.	2020/5/12

1 SUMMARY OF TEST RESULTS

Test procedures according to the technical standards.

FCC Part 15, Subpart C (15.247)				
Standard(s) Section	Description	Test Result	Judgement	Remark
15.207	AC Power Line Conducted Emissions	APPENDIX A	Pass	-----
15.205 15.209 15.247(d)	Radiated Emissions	APPENDIX B APPENDIX C	Pass	-----
15.247(a)(2)	Bandwidth	APPENDIX D	Pass	-----
15.247(b)(3)	Output Power	APPENDIX E	Pass	-----
15.247(e)	Power Spectral Density	APPENDIX F	Pass	-----
15.247(d)	Antenna conducted Spurious Emission	APPENDIX G	Pass	-----
15.203	Antenna Requirement	-----	Pass	-----

NOTE:

- (1) "N/A" denotes test is not applicable in this Test Report.
- (2) The report format version is TP.1.1.1.

1.1 TEST FACILITY

The test facilities used to collect the test data in this report:

No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

The test sites and facilities are covered under FCC RN: 355421 and DN: TW1099.

☒ C05 ☐ CB08 ☐ CB11 ☐ CB15 ☐ CB16
☒ SR06

No.18, Ln. 171, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 114, Taiwan

The test sites and facilities are covered under FCC RN: 325517 and DN: TW1115.

☐ C03 ☒ CB18 ☐ CB19

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k = 2$, providing a level of confidence of approximately **95 %**.

The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2 U_{cispr} requirement.

A. AC power line conducted emissions test:

Test Site	Method	Measurement Frequency Range	$U, (dB)$
C05	CISPR	150 kHz ~ 30MHz	3.44

B. Radiated emissions test :

Test Site	Measurement Frequency Range	$U, (dB)$
CB18	0.03 GHz ~ 0.2 GHz	4.17
	0.2 GHz ~ 1 GHz	4.72
	1 GHz ~ 6 GHz	5.21
	6 GHz ~ 18 GHz	5.51
	18 GHz ~ 26 GHz	3.69
	26 GHz ~ 40 GHz	4.23

C. Conducted test :

Test Item	$U, (dB)$
Bandwidth	1.13
Output power	1.06
Power Spectral Density	1.20
Conducted Spurious emissions	1.14
Conducted Band edges	1.13

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	Environment Condition	Tested by
AC Power Line Conducted Emissions	24 °C, 66 %	William Wei
Radiated emissions below 1 GHz	23 °C, 65 %	Hunter Chiang
Radiated emissions above 1 GHz	23 °C, 65 %	Hunter Chiang
Bandwidth	23.5 °C, 53 %	Jay Kao
Output Power	23.5 °C, 53 %	Jay Kao
Power Spectral Density	23.5 °C, 53 %	Jay Kao
Antenna conducted Spurious Emission	23.5 °C, 53 %	Jay Kao

1.4 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

Test Software	Teraterm				
Modulation Mode	2405 MHz	2440 MHz	2470 MHz	2475 MHz	Data Rate
ZigBee	0	1	-3	-10	250 kbps

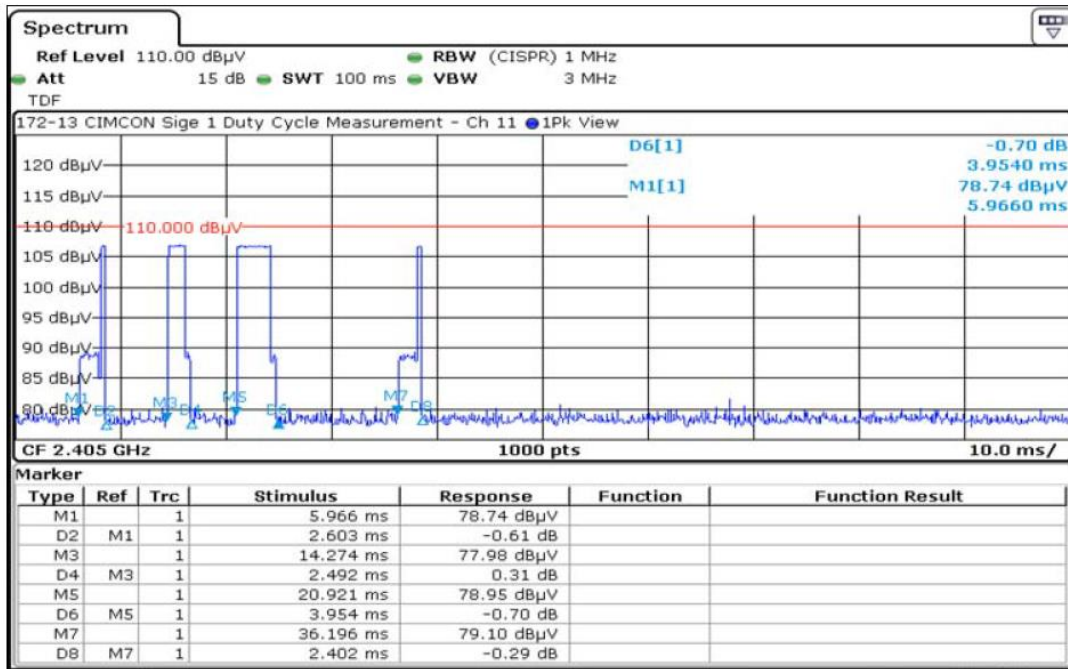
1.5 DUTY CYCLE

If duty cycle is $\geq 98\%$, duty factor is not required.

If duty cycle is $< 98\%$, duty factor shall be considered.

ZigBee

Low Channel, 11



Channel	Channel Frequency (MHz)	Total Time On per 100 ms Period (ms)	Percentage of Time On per 100 ms Period (Fraction)	Duty Cycle Correction Factor (dB)	Maximum Allowed Duty Cycle Correction Factor (dB)	Applied Duty Cycle
Low	2405	11.451	0.11451	-18.823	-20	-18.823

NOTE: The test data are supplied by manufacturer.

2 GENERAL INFORMATION

2.1 DESCRIPTION OF EUT

Equipment	Photocontroller
Model Name	iSLC3100-7P
Brand Name	CIMCON
Model Difference	N/A
Power Source	AC Mains.
Power Rating	I/P: AC 85~264V, 50/60Hz
Products Covered	N/A
Frequency Range	2400 MHz ~ 2483.5 MHz
Operation Frequency	2405 MHz~ 2470 MHz and 2475 MHz
Modulation Technology	O-QPSK
Transfer Rate	250 kbit/s
Output Power Max.	22.44 dBm (0.1754 W)
Test Model	iSLC3100-7P
Sample Status	Engineering Sample
EUT Modification(s)	N/A

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)
11	2405	19	2445
12	2410	20	2450
13	2415	21	2455
14	2420	22	2460
15	2425	23	2465
16	2430	24	2470
17	2435	25	2475
18	2440		

(3) Table for Filed Antenna:

Ant.	Brand	Model No.	Antenna Type	Connector	Gain (dBi)
1	N/A	iSLC3100-7P	Monopole	N/A	1.5

2.2 TEST MODES

Test Items	Test mode	Channel	Note
AC power line conducted emissions	ZigBee _ Normal	-	-
Transmitter Radiated Emissions (below 1GHz)	ZigBee	11	-
Transmitter Radiated Emissions (above 1GHz)	ZigBee	11/24/25	Bandedge
	ZigBee	11/18/24/25	Harmonic
Bandwidth	ZigBee	11/18/24/25	-
Output Power	ZigBee	11/18/24/25	-
Power Spectral Density	ZigBee	11/18/24/25	-
Antenna conducted Spurious Emission	ZigBee	11/18/24/25	-

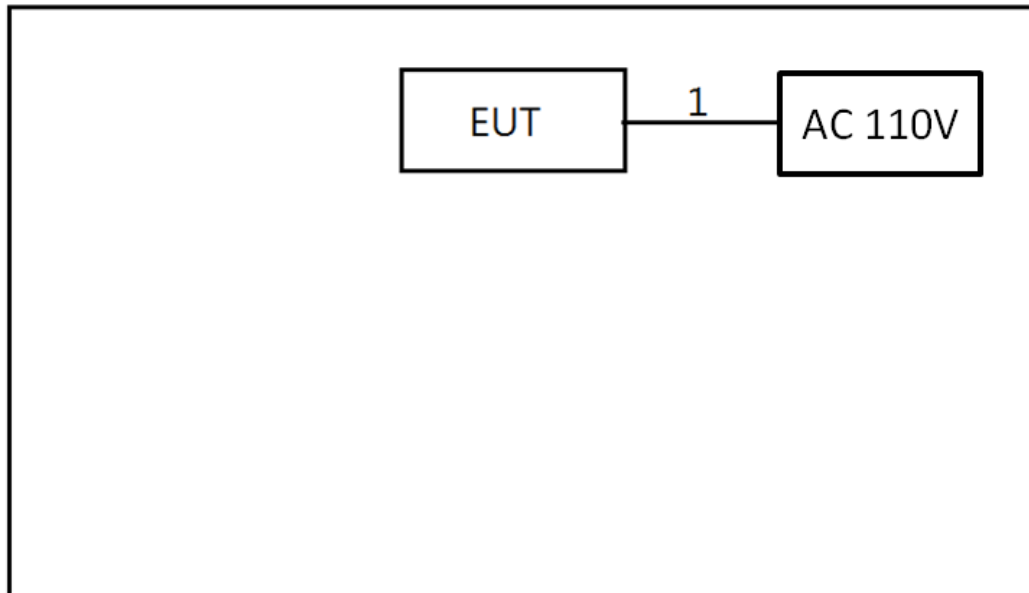
NOTE:

- (1) For radiated emission band edge test, both Vertical and Horizontal are evaluated, but only the worst case (Horizontal) is recorded.
- (2) All X, Y and Z axes are evaluated, but only the worst case (Y axis) is recorded.
- (3) There were no emissions found below 30 MHz within 20 dB of the limit.

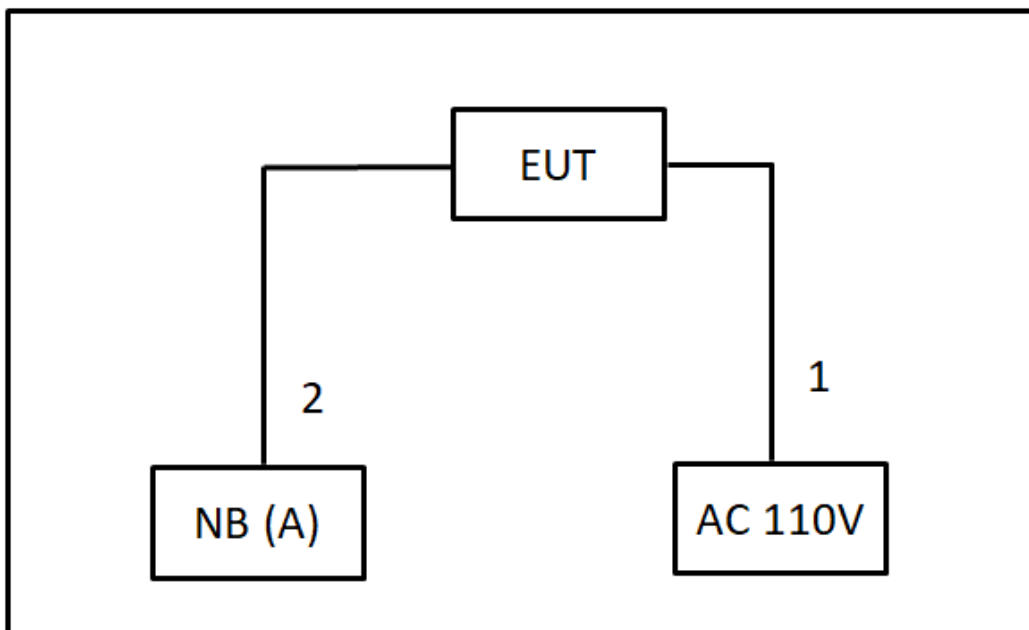
2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Equipment letters and Cable numbers refer to item numbers described in the tables of clause 2.4.

AC Power Line Conducted Emissions



Radiated Emissions



2.4 SUPPORT UNITS

Item	Equipment	Brand	Model No.	Series No.	Remarks
A	NB	HP	TPN-I119	NA	-

Item	Shielded	Ferrite Core	Length	Cable Type	Remarks
1	N/A	N/A	1M	Power cable	-
2	N/A	N/A	1M	USB Cable	-

3 AC POWER LINE CONDUCTED EMISSIONS TEST

3.1 LIMIT

Frequency (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56 *	56 - 46 *
0.50 - 5.0	56	46
5.0 - 30.0	60	50

NOTE:

- (1) The 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) The test result calculated as following:
 Measurement Value = Reading Level + Correct Factor
 Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor (if use)
 Margin Level = Measurement Value – Limit Value
 Calculation example:

Reading Level		Correct Factor		Measurement Value
38.22	+	3.45	=	41.67

Measurement Value		Limit Value		Margin Level
41.67	-	60	=	-18.33

The following table is the setting of the receiver.

Receiver Parameter	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

3.2 TEST PROCEDURE

- a. The EUT was placed 0.8 m above the horizontal ground plane with the EUT being connected to the power mains through a line impedance stabilization network (LISN).
 All other support equipment were powered from an additional LISN(s).
 The LISN provides 50 Ohm/50uH of 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 to keep the cable above 40 cm.
- c. Excess I/O cables that are not connected to a peripheral shall be bundled in the center.
 The end of the cable will be terminated, using the correct terminating impedance.
 The overall length shall not exceed 1 m.
- d. The LISN is spaced at least 80 cm from the nearest part of the EUT chassis.
- e. For the actual test configuration, please refer to the related Item - 錯誤! 找不到參照來源。

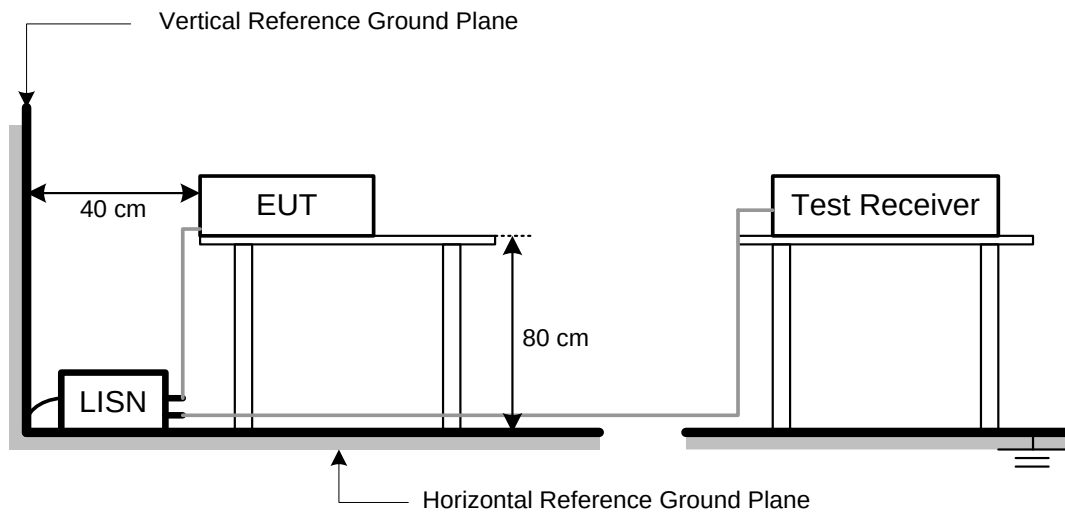
NOTE:

- (1) In the results, each reading is marked as Peak, QP or AVG per the detector used.
 BW=9 kHz (6 dB Bandwidth)
- (2) All readings are Peak unless otherwise stated QP or AVG in column of Note. Both the QP and the AVG readings must be less than the limit for compliance.

3.3 DEVIATION FROM TEST STANDARD

No deviation.

3.4 TEST SETUP



3.5 TEST RESULT

Please refer to the APPENDIX A.

4 RADIATED EMISSIONS TEST

4.1 LIMIT

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

LIMITS OF RADIATED EMISSIONS MEASUREMENT (9 kHz to 1000 MHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

LIMITS OF RADIATED EMISSIONS MEASUREMENT (Above 1000 MHz)

Frequency (MHz)	Radiated Emissions (dBuV/m)		Measurement Distance (meters)
	Peak	Average	
Above 1000	74	54	3

NOTE:

- (1) The limit for radiated test was performed according to FCC Part 15, Subpart C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).
- (4) The test result calculated as following:
 Measurement Value = Reading Level + Correct Factor
 Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)
 Margin Level = Measurement Value - Limit Value
 Calculation example:

Reading Level		Correct Factor		Measurement Value
41.91	+	-8.36	=	33.55

Measurement Value		Limit Value		Margin Level
33.55	-	43.50	=	-9.95

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average

Spectrum Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9KHz~90KHz for PK/AVG detector
Start ~ Stop Frequency	90KHz~110KHz for QP detector
Start ~ Stop Frequency	110KHz~490KHz for PK/AVG detector
Start ~ Stop Frequency	490KHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector

4.2 TEST PROCEDURE

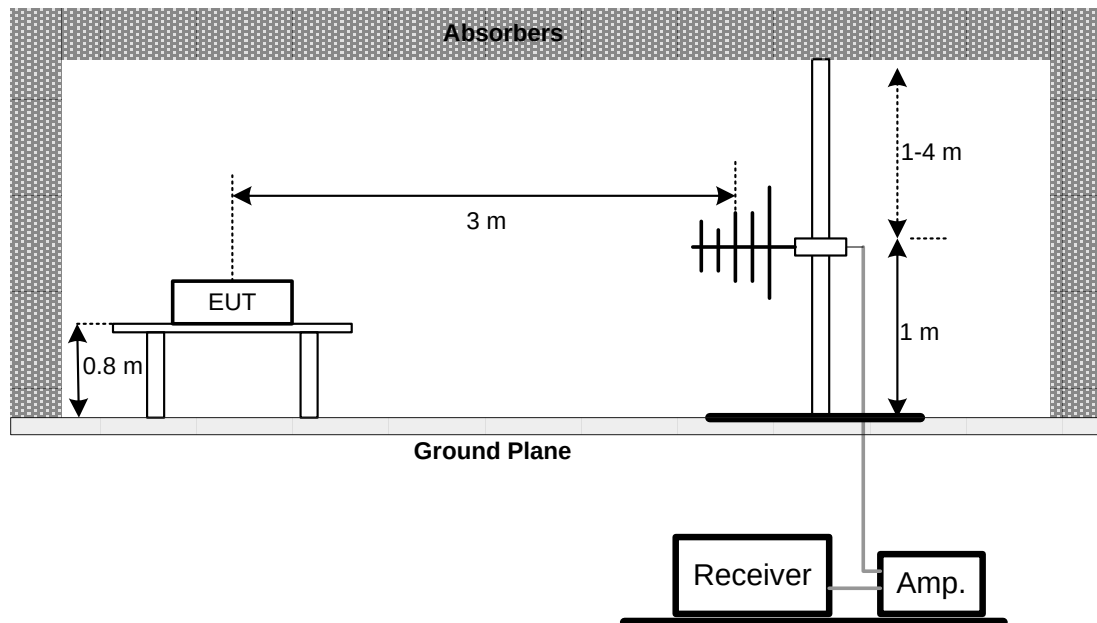
- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The measuring distance 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 1GHz)
- c. The height of the equipment or of the substitution antenna shall be 0.8 m or 1.5 m, 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 1GHz.
- 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 1GHz)
- 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 1GHz)
- i. For the actual test configuration, please refer to the related Item – EUT TEST PHOTO.

4.3 DEVIATION FROM TEST STANDARD

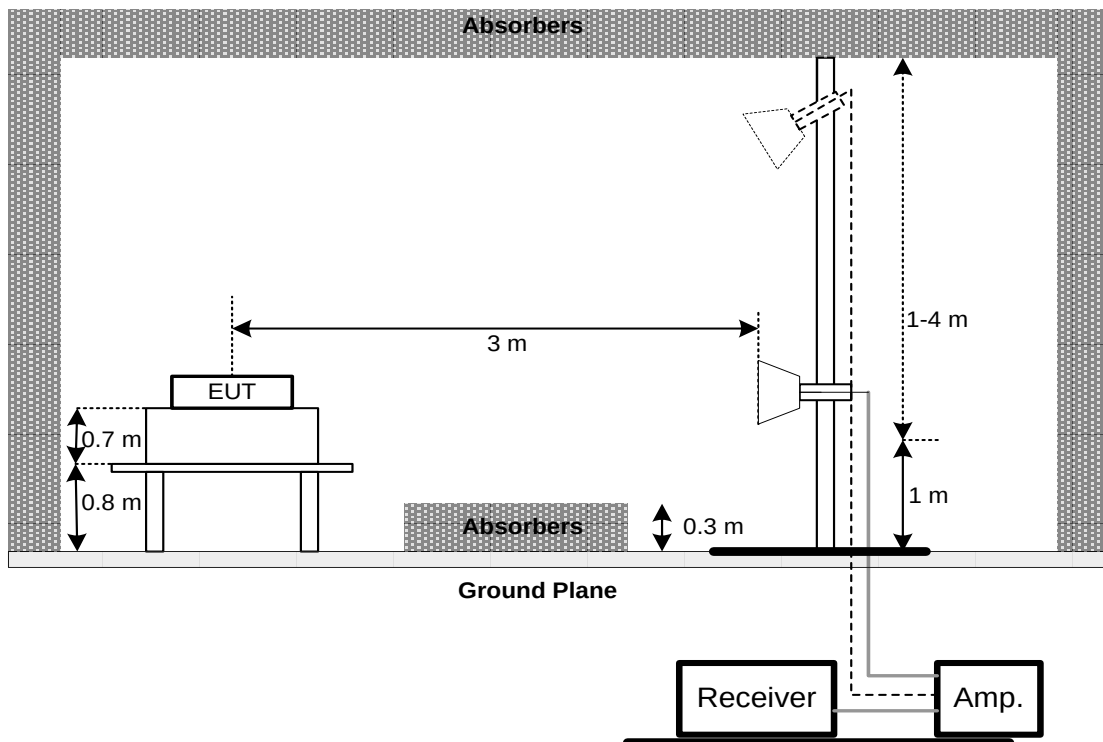
No deviation.

4.4 TEST SETUP

30 MHz to 1 GHz



Above 1 GHz



4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.6 TEST RESULT – 30 MHZ TO 1 GHZ

Please refer to the APPENDIX B.

4.7 TEST RESULT – ABOVE 1 GHZ

Please refer to the APPENDIX C.

NOTE:

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

5 BANDWIDTH TEST

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	$\geq 500\text{KHz}$ (6dB bandwidth)	2400-2483.5	PASS

5.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=300KHz, Sweep time = 2.5 ms.

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

5.6 TEST RESULTS

Please refer to the APPENDIX D.

6 OUTPUT POWER TEST

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Maximum Output Power	1 watt or 30dBm	2400-2483.5	PASS

6.2 TEST PROCEDURE

- The EUT was directly connected to the power meter and antenna output port as show in the block diagram below,
- The maximum peak conducted output power was performed in accordance with method 9.1.2 of FCC KDB 558074 D01 DTS Meas Guidance.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

6.6 TEST RESULTS

Please refer to the APPENDIX E.

7 POWER SPECTRAL DENSITY TEST

7.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(e)	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

7.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting: RBW=3KHz, VBW=10 KHz, Sweep time = auto.

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

7.6 TEST RESULTS

Please refer to the APPENDIX F.

8 ANTENNA CONDUCTED SPURIOUS EMISSION

8.1 APPLIED PROCEDURES / LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits.

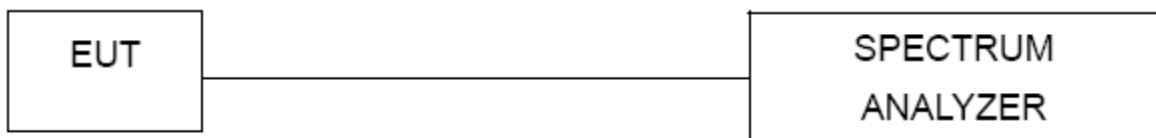
8.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting : RBW= 100KHz, VBW=300KHz, Sweep time = 10 ms.

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

8.6 TEST RESULTS

Please refer to the APPENDIX G.

9 LIST OF MEASURING EQUIPMENTS

AC Power Line Conducted Emissions						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	TWO-LINE V-NETWORK	R&S	ENV216	101050	2019/3/18	2020/3/17
2	Test Cable	EMCI	EMCCFD300-BM-BMR-6000	170715	2019/8/7	2020/8/6
3	EMI Test Receiver	R&S	ESR7	101433	2019/12/13	2020/12/12
4	Measurement Software	EZ	EZ EMC (Version NB-03A)	N/A	N/A	N/A

Radiated Emissions						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Preamplifier	EMCI	EMC001340	980555	2019/4/12	2020/4/11
2	Preamplifier	EMCI	EMC02325B	980217	2019/4/12	2020/4/11
3	Preamplifier	EMCI	EMC012645B	980267	2019/4/12	2020/4/11
4	Test Cable	EMCI	EMC104-SM-SM-800	150207	2019/4/12	2020/4/11
5	Test Cable	EMCI	EMC104-SM-SM-3000	151205	2019/4/12	2020/4/11
6	Test Cable	EMCI	EMC-SM-SM-7000	180408	2019/4/12	2020/4/11
7	MXE EMI Receiver	Agilent	N9038A	MY55420127	2019/3/26	2020/3/25
8	Signal Analyzer	Agilent	N9010A	MY56480554	2019/6/6	2020/6/5
9	Loop Ant	EMCO	EMCI-LPA600	274	2019/5/31	2020/5/30
10	Horn Ant	SCHWARZBECK	BBHA 9120D	9120D-1342	2019/6/10	2020/6/9
11	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	000992	2019/5/29	2020/5/28
12	5dB Attenuator	EMCI	EMCI-N-6-05	AT-N0508	2019/5/29	2020/5/28

Bandwidth						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP40	100129	2019/5/23	2020/5/22

Output Power						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Power Meter	Anritsu	ML2487A	6K00004714	2019/6/20	2020/6/19
2	Power Sensor	Anritsu	MA2491A	1725282	2019/6/20	2020/6/19

Power Spectral Density						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP40	100129	2019/5/23	2020/5/22

Antenna conducted Spurious Emission						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP40	100129	2019/5/23	2020/5/22

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

10 EUT TEST PHOTO

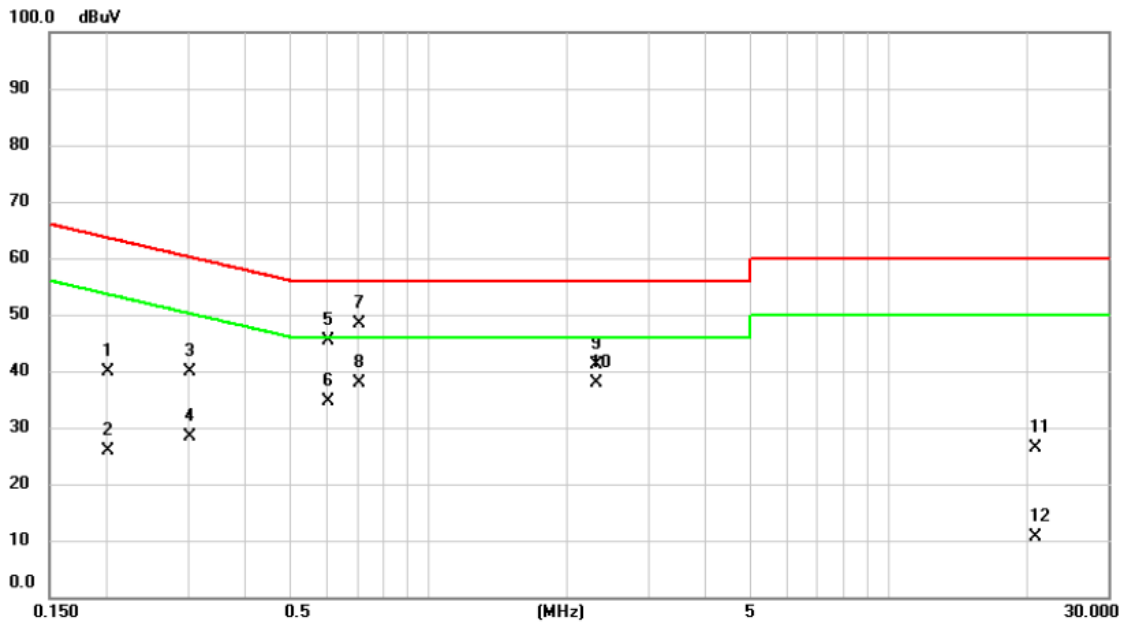
Please refer to document Appendix No.: TP-2002T145-FCCP-1 (APPENDIX-TEST PHOTOS).

11 EUT PHOTOS

Please refer to document Appendix No.: EP-2002T145-1 (APPENDIX-EUT PHOTOS).

APPENDIX A AC POWER LINE CONDUCTED EMISSIONS

Test Mode	ZigBee _Normal	Tested Date	2020/4/7
Test Voltage	AC 120V/60Hz	Phase	Line

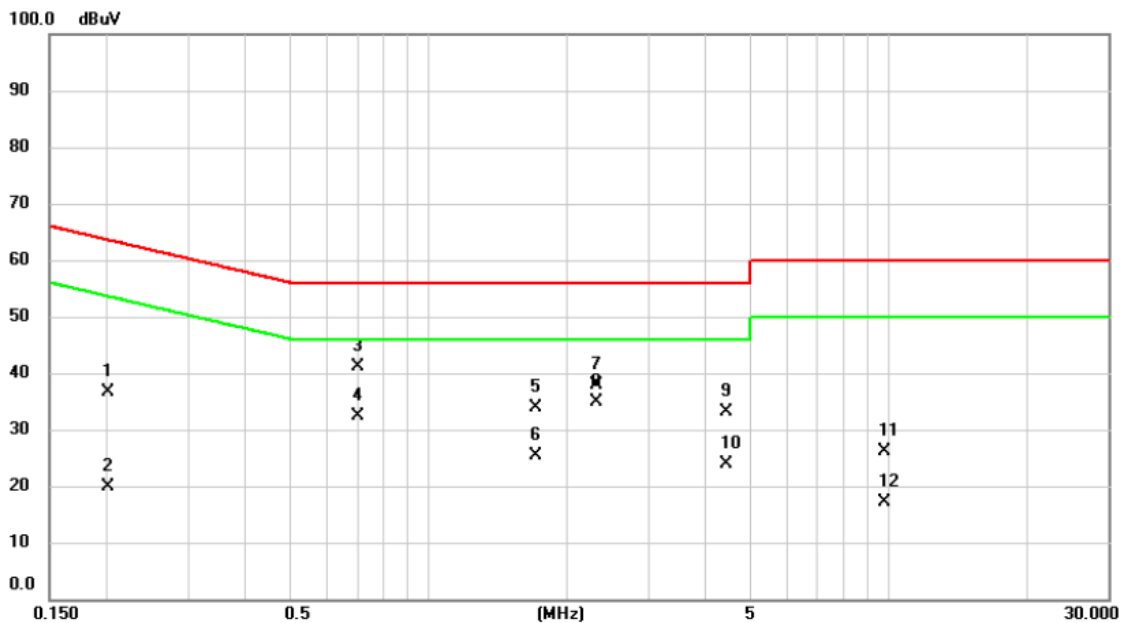


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.2017	30.39	9.61	40.00	63.54	-23.54	QP	
2		0.2017	16.31	9.61	25.92	53.54	-27.62	AVG	
3		0.3030	30.21	9.67	39.88	60.16	-20.28	QP	
4		0.3030	18.69	9.67	28.36	50.16	-21.80	AVG	
5		0.6066	35.72	9.67	45.39	56.00	-10.61	QP	
6		0.6066	24.89	9.67	34.56	46.00	-11.44	AVG	
7	*	0.7056	38.61	9.69	48.30	56.00	-7.70	QP	
8		0.7056	28.09	9.69	37.78	46.00	-8.22	AVG	
9		2.3190	31.36	9.72	41.08	56.00	-14.92	QP	
10		2.3190	28.08	9.72	37.80	46.00	-8.20	AVG	
11		20.8973	16.32	10.05	26.37	60.00	-33.63	QP	
12		20.8973	0.59	10.05	10.64	50.00	-39.36	AVG	

REMARKS:

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

Test Mode	ZigBee _Normal	Tested Date	2020/4/7
Test Voltage	AC 120V/60Hz	Phase	Neutral



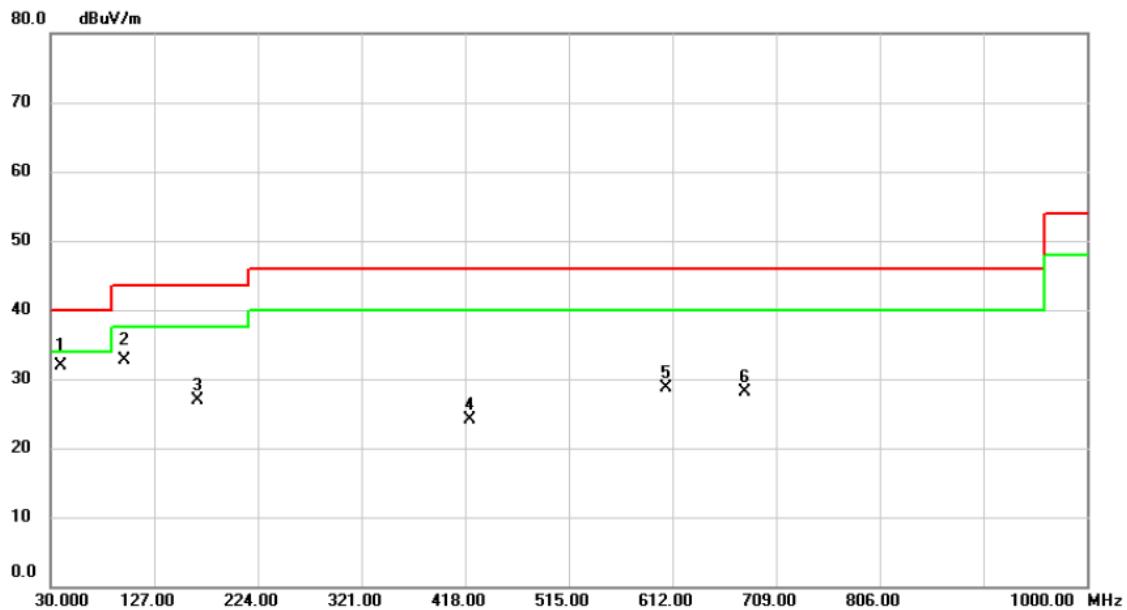
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.2017	27.07	9.61	36.68	63.54	-26.86	QP	
2		0.2017	10.30	9.61	19.91	53.54	-33.63	AVG	
3		0.7035	31.49	9.69	41.18	56.00	-14.82	QP	
4		0.7035	22.81	9.69	32.50	46.00	-13.50	AVG	
5		1.7138	24.18	9.71	33.89	56.00	-22.11	QP	
6		1.7138	15.58	9.71	25.29	46.00	-20.71	AVG	
7		2.3168	28.08	9.72	37.80	56.00	-18.20	QP	
8	*	2.3168	25.19	9.72	34.91	46.00	-11.09	AVG	
9		4.4385	23.31	9.79	33.10	56.00	-22.90	QP	
10		4.4385	13.97	9.79	23.76	46.00	-22.24	AVG	
11		9.7845	16.15	9.92	26.07	60.00	-33.93	QP	
12		9.7845	7.22	9.92	17.14	50.00	-32.86	AVG	

REMARKS:

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

APPENDIX B RADIATED EMISSIONS - 30 MHZ TO 1 GHZ

Test Mode	TX Mode 2405MHz_CH11	Tested Date	2020/3/10
Test Voltage	AC 120V/60Hz	Polarization	Vertical

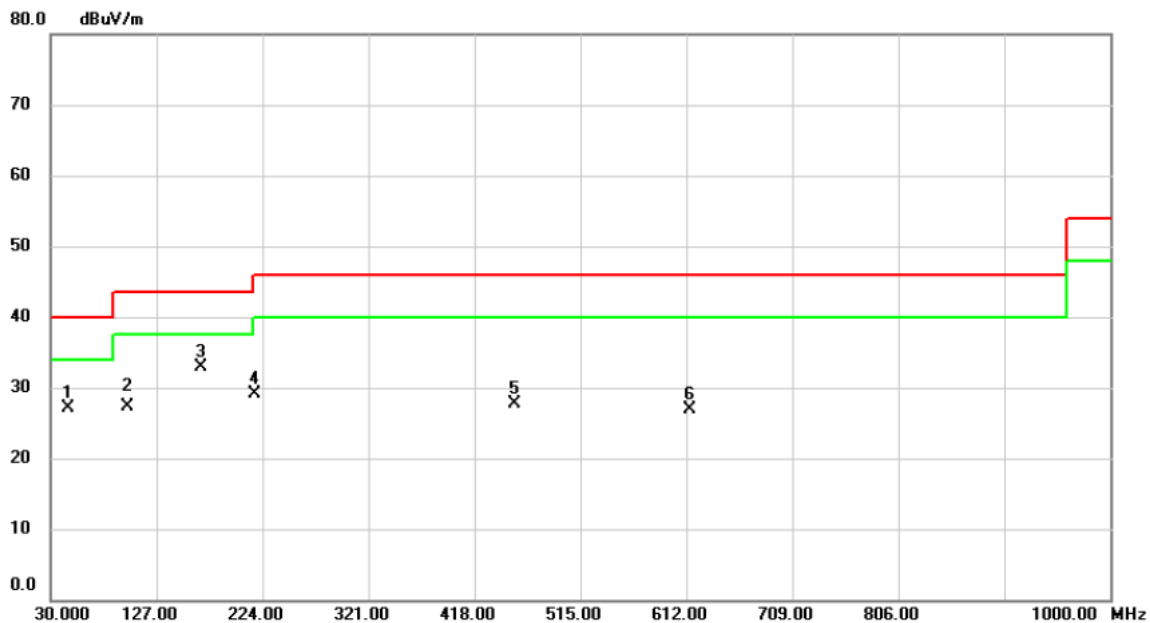


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	39.7000	44.13	-12.18	31.95	40.00	-8.05	QP	
2		98.8700	49.59	-16.93	32.66	43.50	-10.84	QP	
3		167.7400	38.34	-11.39	26.95	43.50	-16.55	peak	
4		421.8800	31.20	-7.11	24.09	46.00	-21.91	peak	
5		606.1800	32.61	-3.87	28.74	46.00	-17.26	peak	
6		679.9000	30.78	-2.60	28.18	46.00	-17.82	peak	

REMARKS:

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

Test Mode	TX Mode 2405MHz_CH11	Tested Date	2020/3/10
Test Voltage	AC 120V/60Hz	Polarization	Horizontal



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	46.4900	38.68	-11.49	27.19	40.00	-12.81	peak	
2	100.8100	44.02	-16.67	27.35	43.50	-16.15	QP	
3 *	167.7400	44.23	-11.39	32.84	43.50	-10.66	peak	
4	216.2400	42.54	-13.50	29.04	46.00	-16.96	peak	
5	454.8600	34.31	-6.51	27.80	46.00	-18.20	peak	
6	614.9100	30.71	-3.71	27.00	46.00	-19.00	peak	

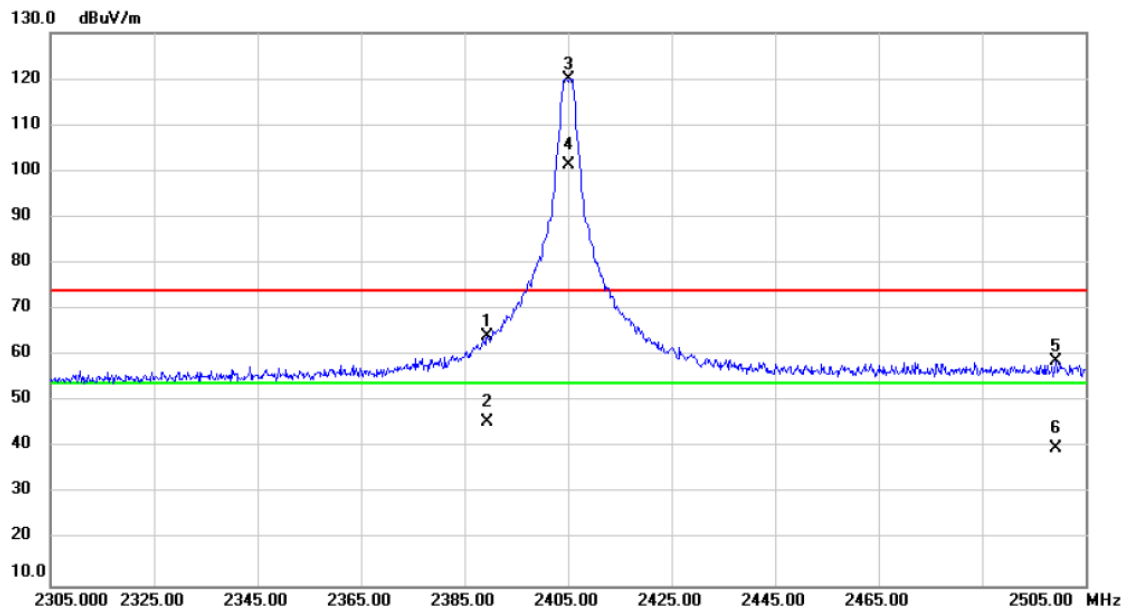
REMARKS:

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

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

APPENDIX C RADIATED EMISSIONS - ABOVE 1 GHZ

Test Mode	TX Mode 2405MHz_CH11	Tested Date	2020/3/10
Test Voltage	AC 120V/60Hz	Polarization	Horizontal

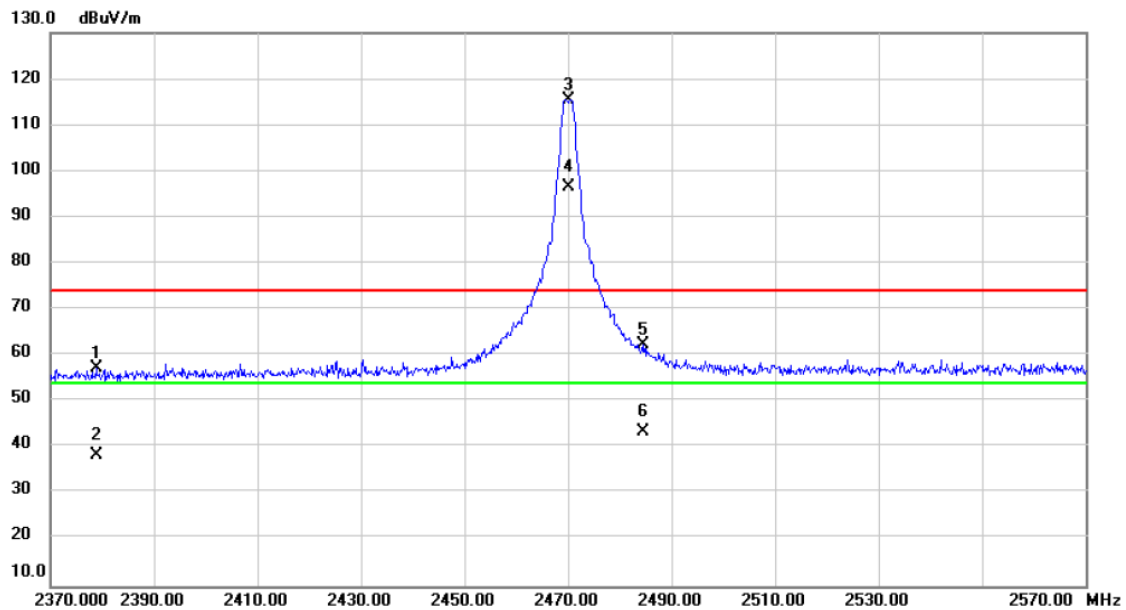


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2389.400	32.98	31.25	64.23	74.00	-9.77	peak	
2		2389.400	64.23	-18.82	45.41	54.00	-8.59	AVG	
3	X	2405.000	88.72	31.32	120.04	74.00	46.04	peak	No Limit
4	*	2405.000	120.04	-18.82	101.22	54.00	47.22	AVG	No Limit
5		2499.200	27.03	31.73	58.76	74.00	-15.24	peak	
6		2499.200	58.76	-18.82	39.94	54.00	-14.06	AVG	

REMARKS:

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

Test Mode	TX Mode 2470MHz_CH24	Tested Date	2020/3/10
Test Voltage	AC 120V/60Hz	Polarization	Horizontal

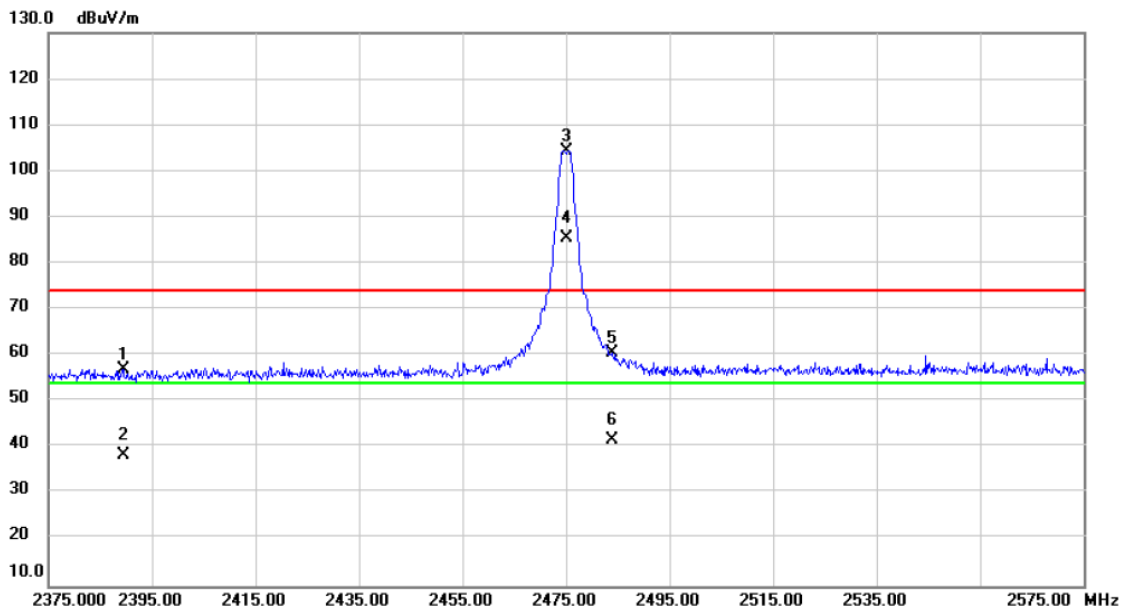


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2378.800	25.89	31.33	57.22	74.00	-16.78	peak	
2		2378.800	57.22	-18.82	38.40	54.00	-15.60	AVG	
3	X	2470.000	83.69	31.70	115.39	74.00	41.39	peak	No Limit
4	*	2470.000	115.39	-18.82	96.57	54.00	42.57	AVG	No Limit
5		2484.400	30.58	31.76	62.34	74.00	-11.66	peak	
6		2484.400	62.34	-18.82	43.52	54.00	-10.48	AVG	

REMARKS:

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

Test Mode	TX Mode 2475MHz_CH25	Tested Date	2020/3/10
Test Voltage	AC 120V/60Hz	Polarization	Horizontal

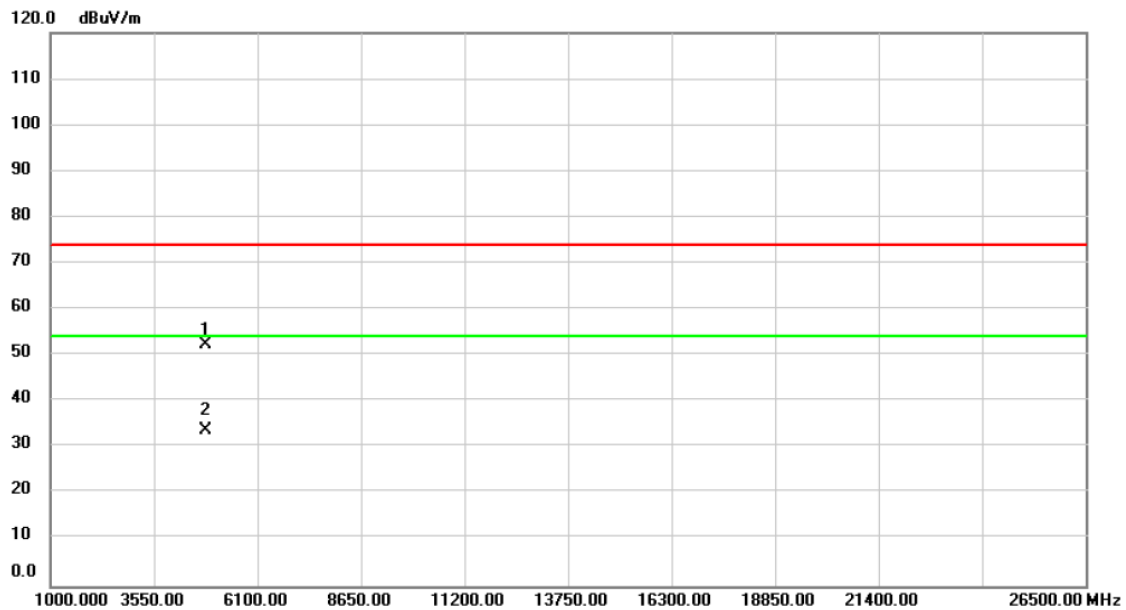


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2389.400	25.85	31.25	57.10	74.00	-16.90	peak	
2		2389.400	57.10	-18.82	38.28	54.00	-15.72	AVG	
3	X	2475.000	72.67	31.62	104.29	74.00	30.29	peak	No Limit
4	*	2475.000	104.29	-18.82	85.47	54.00	31.47	AVG	No Limit
5		2484.000	28.83	31.66	60.49	74.00	-13.51	peak	
6		2484.000	60.49	-18.82	41.67	54.00	-12.33	AVG	

REMARKS:

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

Test Mode	TX Mode 2405MHz_CH11	Tested Date	2020/3/10
Test Voltage	AC 120V/60Hz	Polarization	Vertical

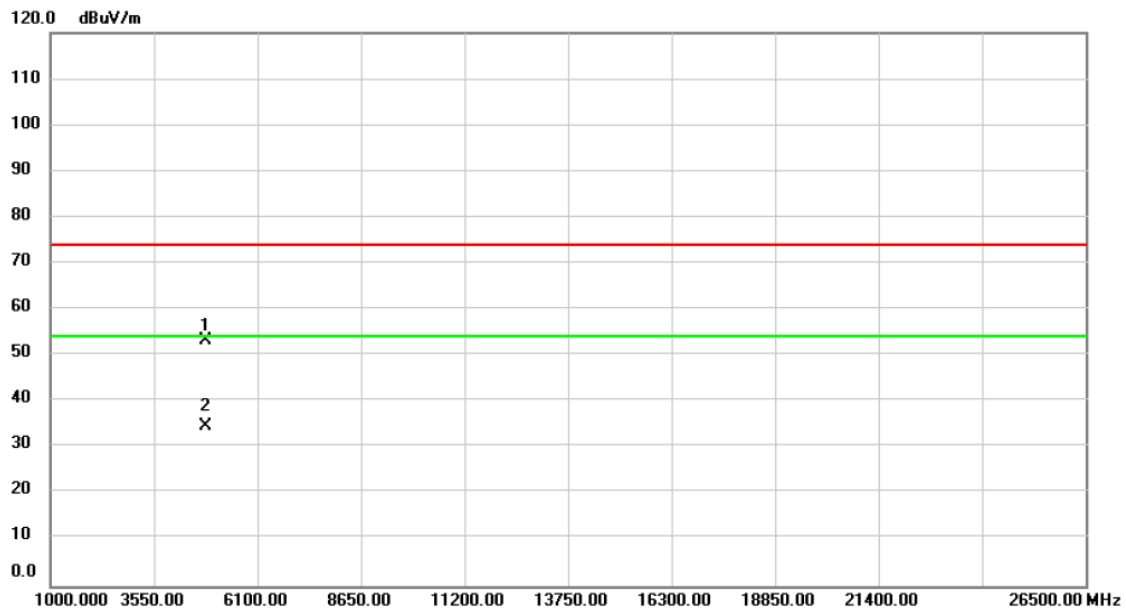


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4810.000	62.98	-10.56	52.42	74.00	-21.58	peak	
2	*	4810.000	52.42	-18.82	33.60	54.00	-20.40	AVG	

REMARKS:

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

Test Mode	TX Mode 2405MHz_CH11	Tested Date	2020/3/10
Test Voltage	AC 120V/60Hz	Polarization	Horizontal

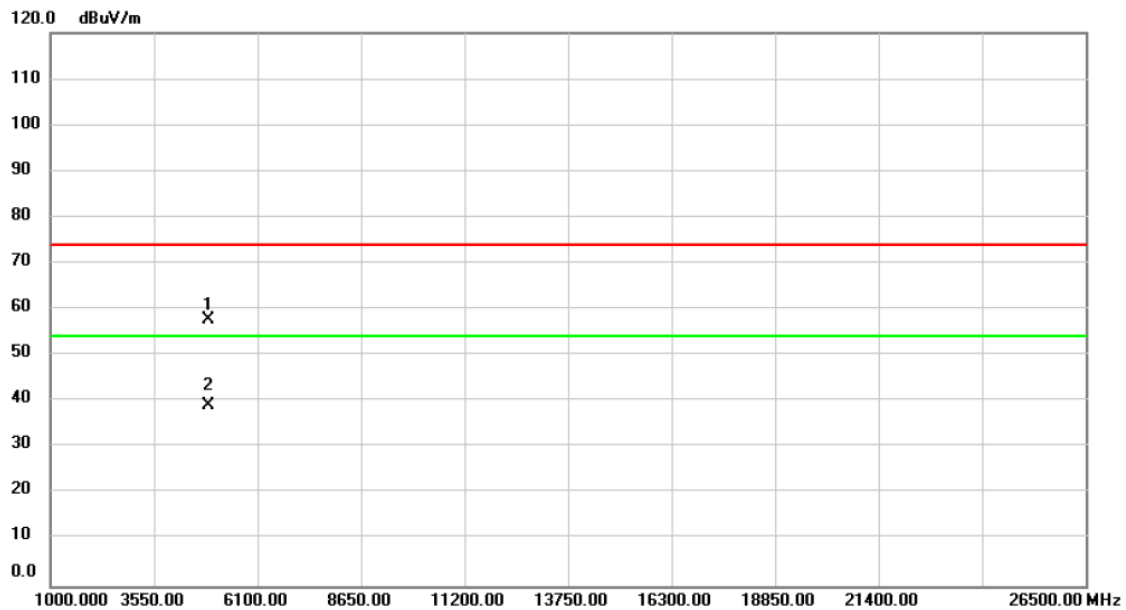


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4810.000	63.94	-10.56	53.38	74.00	-20.62	peak	
2	*	4810.000	53.38	-18.82	34.56	54.00	-19.44	AVG	

REMARKS:

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

Test Mode	TX Mode 2440MHz_CH18	Tested Date	2020/3/10
Test Voltage	AC 120V/60Hz	Polarization	Vertical

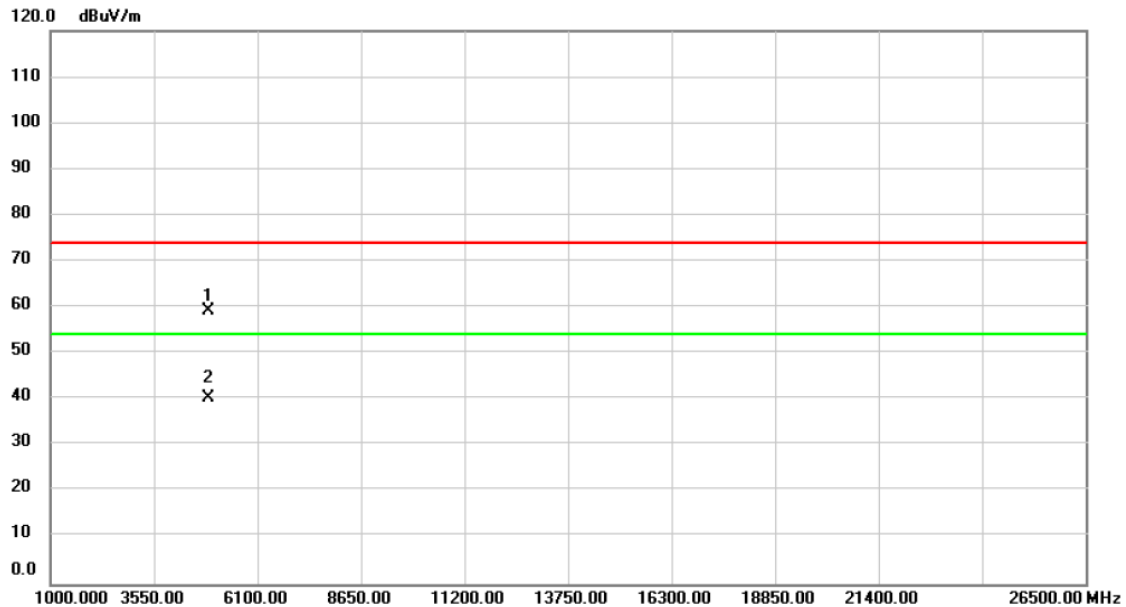


No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4880.000	68.26	-10.39	57.87	74.00	-16.13	peak	
2 *	4880.000	57.87	-18.82	39.05	54.00	-14.95	AVG	

REMARKS:

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

Test Mode	TX Mode 2440MHz_CH18	Tested Date	2020/3/10
Test Voltage	AC 120V/60Hz	Polarization	Horizontal

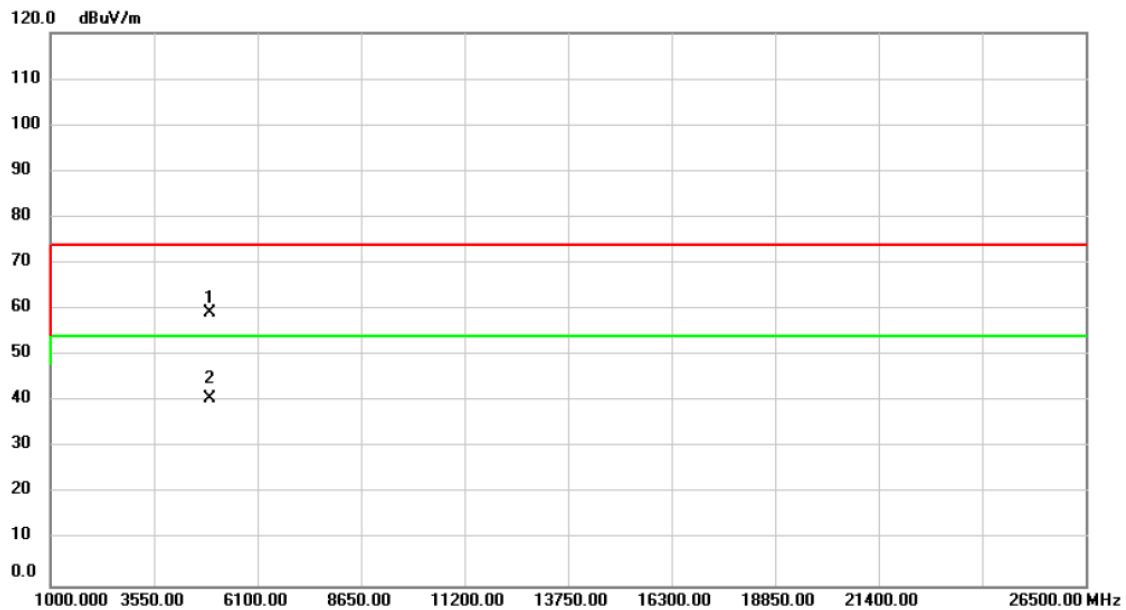


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4880.000	69.63	-10.39	59.24	74.00	-14.76	peak	
2	*	4880.000	59.24	-18.82	40.42	54.00	-13.58	AVG	

REMARKS:

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

Test Mode	TX Mode 2470MHz_CH24	Tested Date	2020/3/30
Test Voltage	AC 120V/60Hz	Polarization	Vertical

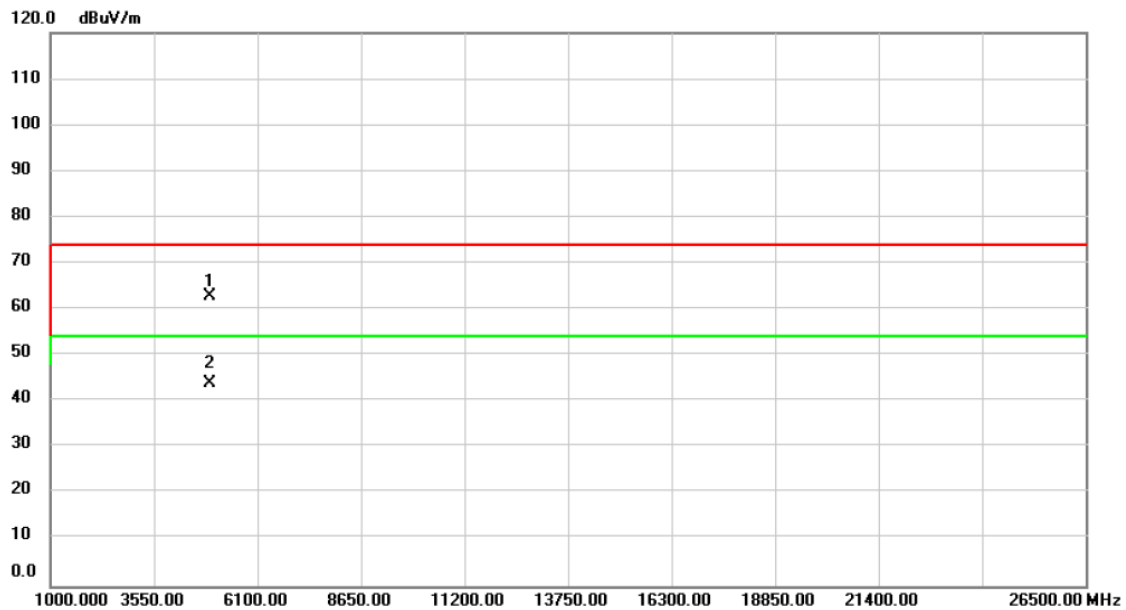


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		4940.000	69.28	-9.94	59.34	74.00	-14.66	peak	
2	*	4940.000	59.34	-18.82	40.52	54.00	-13.48	AVG	

REMARKS:

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

Test Mode	TX Mode 2470MHz_CH24	Tested Date	2020/3/30
Test Voltage	AC 120V/60Hz	Polarization	Horizontal

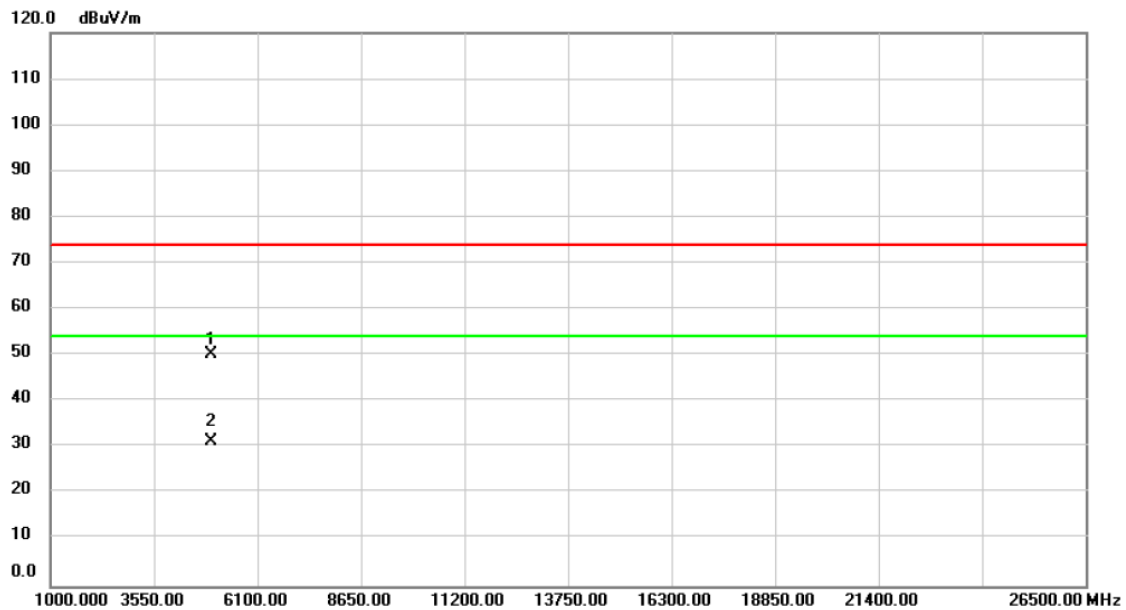


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4940.000	72.24	-9.53	62.71	74.00	-11.29	peak	
2	*	4940.000	62.71	-18.82	43.89	54.00	-10.11	AVG	

REMARKS:

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

Test Mode	TX Mode 2475MHz_CH25	Tested Date	2020/3/10
Test Voltage	AC 120V/60Hz	Polarization	Vertical

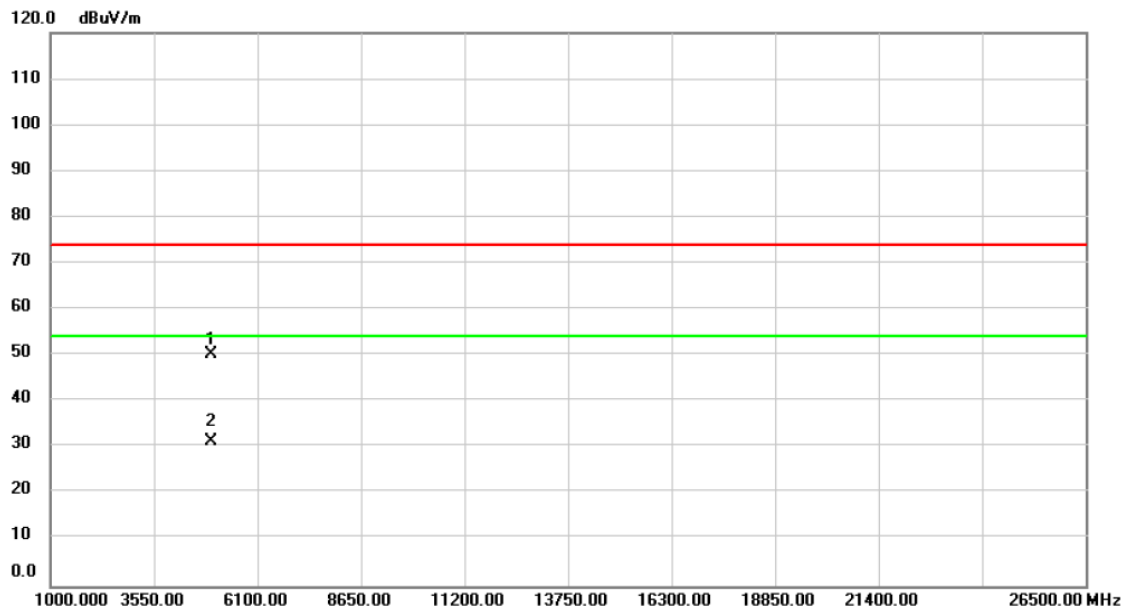


No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	4950.000	60.46	-10.22	50.24	74.00	-23.76	peak	
2 *	4950.000	50.24	-18.82	31.42	54.00	-22.58	AVG	

REMARKS:

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

Test Mode	TX Mode 2475MHz_CH25	Tested Date	2020/3/10
Test Voltage	AC 120V/60Hz	Polarization	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4950.000	60.33	-10.22	50.11	74.00	-23.89	peak	
2	*	4950.000	50.11	-18.82	31.29	54.00	-22.71	AVG	

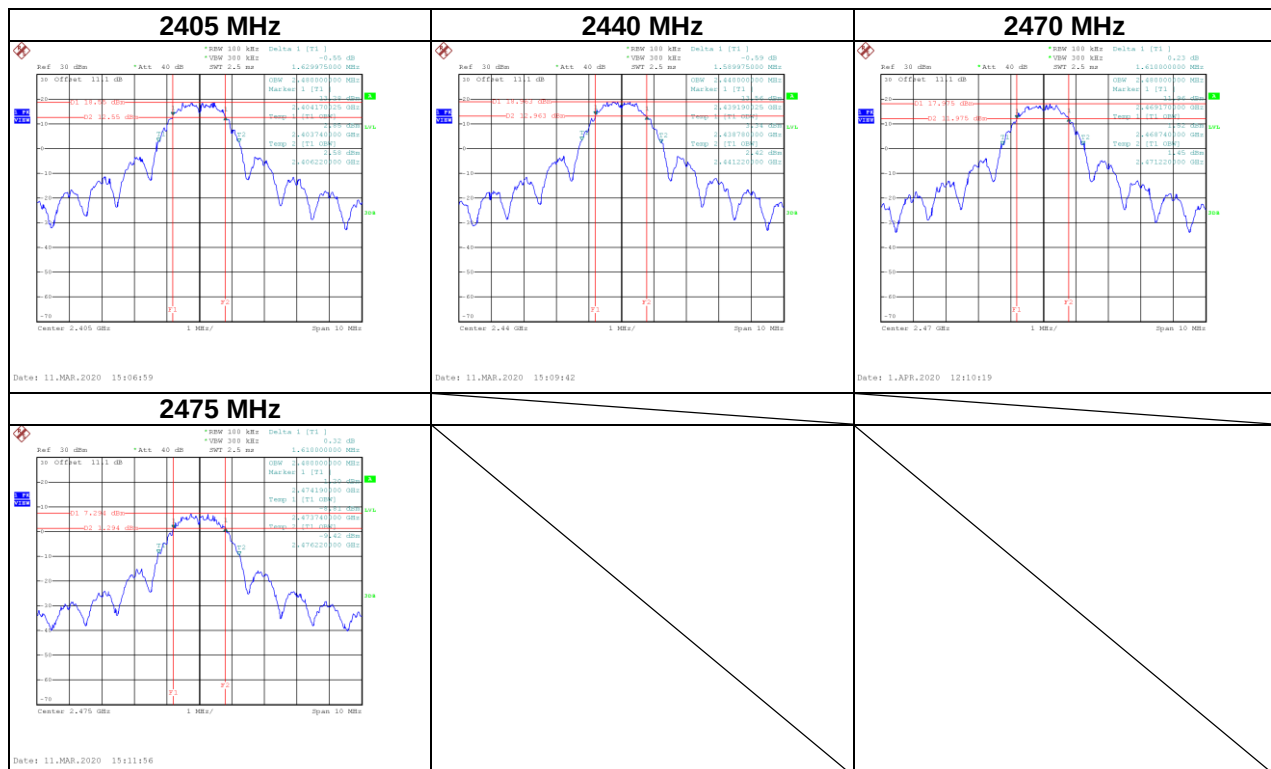
REMARKS:

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

APPENDIX D BANDWIDTH

Test Mode:	TX Mode
Test Voltage	AC 120V/60Hz

Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2405	1.63	2.48	500	Pass
2440	1.59	2.44	500	Pass
2470	1.61	2.48	500	Pass
2475	1.61	2.48	500	Pass



APPENDIX E OUTPUT POWER

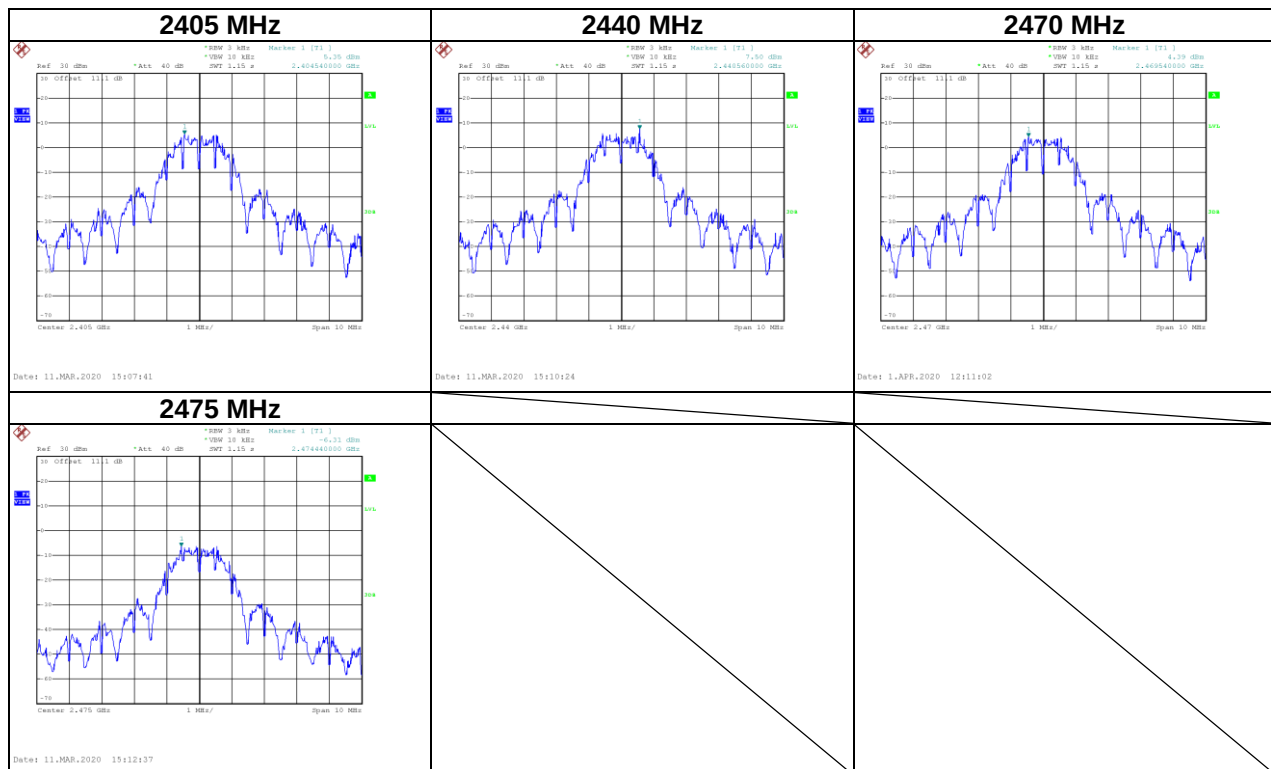
Test Mode :	TX Mode	Tested Date	2020/4/1
Test Voltage	AC 120V/60Hz		

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
2405	22.29	0.1694	30.00	1.0000	Pass
2440	22.44	0.1754	30.00	1.0000	Pass
2470	22.02	0.1592	30.00	1.0000	Pass
2475	10.31	0.0107	30.00	1.0000	Pass

APPENDIX F POWER SPECTRAL DENSITY TEST

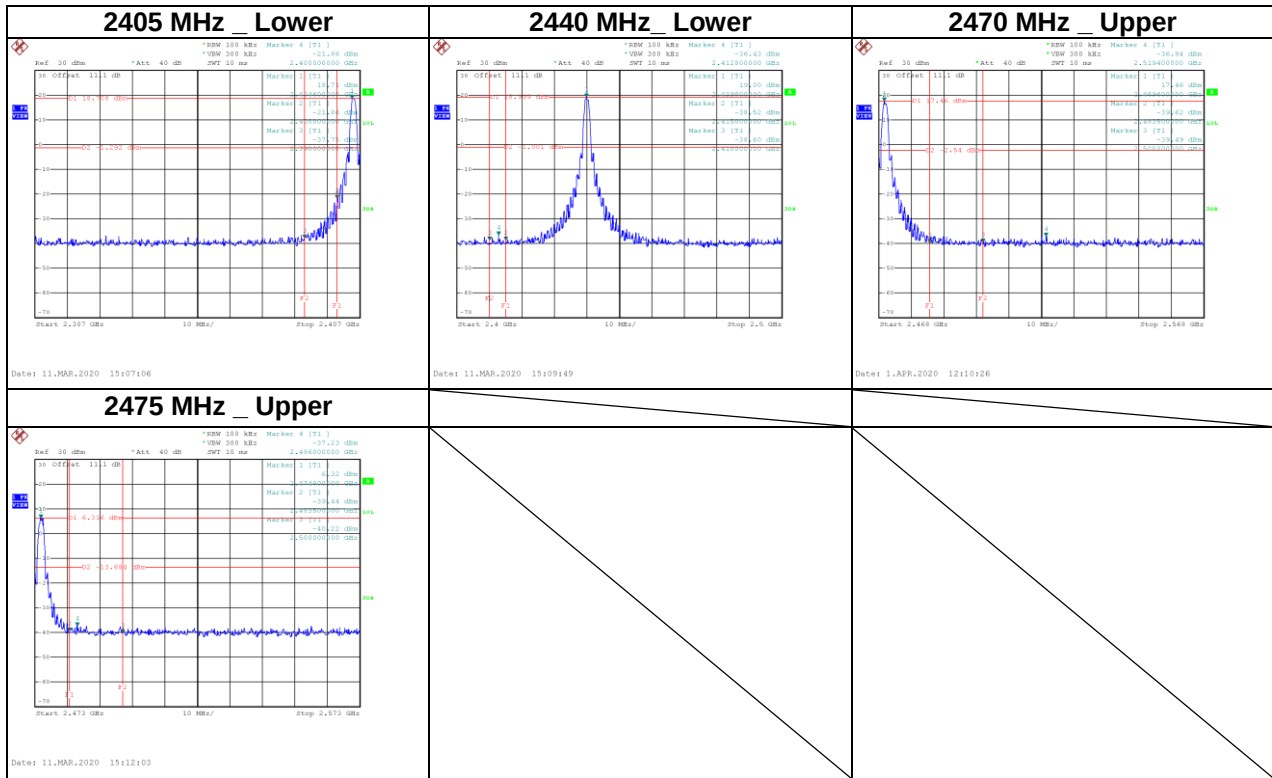
Test Mode:	TX Mode
Test Voltage	AC 120V/60Hz

Frequency (MHz)	Power Density (dBm/3kHz)	Max. Limit (dBm/3kHz)	Test Result
2405	5.35	8	Pass
2440	7.50	8	Pass
2470	4.39	8	Pass
2475	-6.31	8	Pass

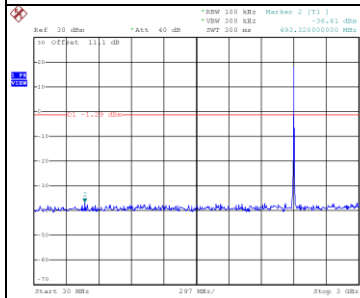


APPENDIX G ANTENNA CONDUCTED SPURIOUS EMISSION

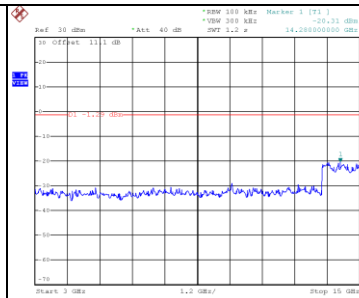
Test Mode :	TX Mode
Test Voltage	AC 120V/60Hz



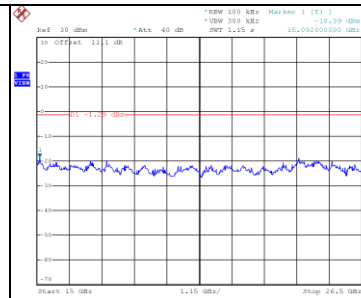
2405 MHz – 10th Harmonics



Date: 11.MAR.2020 15:07:19

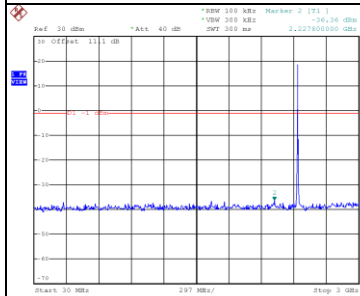


Date: 11.MAR.2020 15:07:26

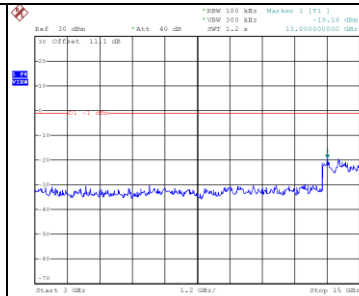


Date: 11.MAR.2020 15:07:33

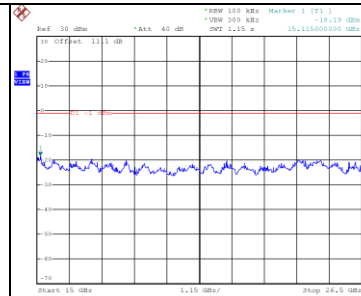
2440 MHz – 10th Harmonics



Date: 11.MAR.2020 15:10:02

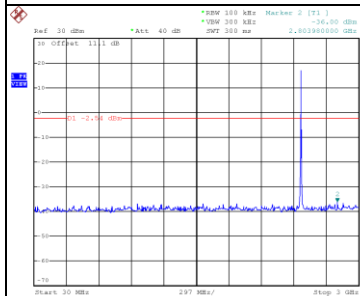


Date: 11.MAR.2020 15:10:08

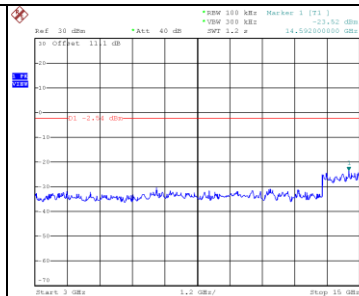


Date: 11.MAR.2020 15:10:15

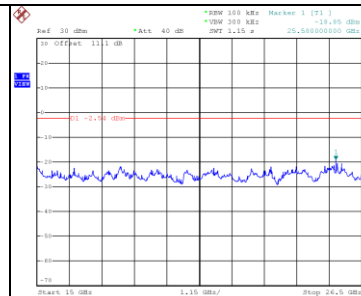
2470 MHz – 10th Harmonics



Date: 1.APR.2020 12:10:40

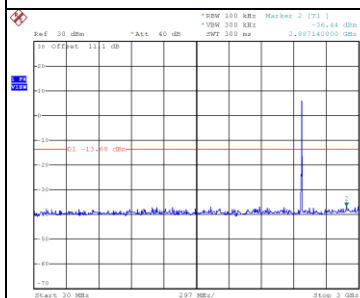


Date: 1.APR.2020 12:10:47

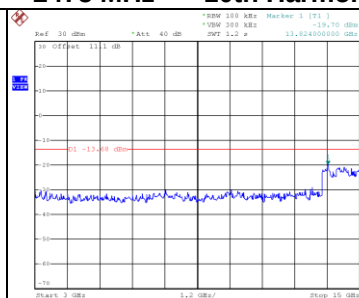


Date: 1.APR.2020 12:10:54

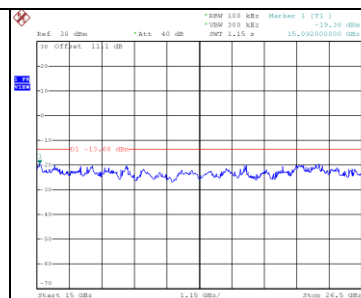
2475 MHz – 10th Harmonics



Date: 11.MAR.2020 15:12:16



Date: 11.MAR.2020 15:12:22



Date: 11.MAR.2020 15:12:29

End of Test Report