Qingdao Yeelink Information Technology Co., Ltd.

RF TEST REPORT

Report Type:
FCC Part 15.247 & ISED RSS-247 RF report

Model:
YLLDDXN01

REPORT NUMBER:
2404B1379SHA-002

ISSUE DATE:
May 6, 2024

DOCUMENT CONTROL NUMBER:
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TEST REPORT

Report no.: 2404B1379SHA-002

Applicant:	Qingdao Yeelink Information Technology Co., Ltd 10F-B4, Building B, Qingdao International Innovation Park, No.1 Keyuan Weiyi Road, Laoshan District, Qingdao City, Shandong Province, P.R.China
Manufacturer:	Qingdao Yeelink Information Technology Co., Ltd 10F-B4, Building B, Qingdao International Innovation Park, No.1 Keyuan Weiyi Road, Laoshan District, Qingdao City, Shandong Province, P.R.China
FCC ID:	2ABEU-YLLDDXN01
IC:	27677-YLLDDXN01

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:

47CFR Part 15 (2023): Radio Frequency Devices (Subpart C)

ANSI C63.10 (2020): American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

RSS-247 Issue 3 (February 2023): Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

RSS-Gen Issue 5 (February 2021) Amendment 2: General Requirements for Compliance of Radio Apparatus

PREPARED BY:	**REVIEWED BY:**
Project Engineer Damon Ding	Reviewer Eric Li

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Content

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Revision History

Report No.	Version	Description	Issued Date
2404B1379SHA-002	Rev. 01	Initial issue of report	May 6, 2024

TEST REPORT

Measurement result summary

TEST ITEM	FCC REFERENCE	IC REFERENCE	RESULT
Minimum 6dB Bandwidth	15.247(a)(2)	RSS-247 Issue 3 Clause 5.2	Pass
Maximum conducted output power and e.i.r.p.	15.247(b)(3)	RSS-247 Issue 3 Clause 5.4	Pass
Power spectrum density	15.247(e)	RSS-247 Issue 3 Clause 5.2	Pass
Emission outside the frequency band	15.247(d)	RSS-247 Issue 3 Clause 5.5	Pass
Radiated Emissions in restricted frequency bands	15.247(d), 15.205&15.209	RSS-Gen Issue 5 Clause 8.9&8.10	Pass
Power line conducted emission	15.207(a)	RSS-Gen Issue 5 Clause 8.8	N/A(Note 4)
Occupied bandwidth	-	RSS-Gen Issue 5 Clause 6.6	Tested
Antenna requirement	15.203	-	Pass

Notes:
1: NA =Not Applicable
2: Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.
3: Additions, Deviations and Exclusions from Standards: None.
4: The product is powered by button batteries.

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name:	Yeelight Natural Light Floor Lamp Controller
Type/Model:	YLLDDXN01
Sample No.:	S202404073078-ZJA01/3
Description of EUT:	The EUT is Yeelight Natural Light Floor Lamp Controller, it supports bluetooth functions, there is only one model, There is a spare PCB power board. We test it and list the worst results in this report.
Rating:	DC 3V
Category of EUT:	Class B
EUT type:	☒ Tabletop ☐ Floor standing
Software Version:	/
Hardware Version:	/
Sample received date:	2024.4.7
Date of test:	2024.4.11-2024.4.23

1.2 Technical Specification

Frequency Band:	2400MHz ~ 2483.5MHz
Support Standards:	Bluetooth LE 5.0
Type of Modulation:	GFSK
Channel Number:	40
Data Rate:	1Mbps
Channel Separation:	2MHz
Antenna Information:	0.2 dBi, PCB antenna

1.3 Description of Test Facility

Name:	Intertek Testing Services Shanghai
Address:	Building 86, No. 1198 Qinzhou Road (North), Shanghai 200233, P.R. China
Telephone:	86 21 61278200
Telefax:	86 21 54262353

The test facility is recognized, certified, or accredited by these organizations:	CNAS Accreditation Lab Registration No. CNAS L0139
	FCC Accredited Lab Designation Number: CN0175
	IC Registration Lab CAB identifier.: CN0014
	VCCI Registration Lab Member No: 3598 (Registration No.: R-14243, G-10845, C-14723, T-12252)
	A2LA Accreditation Lab Certificate Number: 3309.02

All tests were sub-contracted at Shenzhen UnionTrust Quality and Technology Co., Ltd, and conducted by David Chen.
Reviewed and approved by Wakeyou Wang from Intertek Testing Services shanghai.

Name:	Shenzhen UnionTrust Quality and Technology Co., Ltd.
Address:	Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng Science and Technology Park, Longhua District, Shenzhen, China
Telephone:	+86 (0) 755 2823 0888
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The test facility is recognized, certified, or accredited by these organizations:	CNAS Accreditation Lab Registration No. CNAS L969
	FCC Accredited Lab Designation Number: CN1194
	IC Registration Lab CAB identifier.: CN0032
	VCCI Registration Lab Member No: 4142 (Registration No.: C-20097, T-20098, R-20135, G-20130)
	A2LA Accreditation Lab Certificate Number: 4312.01

2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2023)
ANSI C63.10 (2020)
RSS-247 Issue 3 (February 2023)
RSS-Gen Issue 5, (February 2021) Amendment 2
KDB 558074 (v05or02)

2.2 Mode of operation during the test

The lowest, middle and highest channel were tested as representatives.

Frequency Band (MHz)				2400 ~ 2483.5			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	**2402**	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	**19**	**2440**	29	2460	**39**	**2480**

Data rate VS Power:

The test setting software is offered by the applicant. The pre-scan for the conducted power with all rates in each modulation and bands was used, and the worst case was found and used in all test cases.

Test software and Power Setting parameter			
Test Software	RTL8762x_RFTestTool_v1.0.2.6		
Working Mode	BLE		
Test Channel	2402MHz	2440MHz	2480MHz

While testing transmitting mode of EUT, the internal modulation and continuously transmission was applied.

Radiated test mode: EUT transmitted signal with antenna.

Conducted test mode: EUT transmitted signal from RF port connected to SPA directly.

2.3 Test peripherals list

Item No.	Name	Band and Model	Description
1	Laptop computer	DELL 5480	100-240V AC, 50/60Hz

2.4 Test environment condition:

Test items	Temperature	Humidity
Minimum 6dB Bandwidth	23.5°C	44.2% RH
Maximum conducted output power and e.i.r.p.		
Power spectrum density		
Emission outside the frequency band		
Occupied bandwidth		
Radiated Emissions in restricted frequency bands	24.9°C	55.7% RH

2.5 Instrument list

Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	NA	2026-11-10
☒	Receiver	R&S	ESIB26	100114	2024-10-26
☒	Loop Antenna	ETS-Lindgren	6502	00202525	2024-10-29
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	2024-10-29
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	2024-10-29
☒	Preamplifier	HP	8447F	2805A02960	2024-10-30
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	2024-10-30
☒	Pre-amplifier	ETS-Lindgren	00118385	00201874	2024-10-30
☒	Multi device Controller	ETS-LINDGREN	7006-001	NA	NA
☒	Test Software	Audix	e3	Software Version: 9.160323	
RF test					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	2025-03-28
☒	USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55430035	2024-10-26
☒	MXG X-Series RF Vector Signal Generator	KEYSIGHT	N5182B	MY51350267	2024-10-26
☒	Wideband Radio Communication Tester	R&S	CMW500	1201.002k50	2025-03-28
☒	Temp & Humidity chamber	Votisch	VT4002	58566133290020	2025-03-28

2.6 Measurement uncertainty

The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Test item	Measurement uncertainty
Maximum peak output power	± 0.74dB
Power spectrum density	± 0.74dB
Radiated Emissions in restricted frequency bands below 1GHz	± 4.90dB
Radiated Emissions in restricted frequency bands above 1GHz	± 5.02dB
Emission outside the frequency band	± 2.89dB
Power line conducted emission	± 3.19dB
Minimum 6dB Bandwidth	$\pm 0.84 \times 10^{-7}$
Occupied bandwidth	$\pm 0.84 \times 10^{-7}$

3 Minimum 6dB bandwidth

Test result: Pass

3.1 Limit

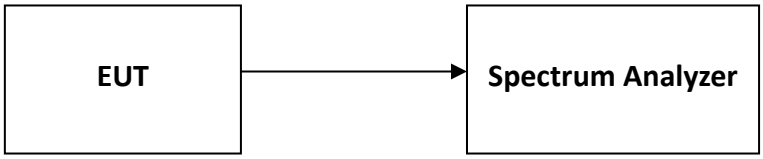
For systems using digital modulation techniques that may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz bands, the minimum 6 dB bandwidth shall be at least 500 kHz.

3.2 Measurement Procedure

The minimum 6dB bandwidth is measured using the Spectrum Analyzer according to DTS test procedure of “558074 D01 15.247 Meas Guidance v05r02” (clause 8.2) for compliance requirements.

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

3.3 Test Configuration



3.4 Test Results of Minimum 6dB bandwidth

Please refer to Appendix A

4 Maximum conducted output power and e.i.r.p.

Test result: Pass

4.1 Limit

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 W. (The e.i.r.p. shall not exceed 4 W)

If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. If there have a beam forming type, the limit should be the minimum of 30dBm and 30+ (6 –antenna gain-beam forming gain).

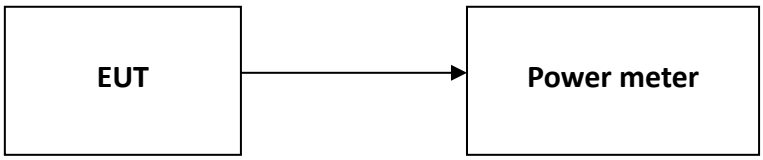
4.2 Measurement Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.

2. Measure out each test modes' peak or average output power, record the power level.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

4.3 Test Configuration



4.4 Test Results of Maximum conducted output power

Please refer to Appendix A

5 Power spectrum density

Test result: **Pass**

5.1 Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

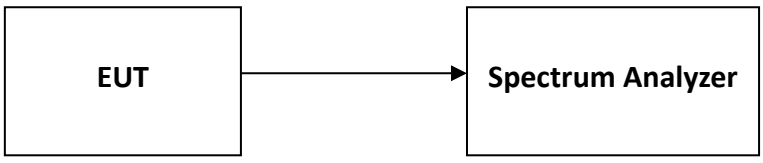
If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. If there have a beam forming type, the limit should be the minimum of 8dBm/MHz and 8+ (6 –antenna gain-beam forming gain).

5.2 Measurement Procedure

The power output was tested according to DTS test procedure of “558074 D01 15.247 Meas Guidance v05r02” (clause 8.4) for compliance requirements.

a) Set analyzer center frequency to DTS channel center frequency.
b) Set the span to 1.5 times the DTS bandwidth.
c) Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d) Set the VBW ≥ 3 × RBW.
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum amplitude level within the RBW.
j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.3 Test Configuration



5.4 Test Results of Power spectrum density

Please refer to Appendix A

6 Emission outside the frequency band

Test result: **Pass**

6.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.

6.2 Measurement Procedure

The EUT was tested according to DTS test procedure of "558074 D01 15.247 Meas Guidance v05r02" (clause 8.5) for compliance requirements.

Reference level measurement

Establish a reference level by using the following procedure:

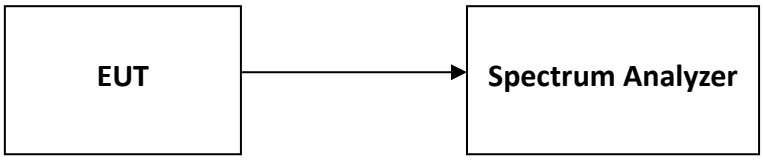
a) Set instrument center frequency to DTS channel center frequency.
b) Set the span to ≥ 1.5 times the DTS bandwidth.
c) Set the RBW = 100 kHz.
d) Set the VBW ≥ 3 x RBW.
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum PSD level.

Emission level measurement

a) Set the center frequency and span to encompass frequency range to be measured.
b) Set the RBW = 100 kHz.
c) Set the VBW ≥ 3 x RBW.
d) Detector = peak.
e) Sweep time = auto couple.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in 11.1 a) or 11.1 b). Report the three highest emissions relative to the limit.

6.3 Test Configuration



6.4 The results of Emission outside the frequency band

Please refer to Appendix A

7 Radiated Emissions in restricted frequency bands

Test result: **Pass**

7.1 Limit

The radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified showed as below:

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

7.2 Measurement Procedure

For Radiated emission below 30MHz:

a) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c) Both X and Y axes of the antenna are set to make the measurement.
d) For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e) The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

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For Radiated emission above 30MHz:

a) The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c) The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e) The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

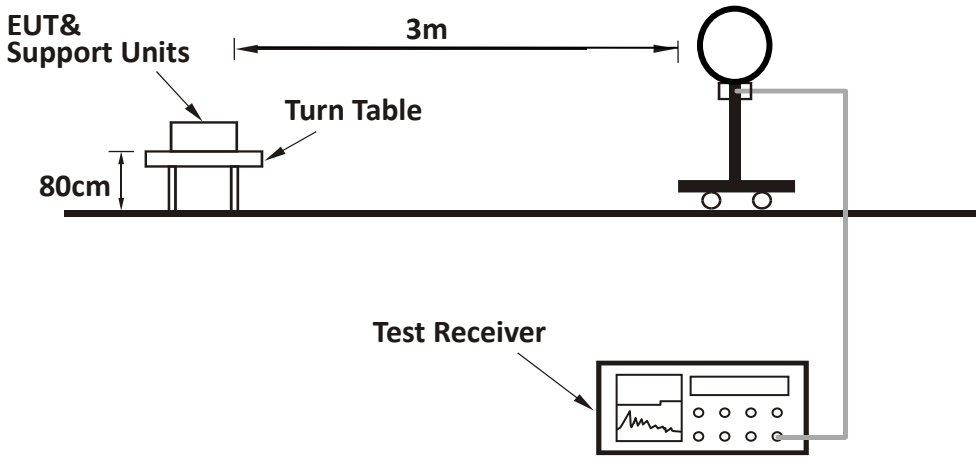
f) The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

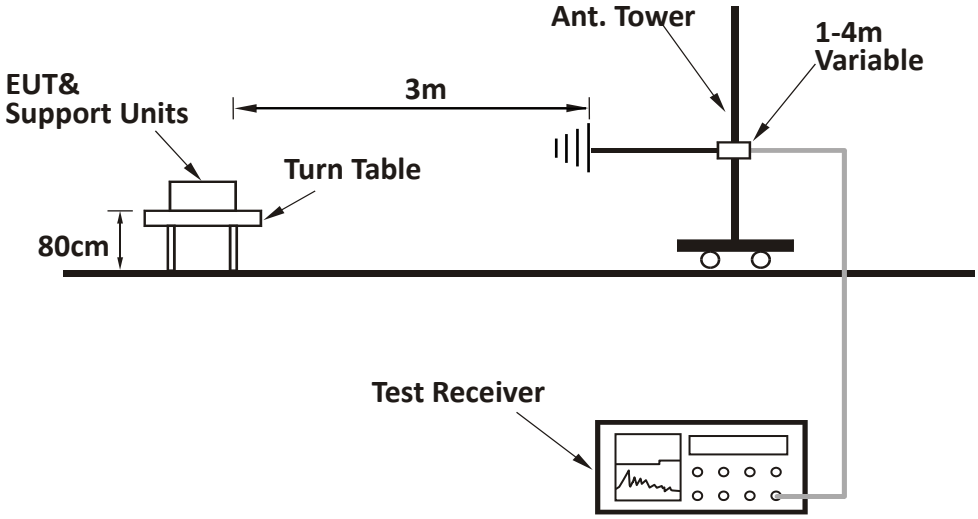
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 3 x RBW (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported

7.3 Test Configuration

For Radiated emission below 30MHz:



For Radiated emission 30MHz to 1GHz:



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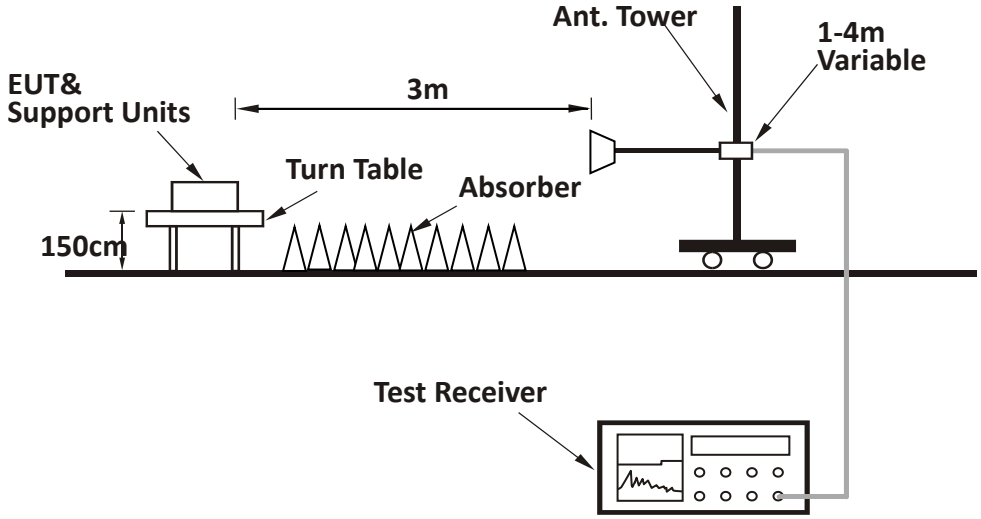
For Radiated emission above 1GHz:



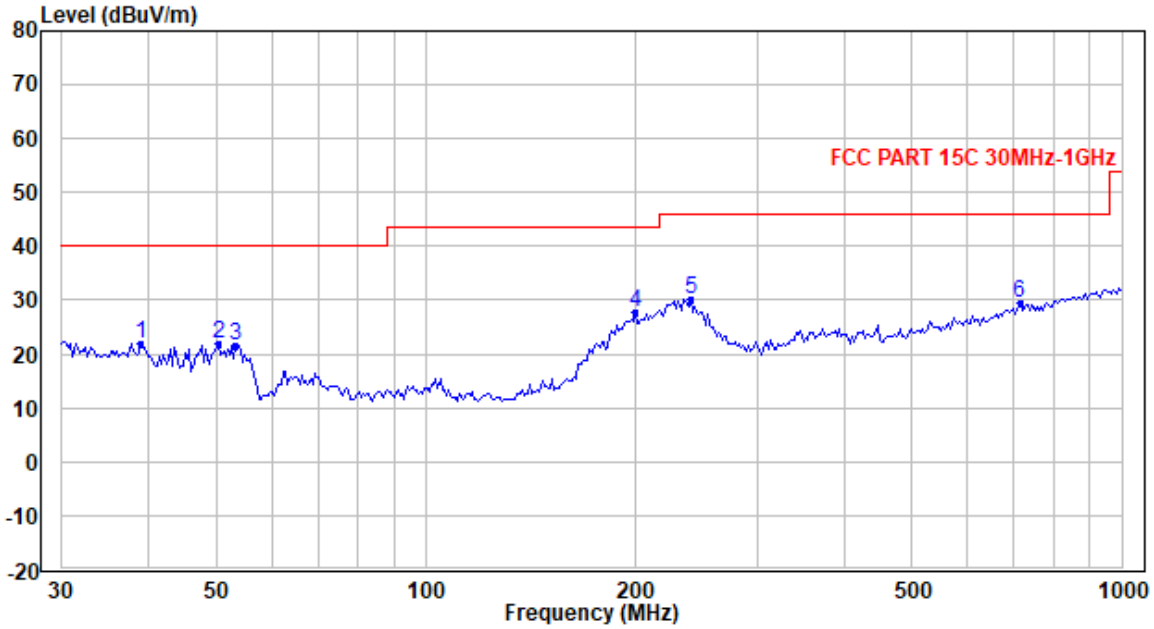
7.4 Test Results of Radiated Emissions

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

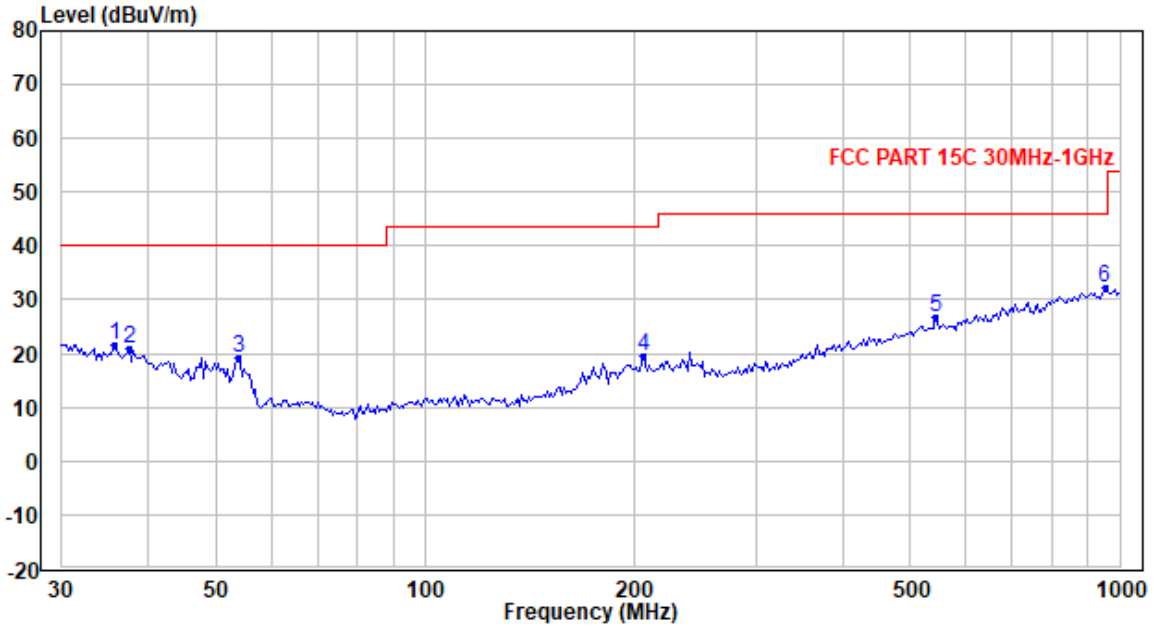
The worst waveform from 30MHz to 1000MHz is listed as below:

For LE

Horizontal



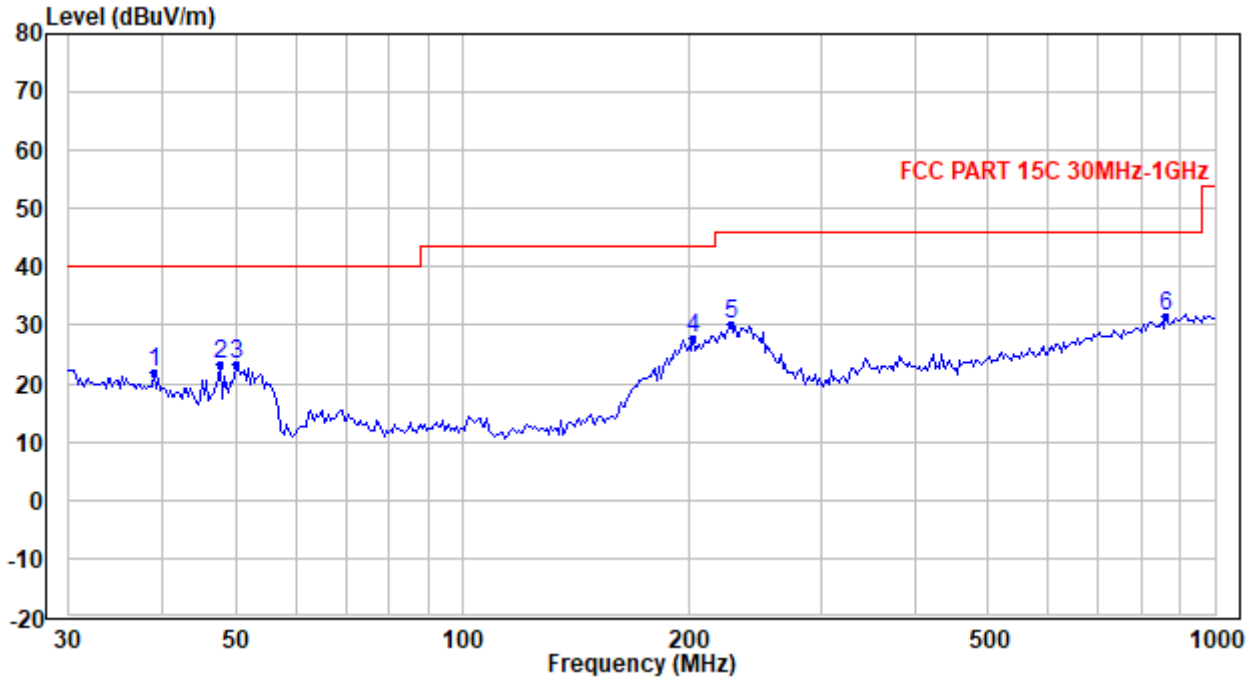
Vertical



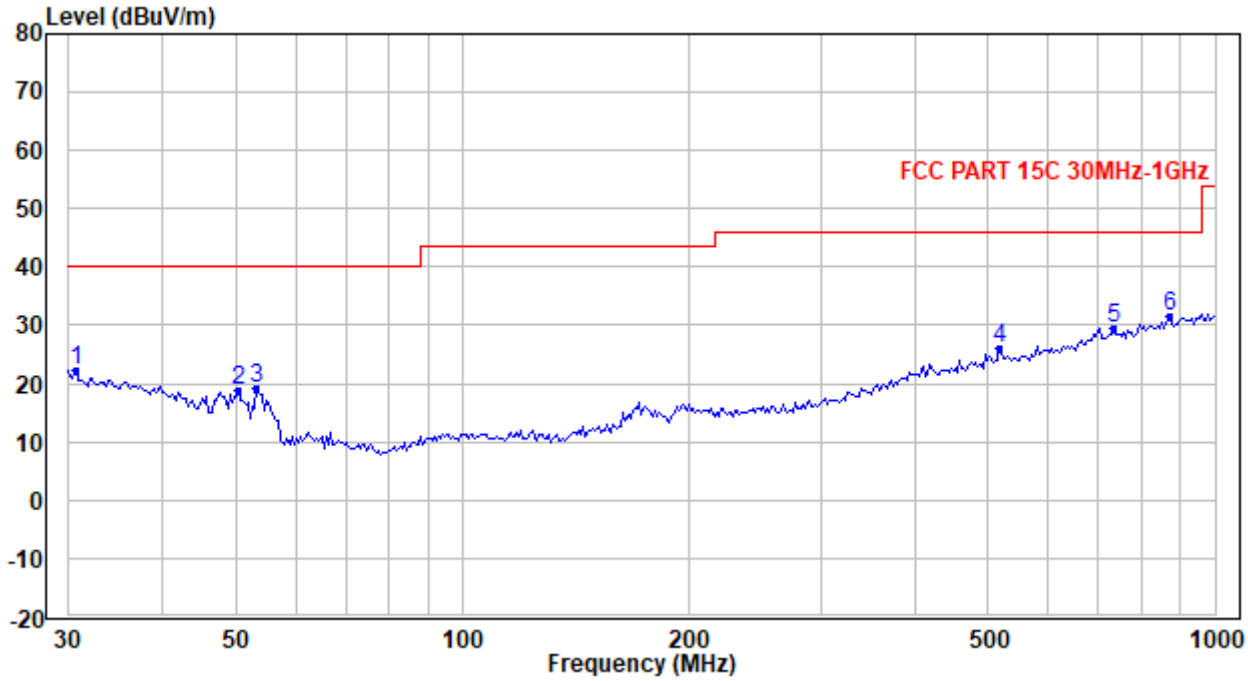
TEST REPORT

For 2LE

Horizontal



Vertical



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Test data below 1GHz

For LE

Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	38.908	22.03	40.00	-17.97	PK
H	50.461	21.98	40.00	-18.02	PK
H	53.379	21.73	40.00	-18.27	PK
H	200.043	27.87	43.50	-15.63	PK
H	240.144	30.16	46.00	-15.84	PK
H	713.692	29.36	46.00	-16.64	PK
V	35.762	21.57	40.00	-18.43	PK
V	37.565	21.03	40.00	-18.97	PK
V	53.756	19.21	40.00	-20.79	PK
V	205.746	19.49	43.50	-24.01	PK
V	542.610	26.58	46.00	-19.42	PK
V	952.000	32.08	46.00	-13.92	PK

For 2LE

Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	38.908	21.80	40.00	-18.20	PK
H	47.703	23.18	40.00	-16.82	PK
H	50.108	23.42	40.00	-16.58	PK
H	202.875	27.61	43.50	-15.89	PK
H	227.016	30.26	46.00	-15.74	PK
H	862.802	31.45	46.00	-14.55	PK
V	30.639	22.14	40.00	-17.86	PK
V	50.461	18.92	40.00	-21.08	PK
V	53.379	19.25	40.00	-20.75	PK
V	516.565	26.17	46.00	-19.83	PK
V	734.037	29.54	46.00	-16.46	PK
V	868.886	31.70	46.00	-14.30	PK

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), the value was added to Original Receiver Reading by the software automatically.
2. Corrected Reading = Original Receiver Reading + Correct Factor
3. Margin = Corrected Reading - Limit
4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV,
Limit = 40.00dBuV/m.
Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;
Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m;
Margin = 10.20dBuV/m - 40.00dBuV/m = -29.80dB.

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Test result above 1GHz:
The emission was conducted from 1GHz to 18GHz

For LE

Radiated Emission Test Data (Above 1GHz):								
LE_ Lowest Channel:								
No.	**Frequency (MHz)**	**Reading (dBμV)**	**Correction factor (dB/m)**	**Result (dBμV/m)**	**Limit (dBμV/m)**	**Margin (dB)**	**Detector**	**Antenna Polaxis**
1	4804	25.26	-0.86	24.40	54.00	-29.60	Average	Horizontal
2	4804	38.74	-0.86	37.88	74.00	-36.12	Peak	Horizontal
3	7206	25.87	2.86	28.73	54.00	-25.27	Average	Horizontal
4	7206	37.97	2.86	40.83	74.00	-33.17	Peak	Horizontal
5	4804	25.57	-0.86	24.71	54.00	-29.29	Average	Vertical
6	4804	38.53	-0.86	37.67	74.00	-36.33	Peak	Vertical
7	7206	26.02	2.86	28.88	54.00	-25.12	Average	Vertical
8	7206	38.38	2.86	41.24	74.00	-32.76	Peak	Vertical
LE_ Middle Channel:								
1	4880	27.44	-0.77	26.67	54.00	-27.33	Average	Horizontal
2	4880	40.17	-0.77	39.40	74.00	-34.60	Peak	Horizontal
3	7320	25.66	2.95	28.61	54.00	-25.39	Average	Horizontal
4	7320	38.65	2.95	41.60	74.00	-32.40	Peak	Horizontal
5	4880	27.56	-0.77	26.79	54.00	-27.21	Average	Vertical
6	4880	39.88	-0.77	39.11	74.00	-34.89	Peak	Vertical
7	7320	25.59	2.95	28.54	54.00	-25.46	Average	Vertical
8	7320	37.36	2.95	40.31	74.00	-33.69	Peak	Vertical
LE_ Highest Channel:								
1	4960	27.40	-0.67	26.73	54.00	-27.27	Average	Horizontal
2	4960	39.71	-0.67	39.04	74.00	-34.96	Peak	Horizontal
3	7440	24.42	3.05	27.47	54.00	-26.53	Average	Horizontal
4	7440	36.61	3.05	39.66	74.00	-34.34	Peak	Horizontal
5	4960	27.88	-0.67	27.21	54.00	-26.79	Average	Vertical
6	4960	40.17	-0.67	39.50	74.00	-34.50	Peak	Vertical
7	7440	24.15	3.05	27.20	54.00	-26.80	Average	Vertical
8	7440	36.63	3.05	39.68	74.00	-34.32	Peak	Vertical

TEST REPORT

For 2LE

Radiated Emission Test Data (Above 1GHz):								
2LE_ Lowest Channel:								
No.	**Frequency (MHz)**	**Reading (dBμV)**	**Correction factor (dB/m)**	**Result (dBμV/m)**	**Limit (dBμV/m)**	**Margin (dB)**	**Detector**	**Antenna Polaxis**
1	4804	25.57	-0.86	24.71	54.00	-29.29	Average	Horizontal
2	4804	39.26	-0.86	38.40	74.00	-35.60	Peak	Horizontal
3	7206	25.80	2.86	28.66	54.00	-25.34	Average	Horizontal
4	7206	37.86	2.86	40.72	74.00	-33.28	Peak	Horizontal
5	4804	25.50	-0.86	24.64	54.00	-29.36	Average	Vertical
6	4804	37.18	-0.86	36.32	74.00	-37.68	Peak	Vertical
7	7206	25.72	2.86	28.58	54.00	-25.42	Average	Vertical
8	7206	38.52	2.86	41.38	74.00	-32.62	Peak	Vertical
2LE_ Middle Channel:								
1	4880	27.50	-0.77	26.73	54.00	-27.27	Average	Horizontal
2	4880	40.07	-0.77	39.30	74.00	-34.70	Peak	Horizontal
3	7320	25.66	2.95	28.61	54.00	-25.39	Average	Horizontal
4	7320	38.92	2.95	41.87	74.00	-32.13	Peak	Horizontal
5	4880	27.62	-0.77	26.85	54.00	-27.15	Average	Vertical
6	4880	40.04	-0.77	39.27	74.00	-34.73	Peak	Vertical
7	7320	24.95	2.95	27.90	54.00	-26.10	Average	Vertical
8	7320	36.55	2.95	39.50	74.00	-34.50	Peak	Vertical
2LE_ Highest Channel:								
1	4960	27.82	-0.67	27.15	54.00	-26.85	Average	Horizontal
2	4960	39.55	-0.67	38.88	74.00	-35.12	Peak	Horizontal
3	7440	25.09	3.05	28.14	54.00	-25.86	Average	Horizontal
4	7440	37.67	3.05	40.72	74.00	-33.28	Peak	Horizontal
5	4960	27.82	-0.67	27.15	54.00	-26.85	Average	Vertical
6	4960	39.29	-0.67	38.62	74.00	-35.38	Peak	Vertical
7	7440	24.06	3.05	27.11	54.00	-26.89	Average	Vertical
8	7440	36.44	3.05	39.49	74.00	-34.51	Peak	Vertical

TEST REPORT

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), the value was added to Original Receiver Reading by the software automatically.
2. Corrected Reading = Original Receiver Reading + Correct Factor
3. Margin = Corrected Reading - Limit
4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

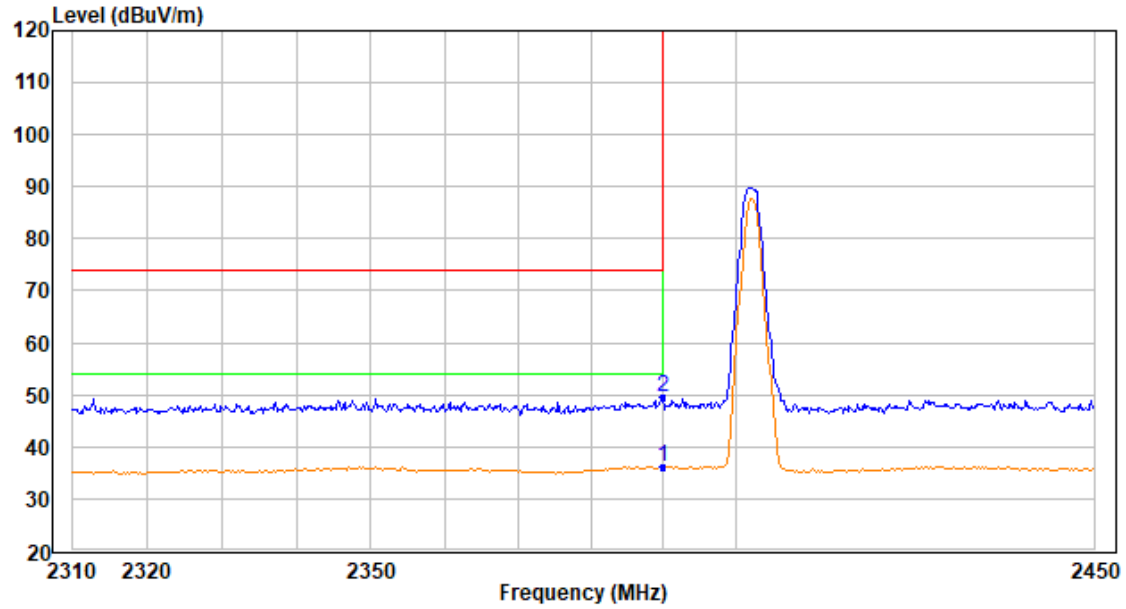
Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV,
Limit = 40.00dBuV/m.
Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;
Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m;
Margin = 10.20dBuV/m - 40.00dBuV/m = -29.80dB.

TEST REPORT

Band Edge Measurements (Radiated)

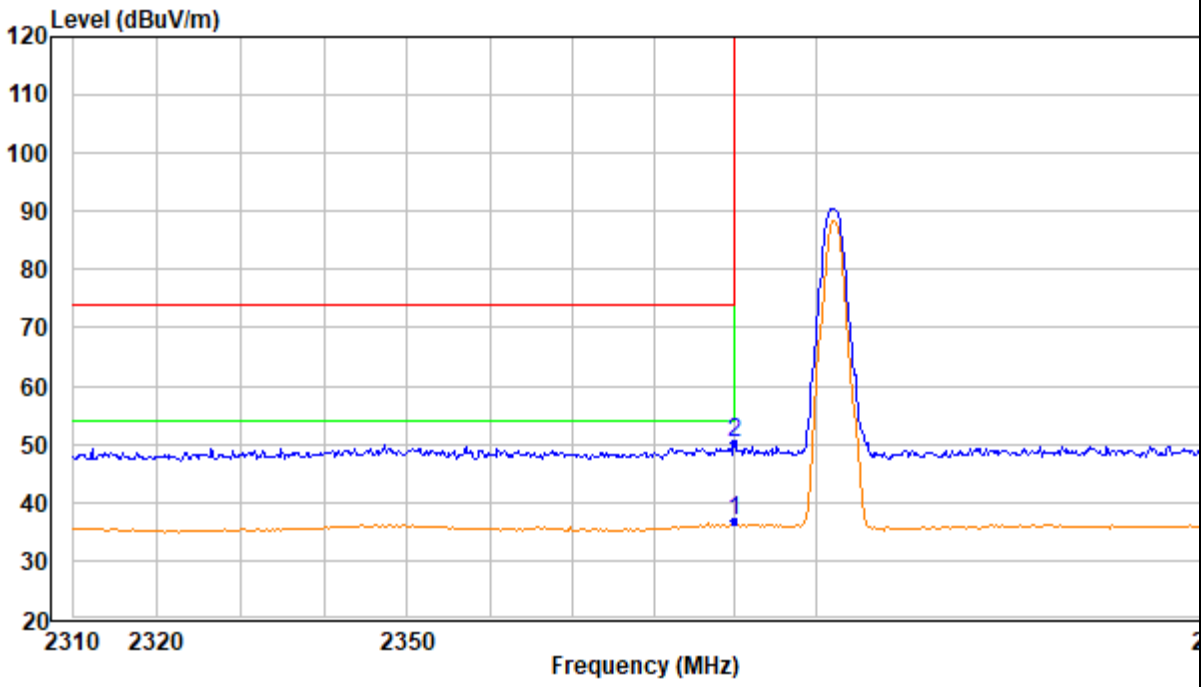
LE Mode:

Test Channel:	Lowest Channel	Ant. Polar. :	Horizontal



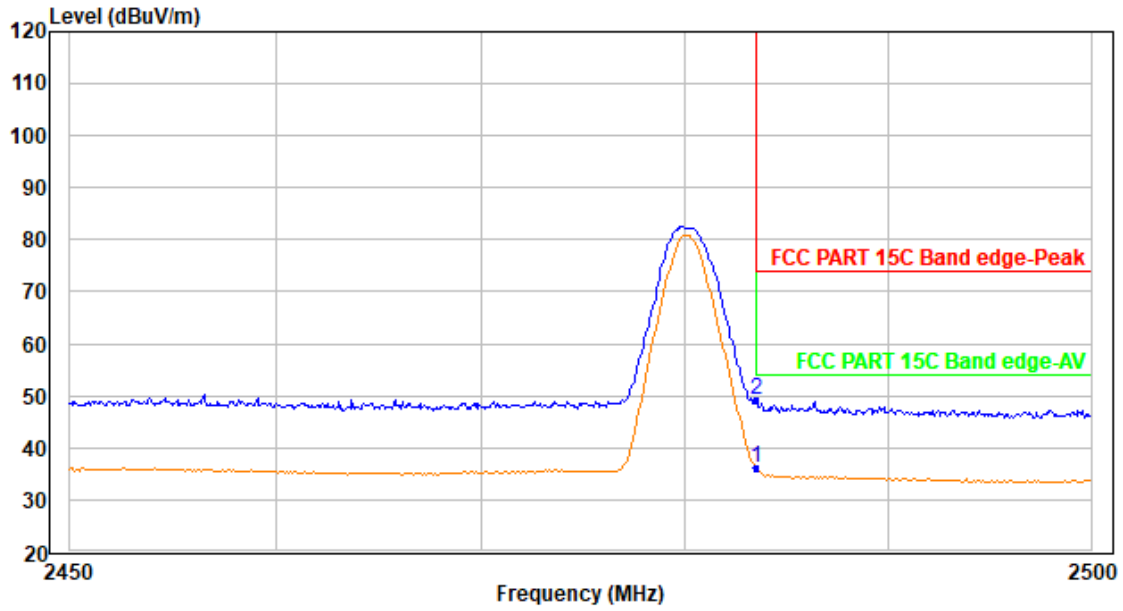
Frequency (MHz)	Peak level (dBµV/m)	Peak Limit (dBµV/m)	AV level (dBµV/m)	AV Limit (dBµV/m)	Conclusion
2390.000	49.53	74.00	36.13	54.00	Pass

Test Channel:	Lowest Channel	Ant. Polar. :	Vertical



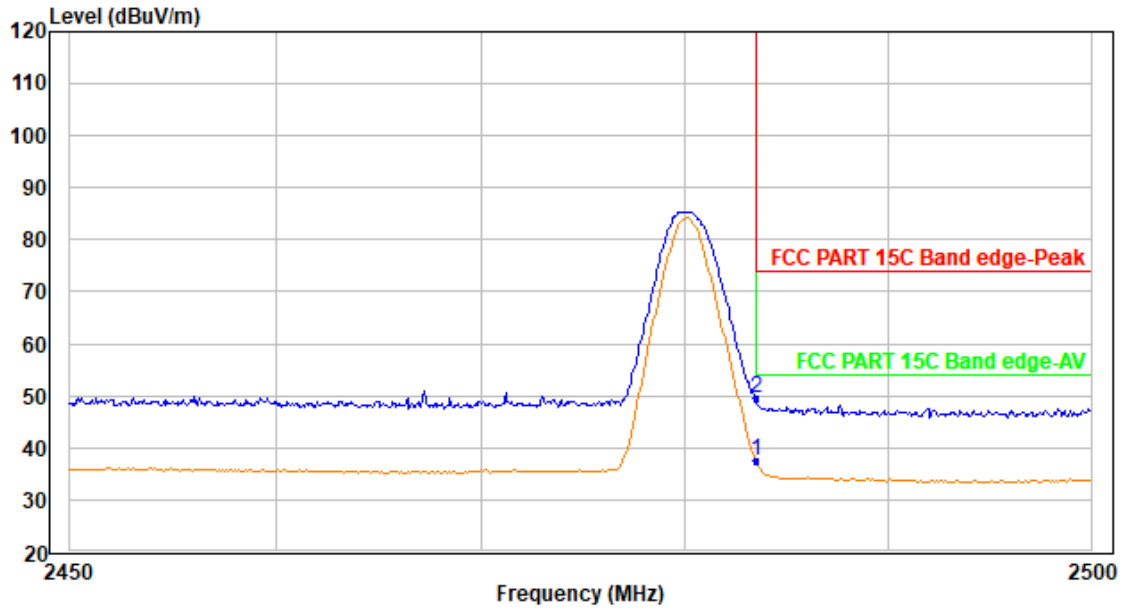
Frequency (MHz)	Peak level (dBµV/m)	Peak Limit (dBµV/m)	AV level (dBµV/m)	AV Limit (dBµV/m)	Conclusion
2390.000	50.28	74.00	36.94	54.00	Pass

Test Channel:	Highest Channel	Ant. Polar. :	Horizontal



Frequency (MHz)	Peak level (dBμV/m)	Peak Limit (dBμV/m)	AV level (dBμV/m)	AV Limit (dBμV/m)	Conclusion
2483.500	49.33	74.00	36.11	54.00	Pass

Test Channel:	Highest Channel	Ant. Polar. :	Vertical

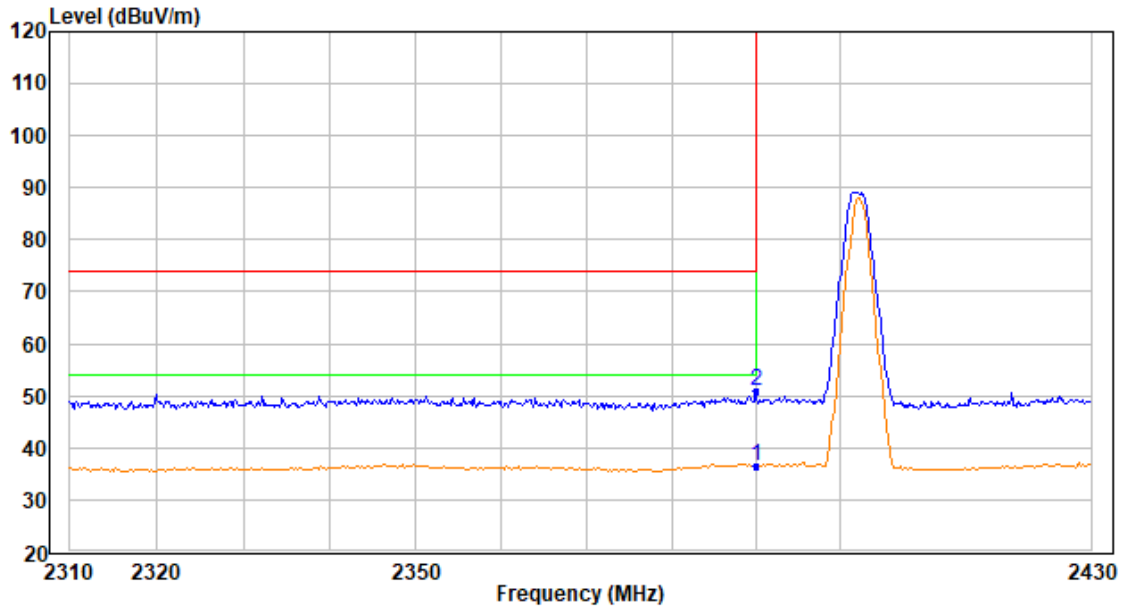


Frequency (MHz)	Peak level (dBμV/m)	Peak Limit (dBμV/m)	AV level (dBμV/m)	AV Limit (dBμV/m)	Conclusion
2483.500	49.46	74.00	37.65	54.00	Pass

TEST REPORT

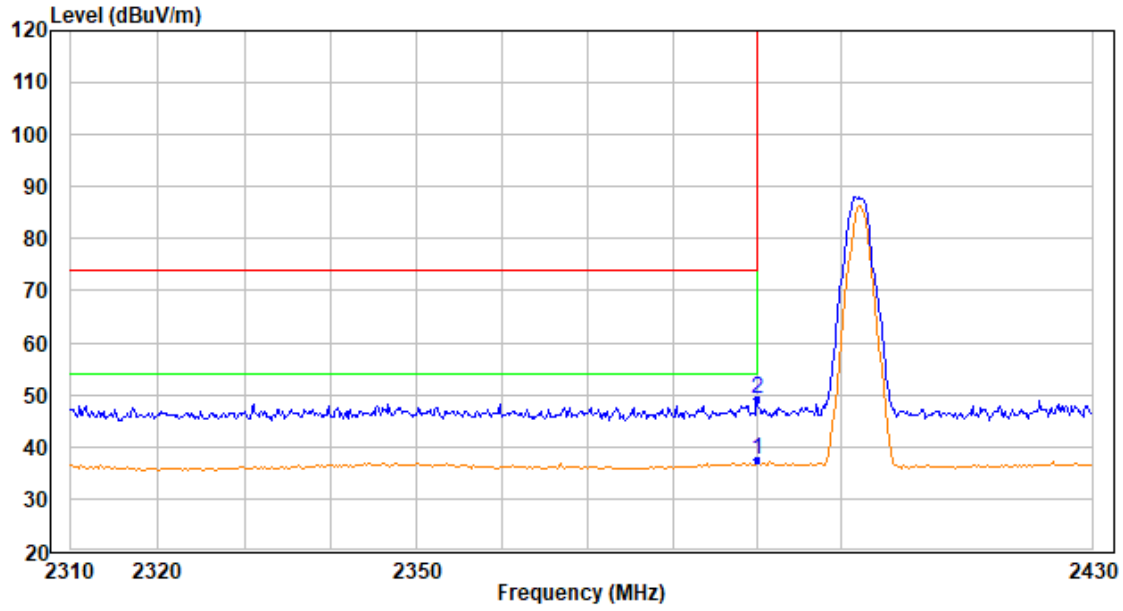
2LE Mode:

Test Channel:	Lowest Channel	Ant. Polar. :	Horizontal



Frequency (MHz)	Peak level (dBµV/m)	Peak Limit (dBµV/m)	AV level (dBµV/m)	AV Limit (dBµV/m)	Conclusion
2390.000	50.87	74.00	36.54	54.00	Pass

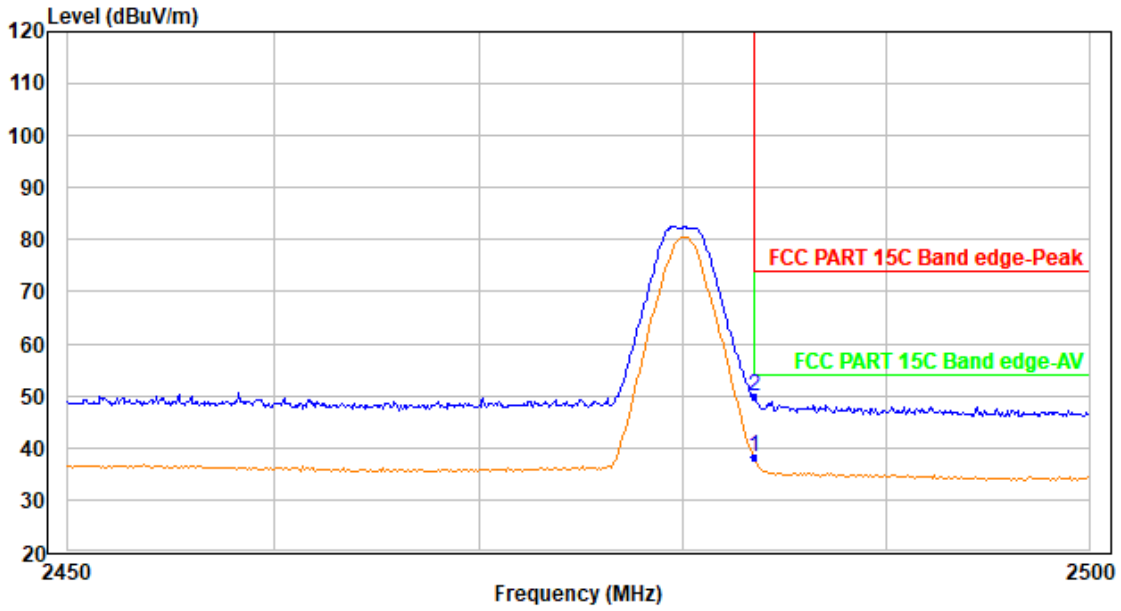
Test Channel:	Lowest Channel	Ant. Polar. :	Vertical



Frequency (MHz)	Peak level (dBµV/m)	Peak Limit (dBµV/m)	AV level (dBµV/m)	AV Limit (dBµV/m)	Conclusion
2390.000	49.18	74.00	37.61	54.00	Pass

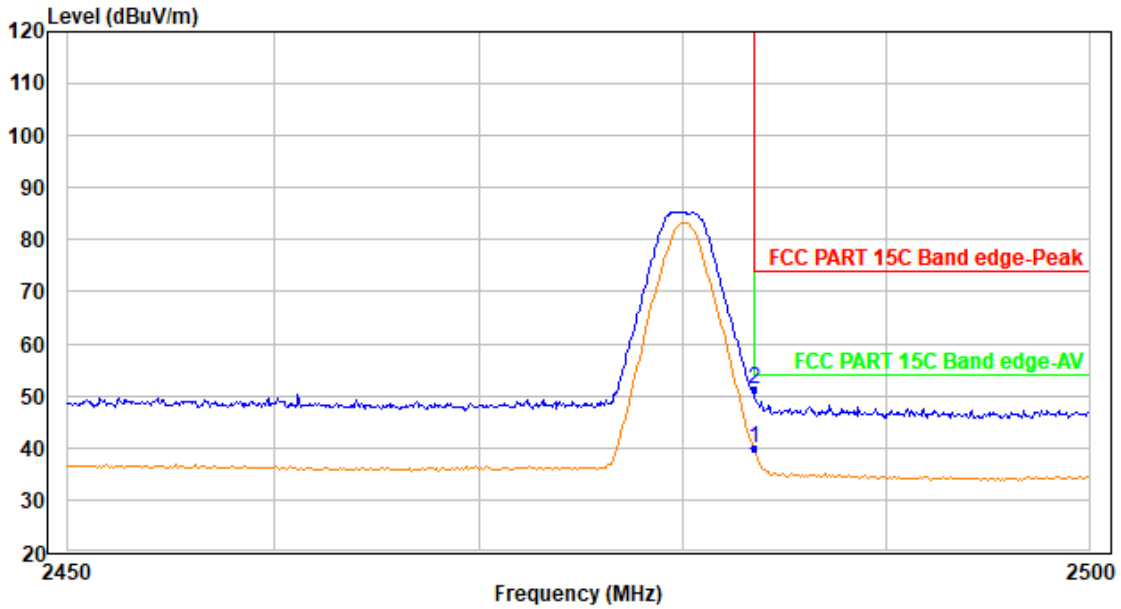
TEST REPORT

Test Channel:	Highest Channel	Ant. Polar. :	Horizontal



Frequency (MHz)	Peak level (dBμV/m)	Peak Limit (dBμV/m)	AV level (dBμV/m)	AV Limit (dBμV/m)	Conclusion
2483.500	50.05	74.00	38.24	54.00	Pass

Test Channel:	Highest Channel	Ant. Polar. :	Vertical



Frequency (MHz)	Peak level (dBμV/m)	Peak Limit (dBμV/m)	AV level (dBμV/m)	AV Limit (dBμV/m)	Conclusion
2483.500	51.34	74.00	39.85	54.00	Pass

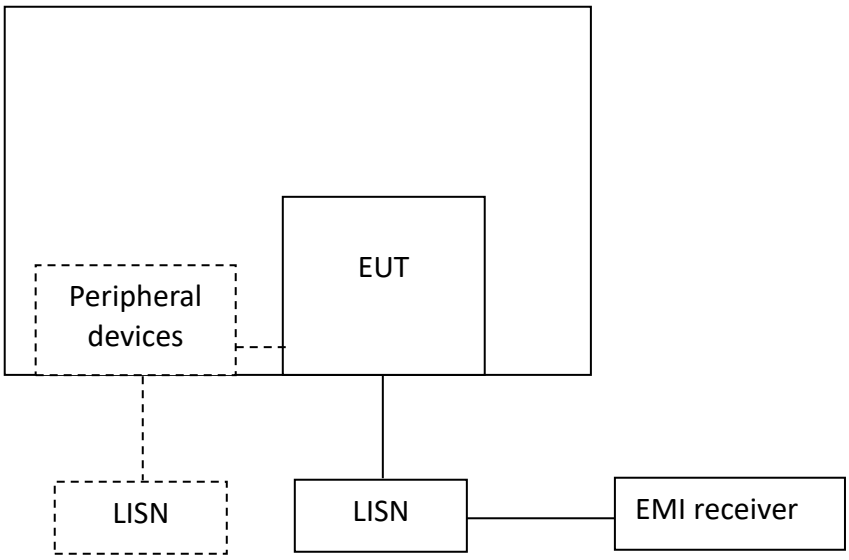
8 Power line conducted emission

Test result: **N/A**

8.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	QP	AV
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.		

8.2 Test Configuration



8.3 Measurement Procedure

Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the 50 Ω LISN port (to which the EUT is connected), where permitted, terminated into a 50 Ω measuring instrument. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements using a LISN, the 50 Ω measuring port is terminated by a measuring instrument having 50 Ω input impedance. All other ports are terminated in 50 Ω loads.

Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

The bandwidth of the test receiver is set at 9 kHz.

8.4 Test Results of Power line conducted emission

None

9 Occupied Bandwidth

Test result: **Tested**

9.1 Limit

None

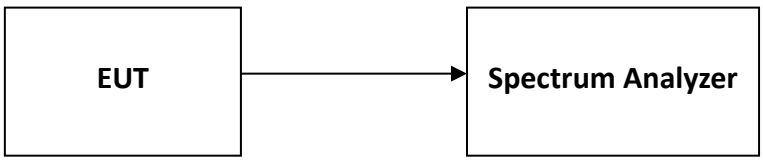
9.2 Measurement Procedure

The occupied bandwidth per RSS-Gen was measured using the Spectrum Analyzer.

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

9.3 Test Configuration



9.4 The results of Occupied Bandwidth

Please refer to Appendix A

10 Antenna requirement

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 permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

Result:
EUT uses permanently attached antenna to the intentional radiator, so it can comply with the provisions of this section.

Appendix A: Test results

Test Results of Maximum conducted output power

Mode	Frequency	Max. Peak Power		Maximum e.i.r.p	Peak Power Limit	Maximum e.i.r.p Limit	Result
	(MHz)	(dBm)	(W)	(dBm)	(dBm)	(dBm)	
LE	2402	**2.17**	0.00165	**2.37**	30	36.02	Pass
	2440	1.79	0.00151	1.99	30	36.02	Pass
	2480	1.39	0.00138	1.59	30	36.02	Pass
2LE	2402	**2.17**	0.00165	**2.37**	30	36.02	Pass
	2440	1.78	0.00151	1.98	30	36.02	Pass
	2480	1.38	0.00137	1.58	30	36.02	Pass

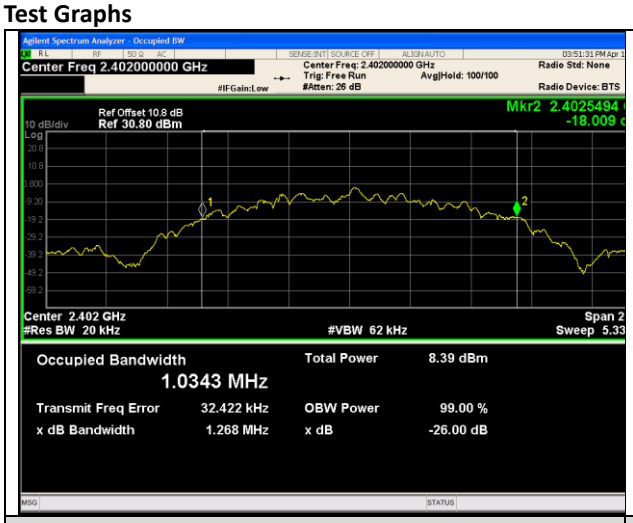
Note: The antenna gain of 0.2 dBi less than 6dBi maximum permission antenna gain value based on 125 mW peak output power limit.
Maximum e.i.r.p = Max. Peak Power + antenna gain

TEST REPORT

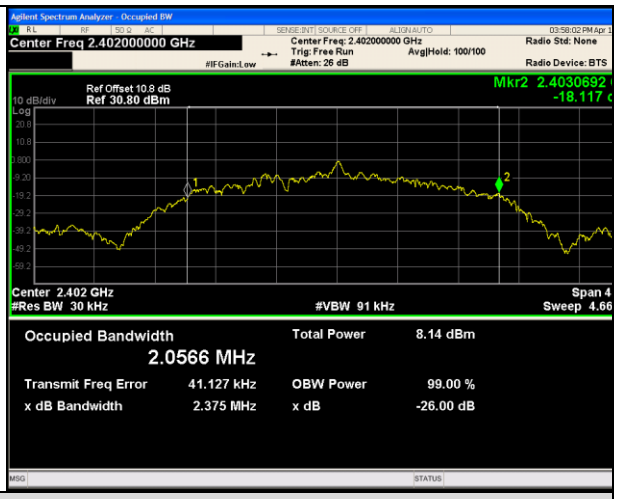
99% Bandwidth

Mode	Channel	99% BW (MHz)
LE	0	1.0343
LE	19	1.0433
LE	39	1.0434
2LE	0	2.0566
2LE	19	2.0706
2LE	39	2.0553

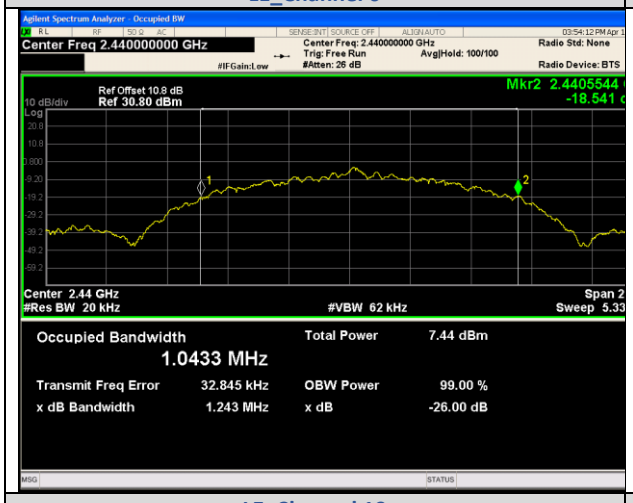
Test Graphs



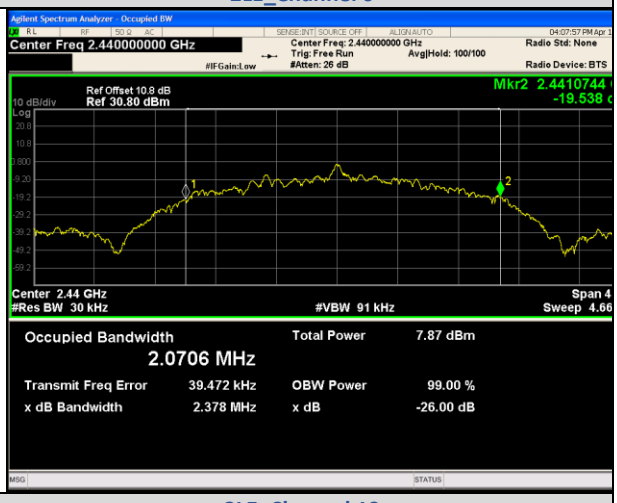
LE_Channel 0



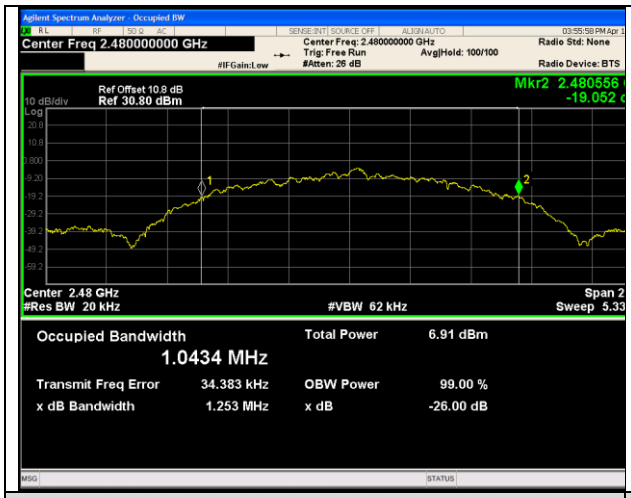
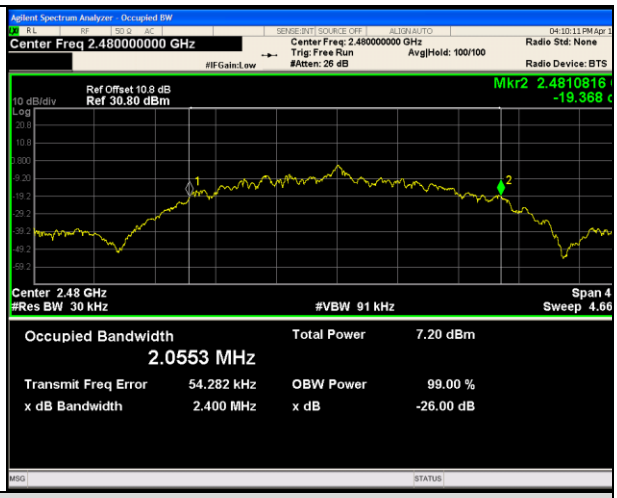
2LE_Channel 0



LE_Channel 19



2LE_Channel 19

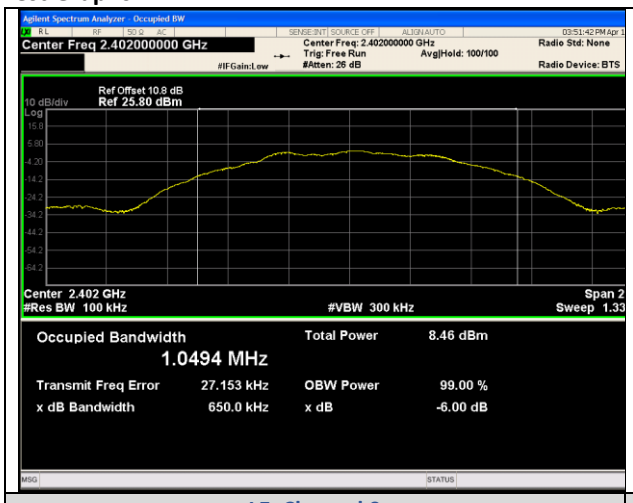
	
LE_Channel 39	2LE_Channel 39

TEST REPORT

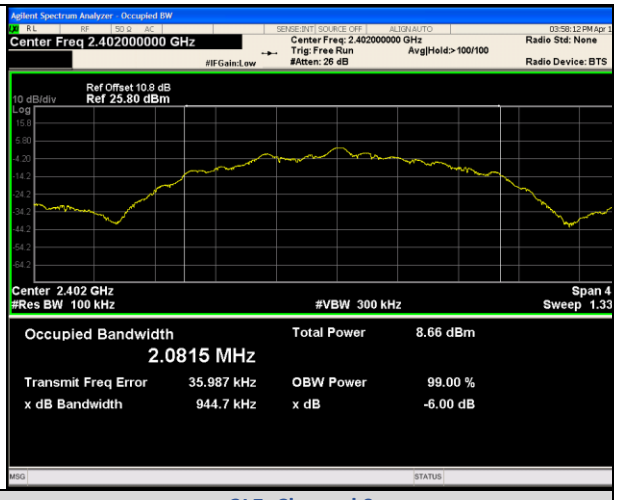
6dB Bandwidth

Mode	Channel	Center Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)	Result
LE	0	2402	0.6500	0.5	PASS
	19	2440	0.6426		PASS
	39	2480	0.6499		PASS
2LE	0	2402	0.9447		PASS
	19	2440	1.112		PASS
	39	2480	1.086		PASS

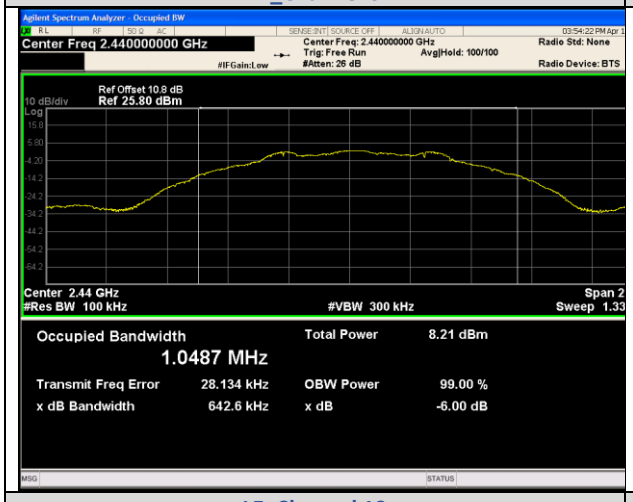
Test Graphs



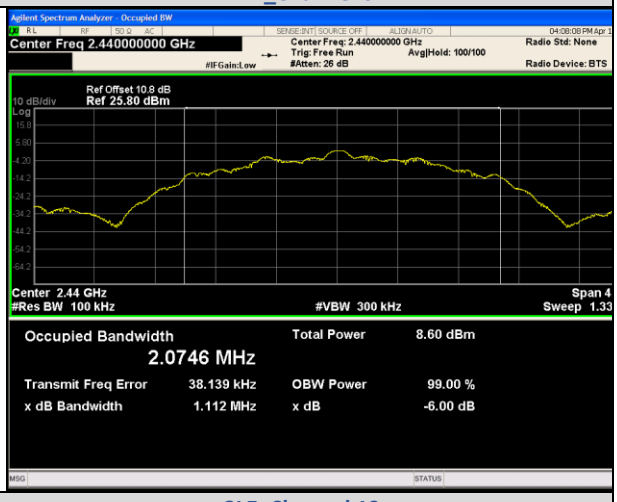
LE_Channel 0



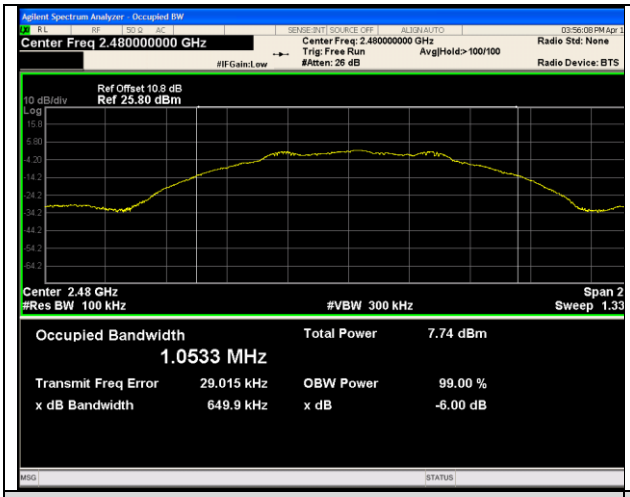
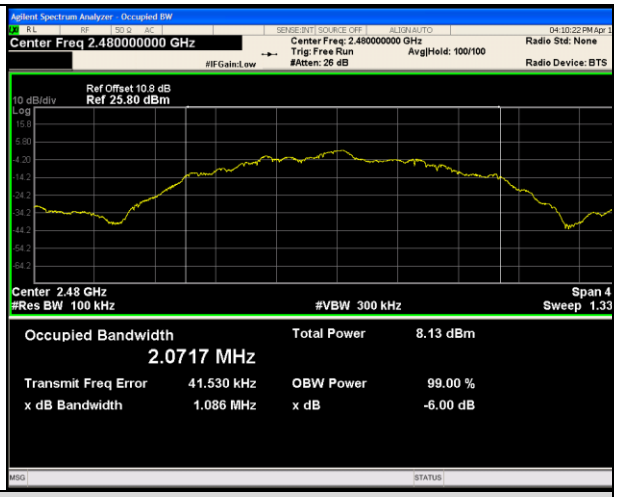
2LE_Channel 0



LE_Channel 19



2LE_Channel 19

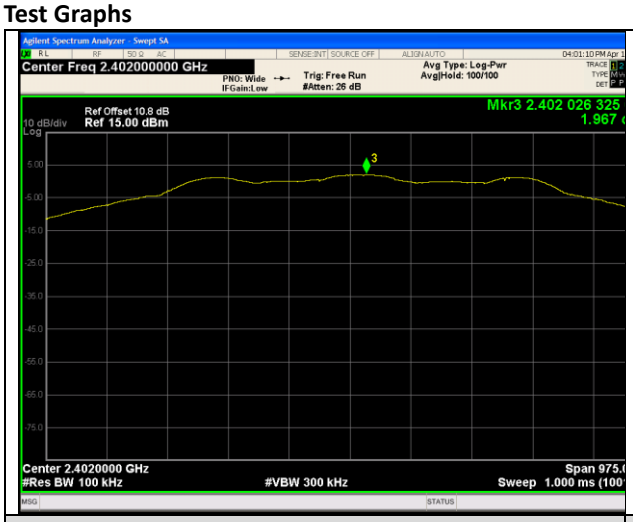
	
LE_Channel 39	2LE_Channel 39

TEST REPORT

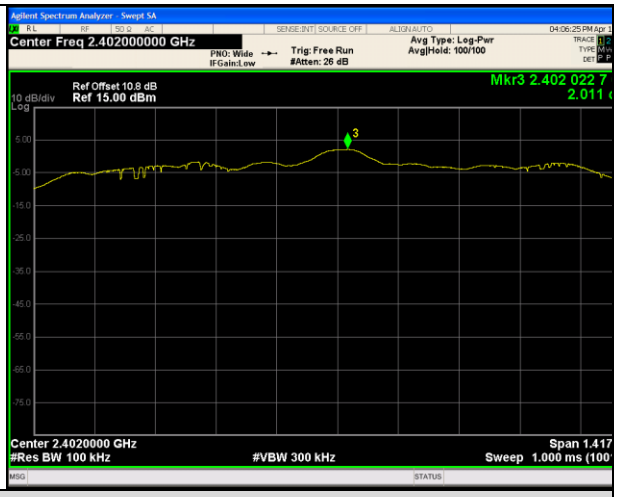
Conducted Out Of Band Emission

Mode	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
LE	0	2400.00	-53.057	-18.03	-35.027	PASS
		2398.69	-51.168	-18.03	-33.138	PASS
		24924.5	-52.188	-18.03	-34.157	PASS
	19	24822.1	-52.275	-18.43	-33.845	PASS
	39	2483.50	-53.261	-18.88	-34.381	PASS
		24463.8	-53.116	-18.88	-34.236	PASS
2LE	0	2400.00	-29.990	-17.99	-12.000	PASS
		24548.7	-52.678	-17.99	-34.688	PASS
	19	24848.3	-51.788	-18.36	-33.428	PASS
	39	2483.50	-53.516	-18.85	-34.666	PASS
		24994.4	-52.736	-18.85	-33.886	PASS

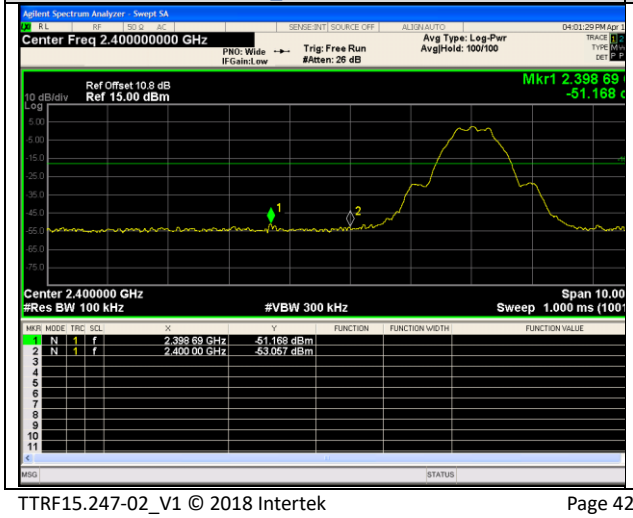
Test Graphs

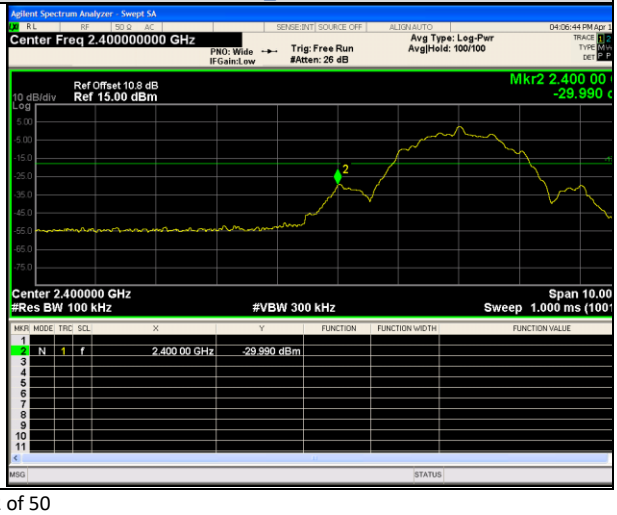


In-Band Reference Level
LE_Channel 0

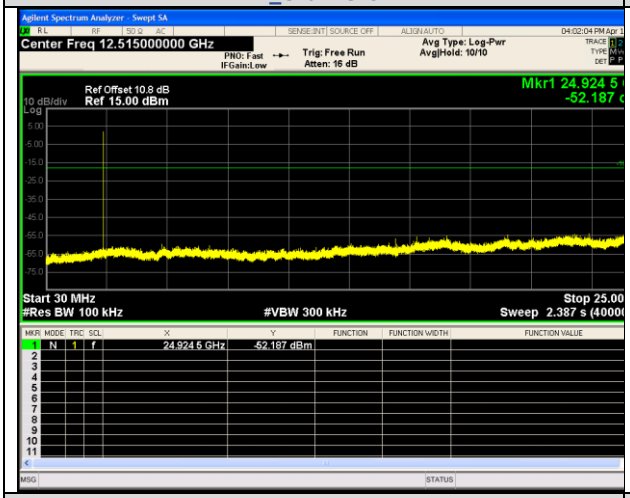
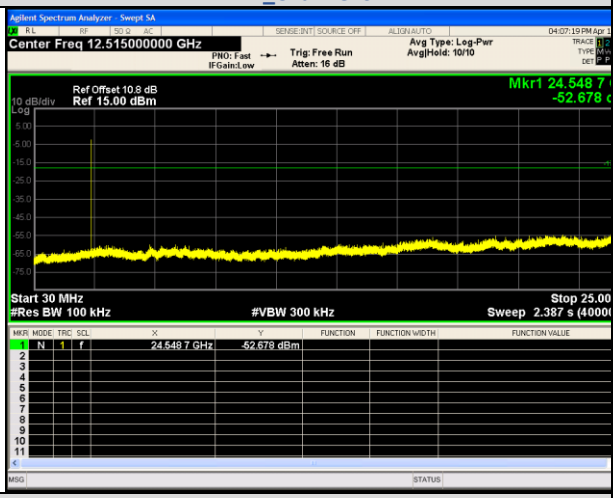
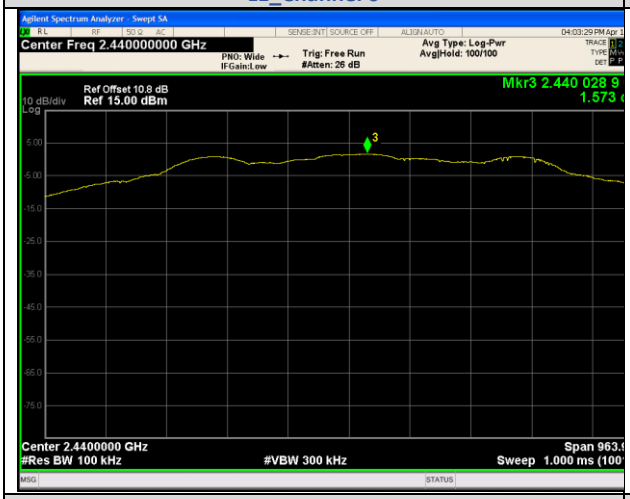
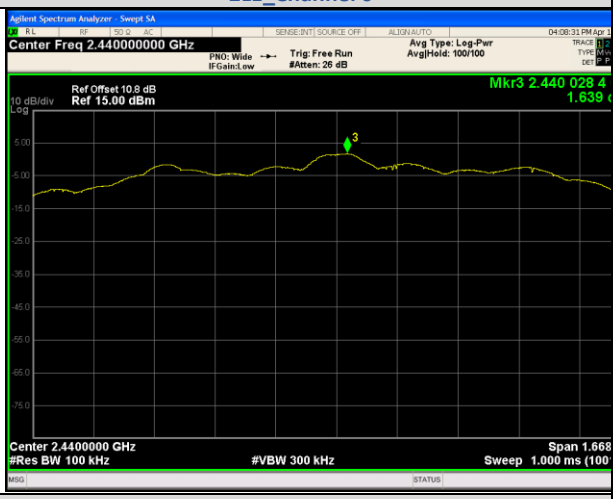
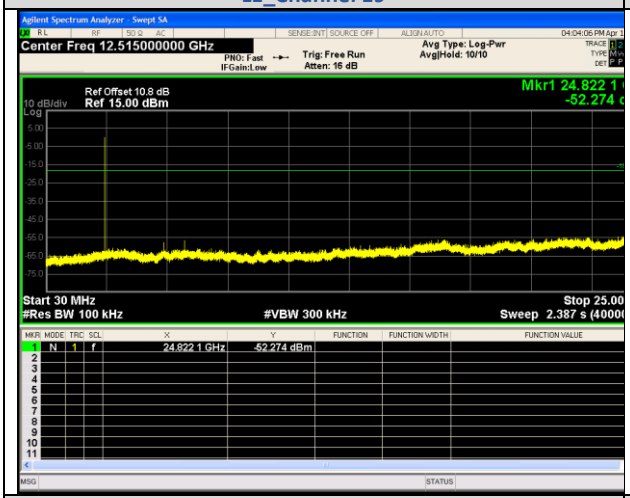
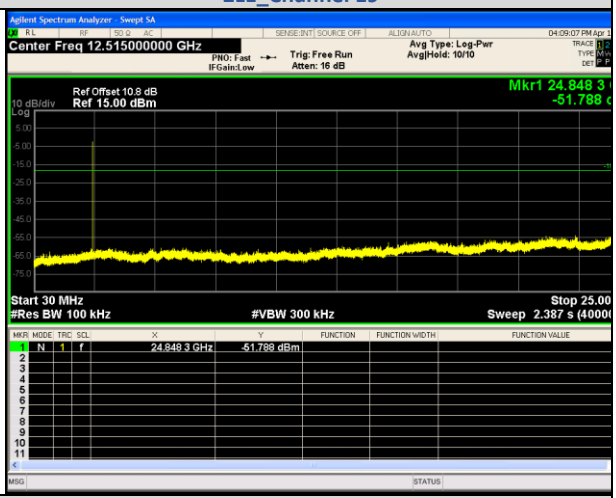


In-Band Reference Level
2LE_Channel 0

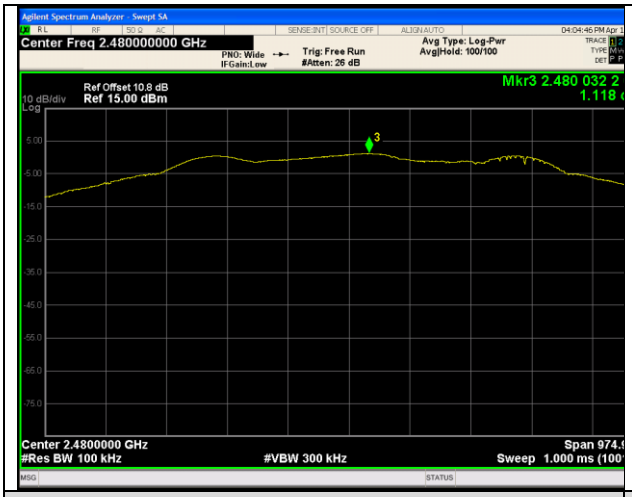




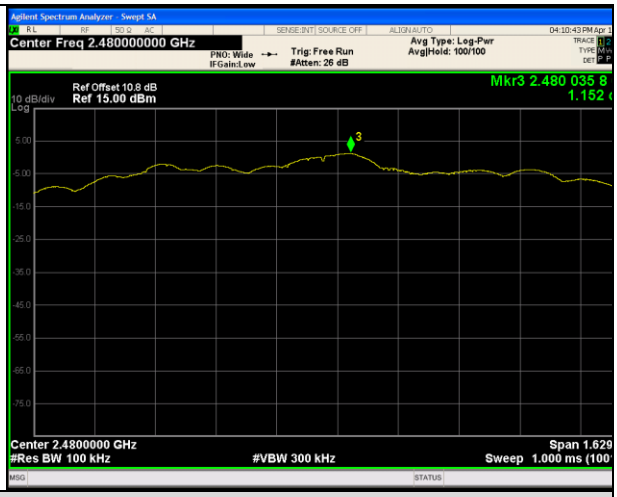
TEST REPORT

Out Of Band Emission LE_Channel 0	Out Of Band Emission 2LE_Channel 0
	
Spurious Emission LE_Channel 0	**Spurious Emission 2LE_Channel 0**
	
In-Band Reference Level LE_Channel 19	**In-Band Reference Level 2LE_Channel 19**
	
Spurious Emissions LE_Channel 19	**Spurious Emissions 2LE_Channel 19**

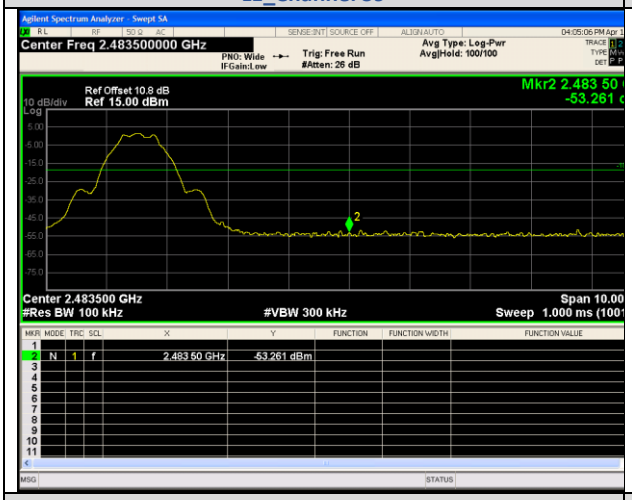
TEST REPORT



In-Band Reference Level
LE_Channel 39

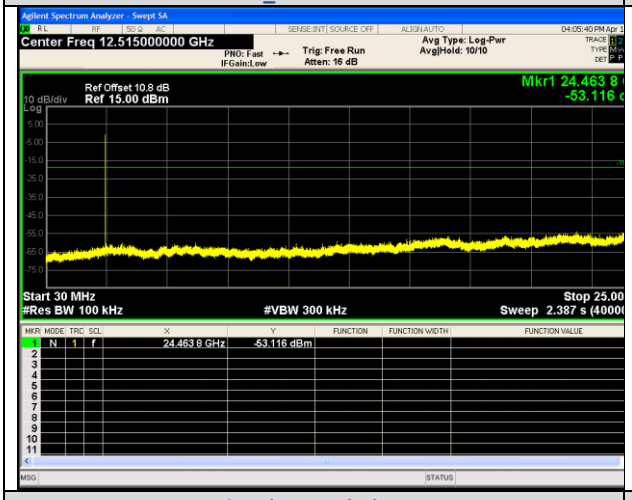


In-Band Reference Level
2LE_Channel 39

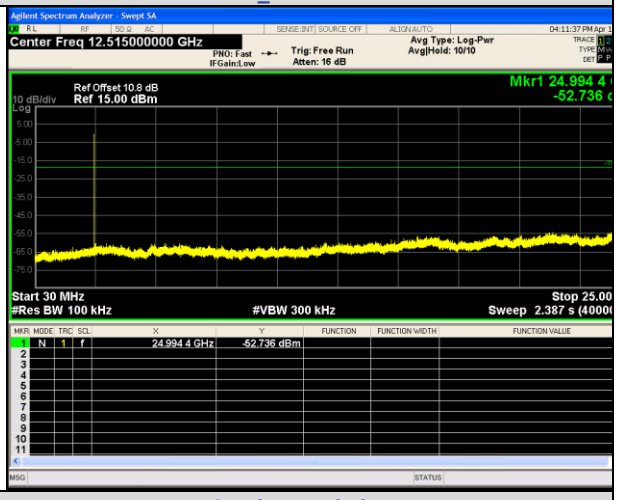


Out Of Band Emission
LE_Channel 39

Out Of Band Emission
2LE_Channel 39



Spurious Emission
LE_Channel 39



Spurious Emission
2LE_Channel 39

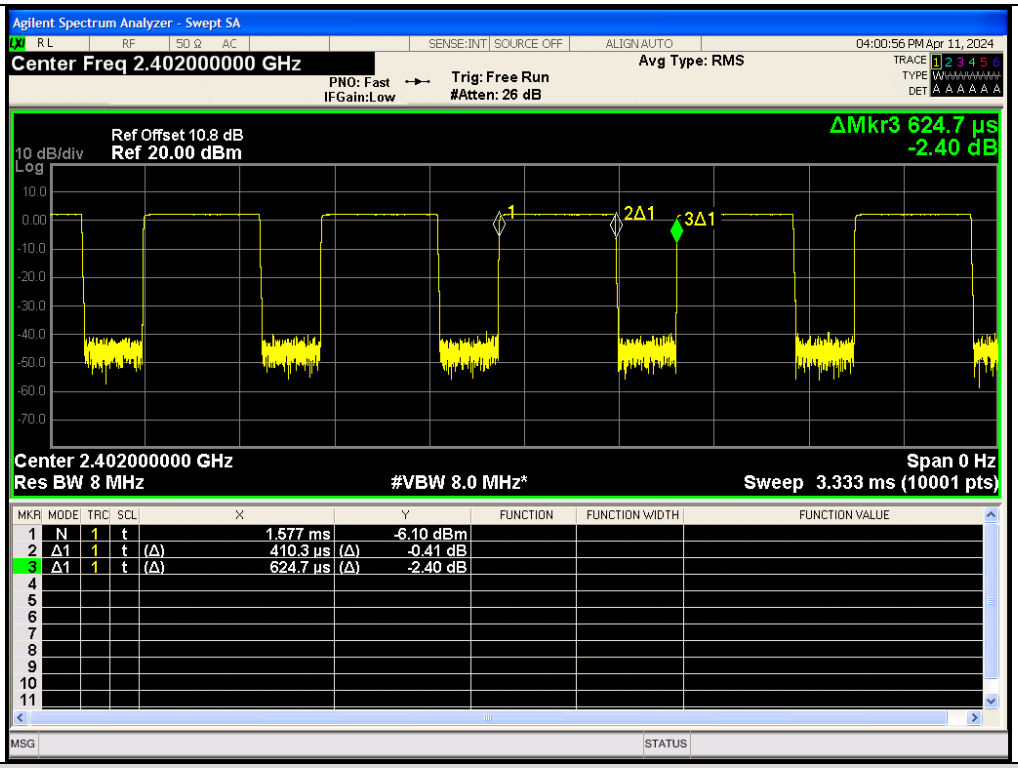
Total Quality. Assured.

TEST REPORT

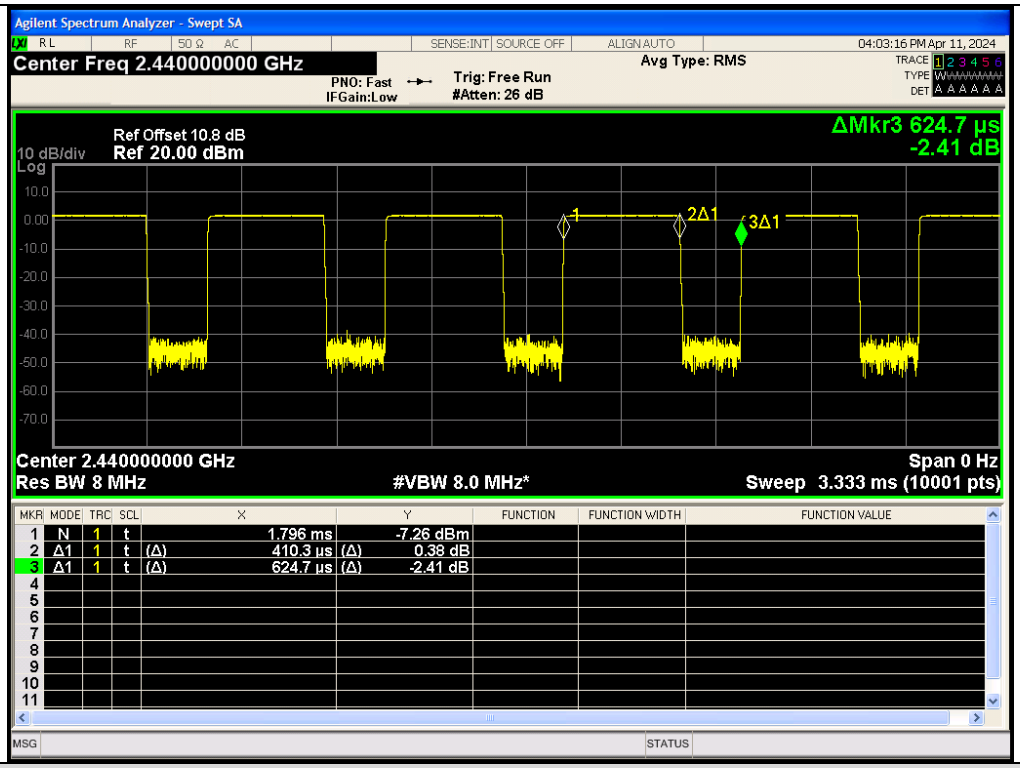
Duty Cycle

Mode	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)
LE	0	0.410	0.625	65.69	0.6569	1.825
	19	0.410	0.625	65.69	0.6569	1.825
	39	0.410	0.625	65.69	0.6569	1.825
2LE	0	0.230	0.625	36.77	0.3677	4.3451
	19	0.229	0.625	36.71	0.3671	4.3522
	39	0.229	0.625	36.71	0.3671	4.3522

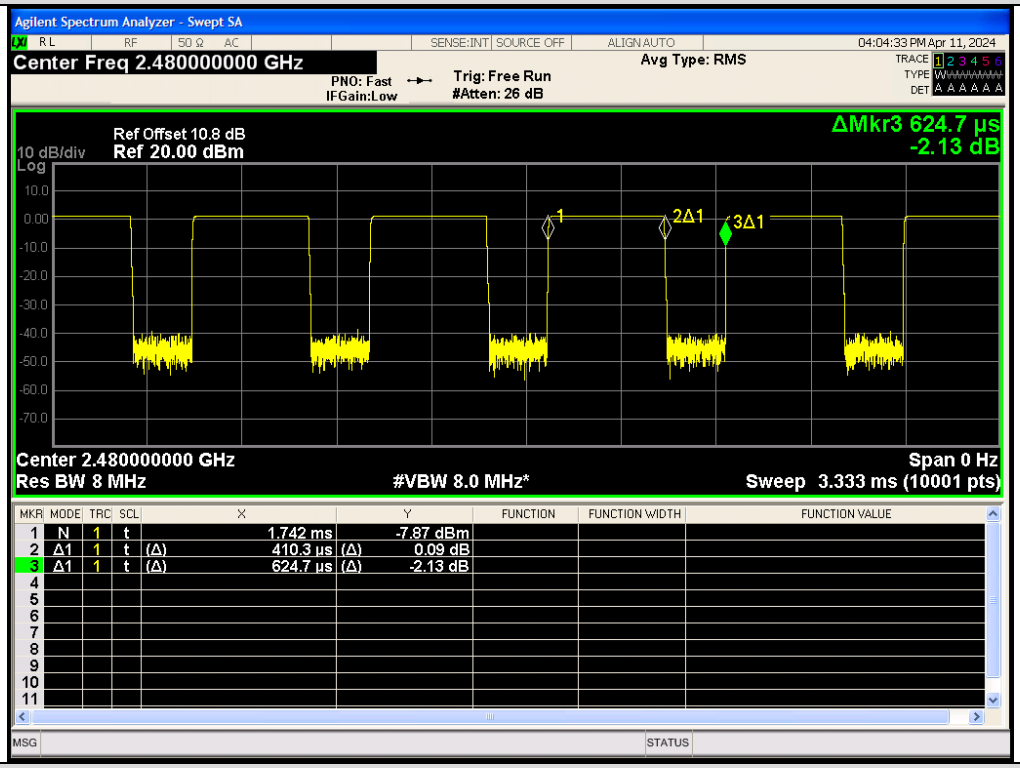
Test Graphs



LE

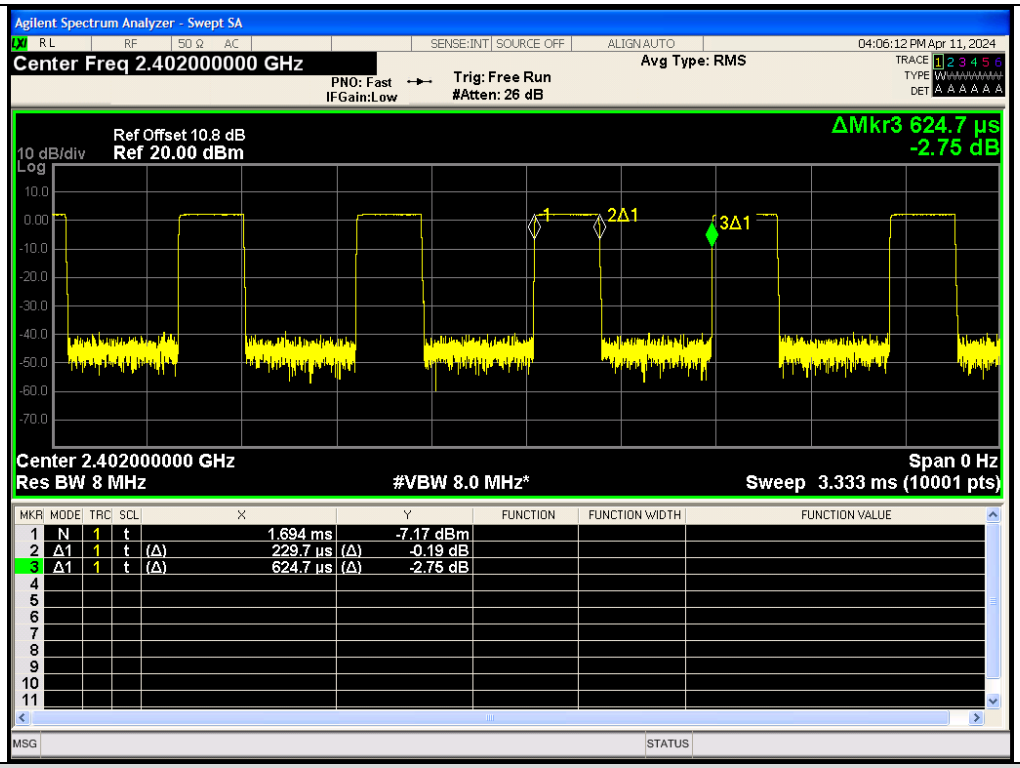

Agilent Spectrum Analyzer - Swept SA
Center Freq 2.440000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 26 dB
Avg Type: RMS
04:03:16 PM Apr 11, 2024
Ref Offset 10.8 dB
10 dB/div
Ref 20.00 dBm
ΔMkr3 624.7 µs
-2.41 dB
Center 2.440000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz*
Span 0 Hz
Sweep 3.333 ms (10001 pts)
1 N 1 t 1.796 ms -7.26 dBm
2 Δ1 1 t (Δ) 410.3 µs (Δ) 0.38 dB
3 Δ1 1 t (Δ) 624.7 µs (Δ) -2.41 dB

LE

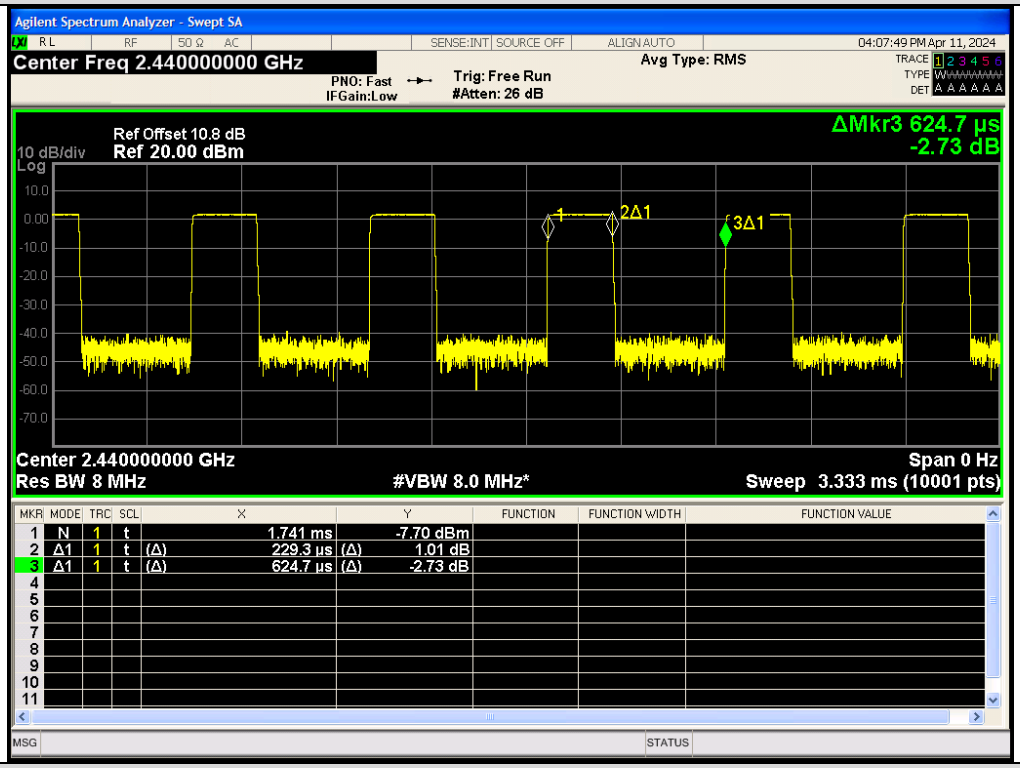

Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 26 dB
Avg Type: RMS
04:04:33 PM Apr 11, 2024
Ref Offset 10.8 dB
10 dB/div
Ref 20.00 dBm
ΔMkr3 624.7 µs
-2.13 dB
Center 2.480000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz*
Span 0 Hz
Sweep 3.333 ms (10001 pts)
1 N 1 t 1.742 ms -7.87 dBm
2 Δ1 1 t (Δ) 410.3 µs (Δ) 0.09 dB
3 Δ1 1 t (Δ) 624.7 µs (Δ) -2.13 dB

LE

TEST REPORT

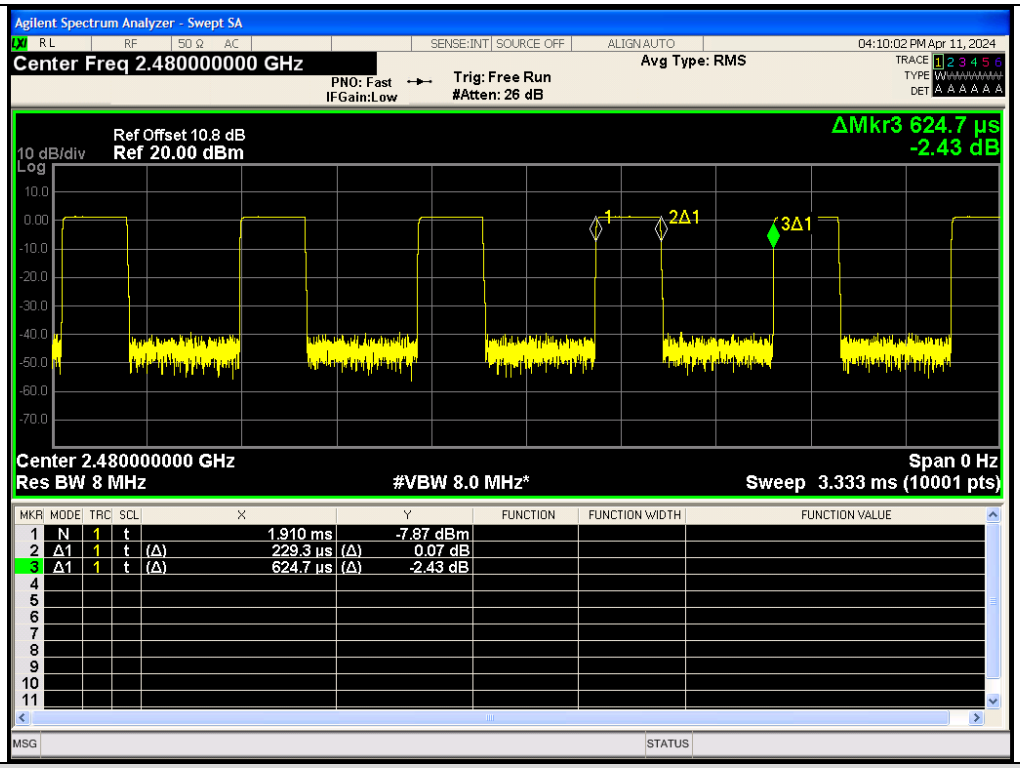


2LE



2LE

TEST REPORT



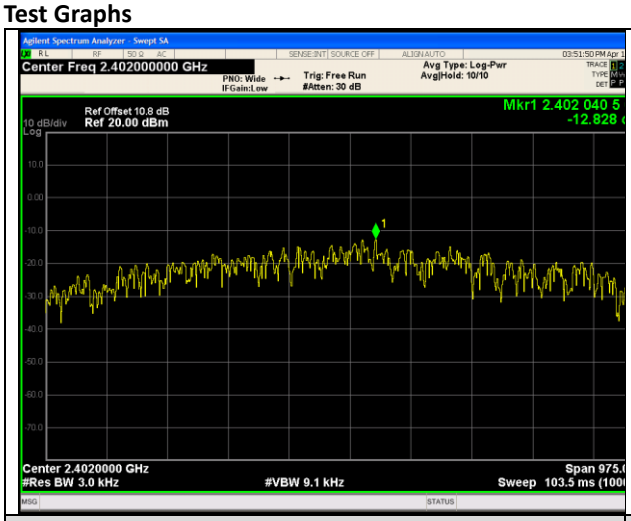
2LE

TEST REPORT

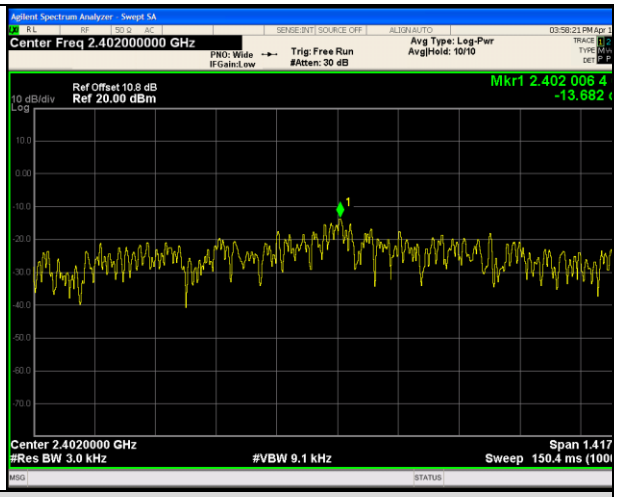
Power Spectral Density

Mode	Channel	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
LE	0	-12.828	8	PASS
LE	19	-13.360	8	PASS
LE	39	-14.510	8	PASS
2LE	0	-13.682	8	PASS
2LE	19	-14.221	8	PASS
2LE	39	-15.715	8	PASS

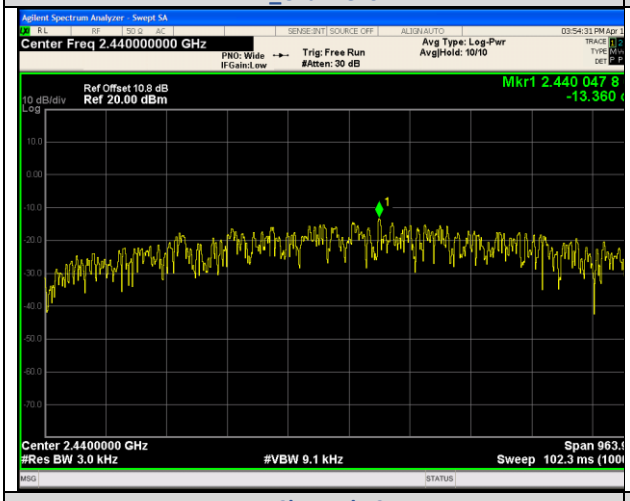
Test Graphs



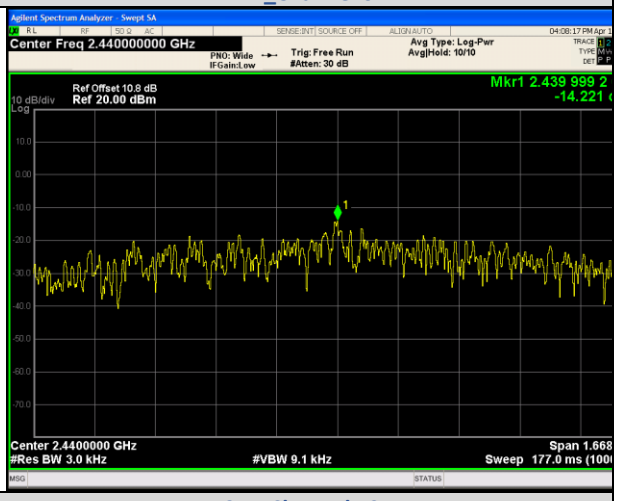
LE_Channel 0



2LE_Channel 0

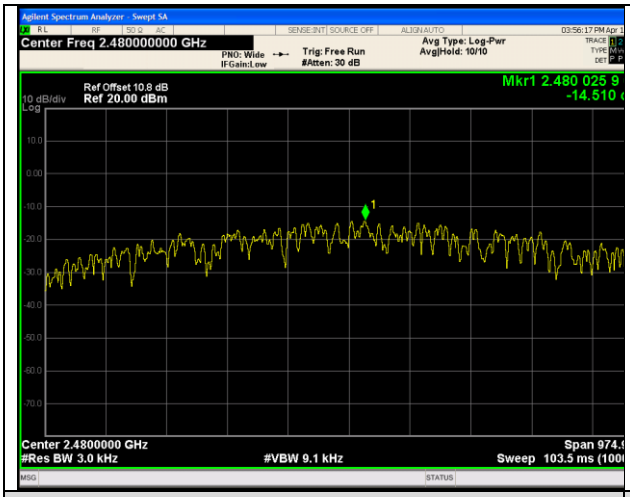
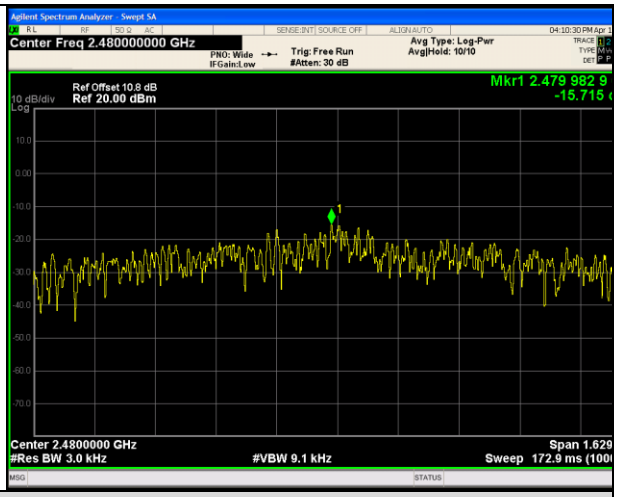


LE_Channel 19



2LE_Channel 19

TEST REPORT

	
LE_Channel 39	2LE_Channel 39

********** END **********