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Report No.: HKES170100022002
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TEST REPORT

Application No.: HKES1701000220IT
Applicant: PACIFIC SMART SYSTEM LIMITED
Address of Applicant: A5, 5/F, HK SPINNERS IND BLDG, PHASE 6, 481 CASTLE PEAK RD,
CHEUNG SHA WAN, KL, HONGKONG
Equipment Under Test (EUT):
EUT Name: Smart Terminal with LCD Display
Model No.: Smart Terminal
Brand Name: Pepxim
FCC ID: 2AK6U-P1IOT
Standards: 47 CFR Part 15, Subpart C 15.247
Date of Receipt: 2017-02-07
Date of Test: 2017-02-13 to 2017-02-28
Date of Issue: 2017-03-22

Test Result :	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.



Jack Zhang
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2017-03-22		Original

Authorized for issue by:			
Tested By			
	Hank Yan /Project Engineer	2017-03-22	Date
Checked By			
	Eric Fu /Reviewer	2017-03-22	Date



2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Conducted Disturbance 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
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.9.1.2	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Minimum 6dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.4	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 Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass



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4 General Information

4.1 Details of E.U.T.

Power supply:	Powered by PoE port
Type of Modulation:	IEEE for 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE for 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n (HT20 and HT40): OFDM (64QAM, 16QAM, QPSK, BPSK)
Operating Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz
Channel Number:	IEEE 802.11b/g, IEEE 802.11n(HT20): 13 Channels IEEE 802.11n(HT40): 7 Channels
Channels Step:	Channels with 5MHz step
Antenna Type:	Integral Antenna
Antenna Gain:	2dBi

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Network Cable	SGS	N/A	REF. No.SEA1100
PoE power supply	PHIHONG	POE36U-1AT-R	--

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conduction emission	3.45dB (9kHz to 150kHz)
		3.0dB (150kHz to 30MHz)
2	Radiated Power	3.64dB
3	Radiated emission	4.5dB (30MHz-1GHz)
		4.8dB (1GHz-6GHz)
4	Radio Frequency	7.25×10^{-8}
5	Duty cycle	0.37%
6	Occupied Bandwidth	3%
7	RF conducted power	0.75dB
8	RF power density	2.84dB
9	Conducted Spurious emissions	0.75dB
10	Temperature test	1 °C
11	Humidity test	3%
12	Supply voltages	1.5%
13	Time	3%



4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China.
518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

- **FCC – Registration No.: 556682**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



5 Equipment List

Conducted Disturbance at AC Power Line(150kHz-30MHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2016-05-13	2017-05-13
LISN	Rohde & Schwarz	ENV216	SEM007-01	2016-10-09	2017-10-09
LISN	ETS-LINDGREN	3816/2	SEM007-02	2016-04-25	2017-04-25
8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	EMC0120	2016-09-28	2017-09-28
4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	EMC0121	2016-09-28	2017-09-28
2 Line ISN	Fischer Custom	FCC-TLISN-T2-02	EMC0122	2016-09-28	2017-09-28

Conducted Peak Output Power					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
Signal Generator	Rohde & Schwarz	SML03	SEM006-02	2016-04-25	2017-04-25
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09

Minimum 6dB Bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
Signal Generator	Rohde & Schwarz	SML03	SEM006-02	2016-04-25	2017-04-25
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09

Power Spectrum Density					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
Signal Generator	Rohde & Schwarz	SML03	SEM006-02	2016-04-25	2017-04-25
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09



Conducted Spurious Emissions					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
Signal Generator	Rohde & Schwarz	SML03	SEM006-02	2016-04-25	2017-04-25
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09

Conducted Band Edges Measurement					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
Signal Generator	Rohde & Schwarz	SML03	SEM006-02	2016-04-25	2017-04-25
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09

General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2016-10-12	2017-10-12
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2016-10-12	2017-10-12
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2016-10-12	2017-10-12
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2016-05-18	2017-05-18

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.247

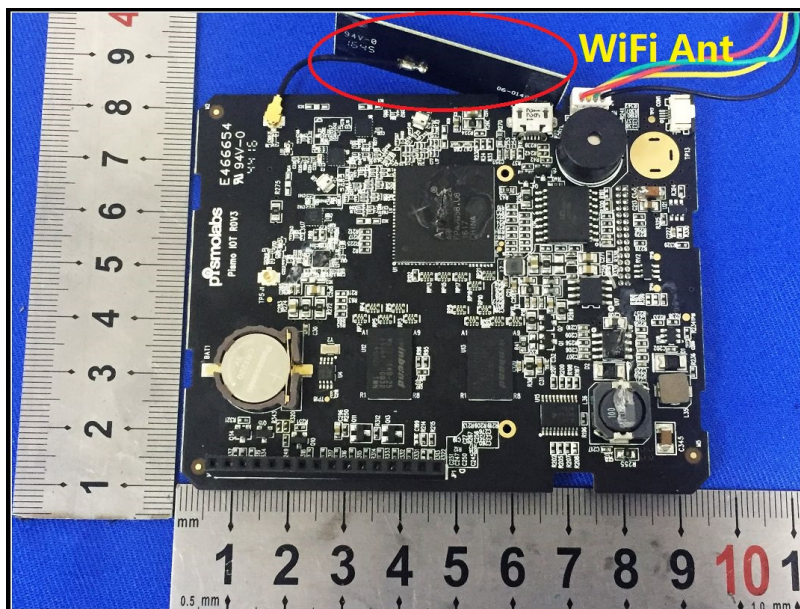
6.1.2 Conclusion

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 permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.



EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 2dBi.

7 Radio Spectrum Matter Test Results

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

Test Requirement 47 CFR Part 15, Subpart C 15.207
Test Method: ANSI C63.10 (2013) Section 6.2
Limit:

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.

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 24.0 °C Humidity: 54 % RH Atmospheric Pressure: 1015 mbar

Test mode Transmitting with all kind of modulations, data rates at lowest, middle and highest channel.

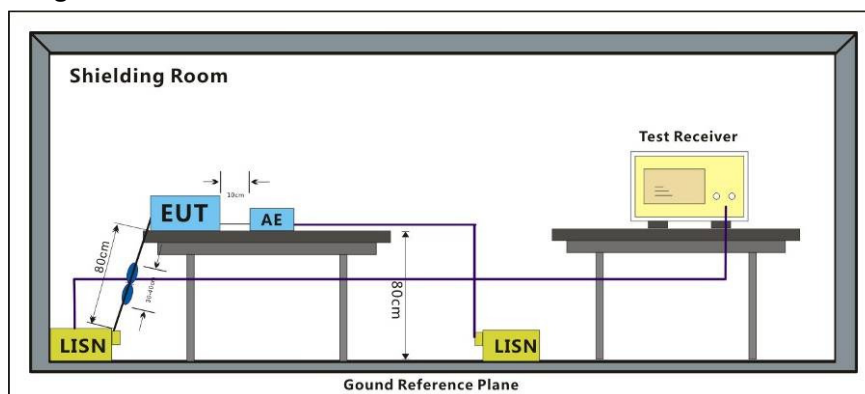
Transmitting mode.

The worst case for final test: Through Pre-scan, find the 6.5Mbps of rate of 802.11n (HT 20) at lowest channel is the worst case.

Transmitting mode.

Only the worst case is recorded in the report.

7.1.2 Test Setup Diagram

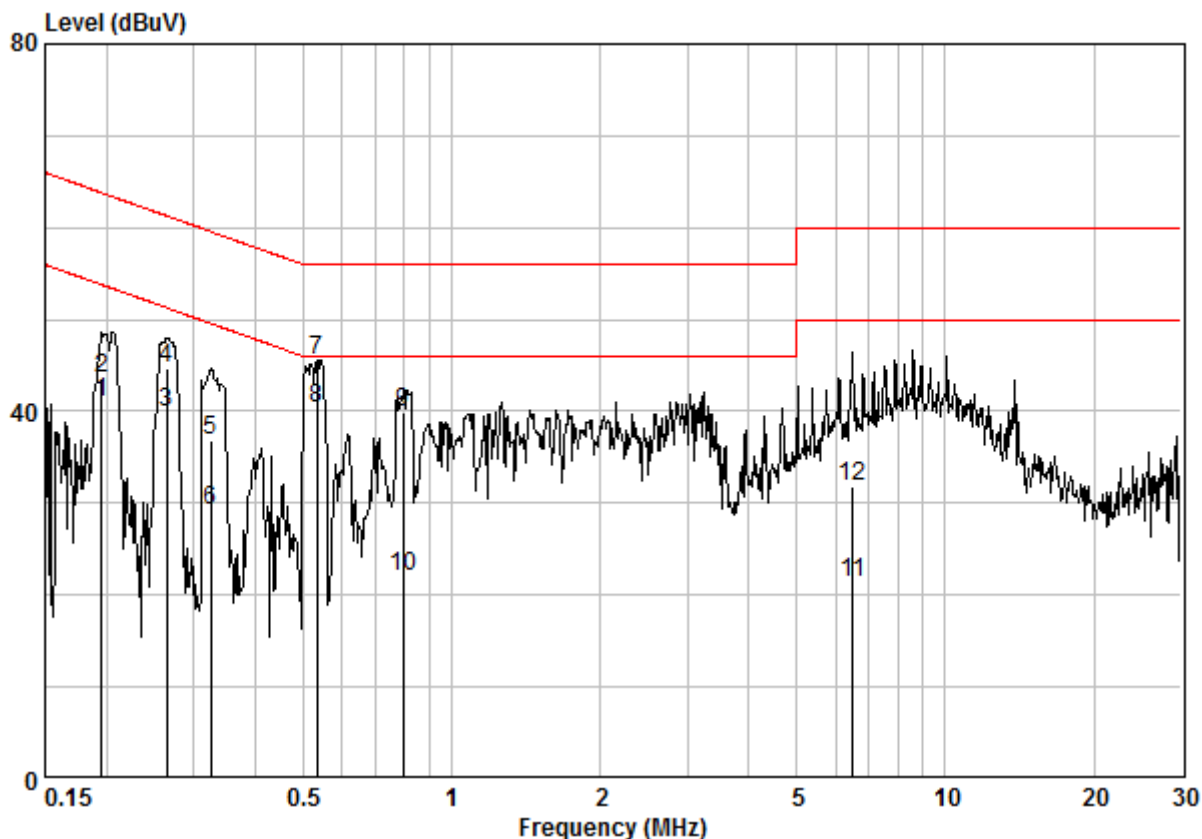




7.1.3 Measurement Procedure and Data

- 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 $50\Omega/50\mu\text{H} + 50\Omega$ 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.

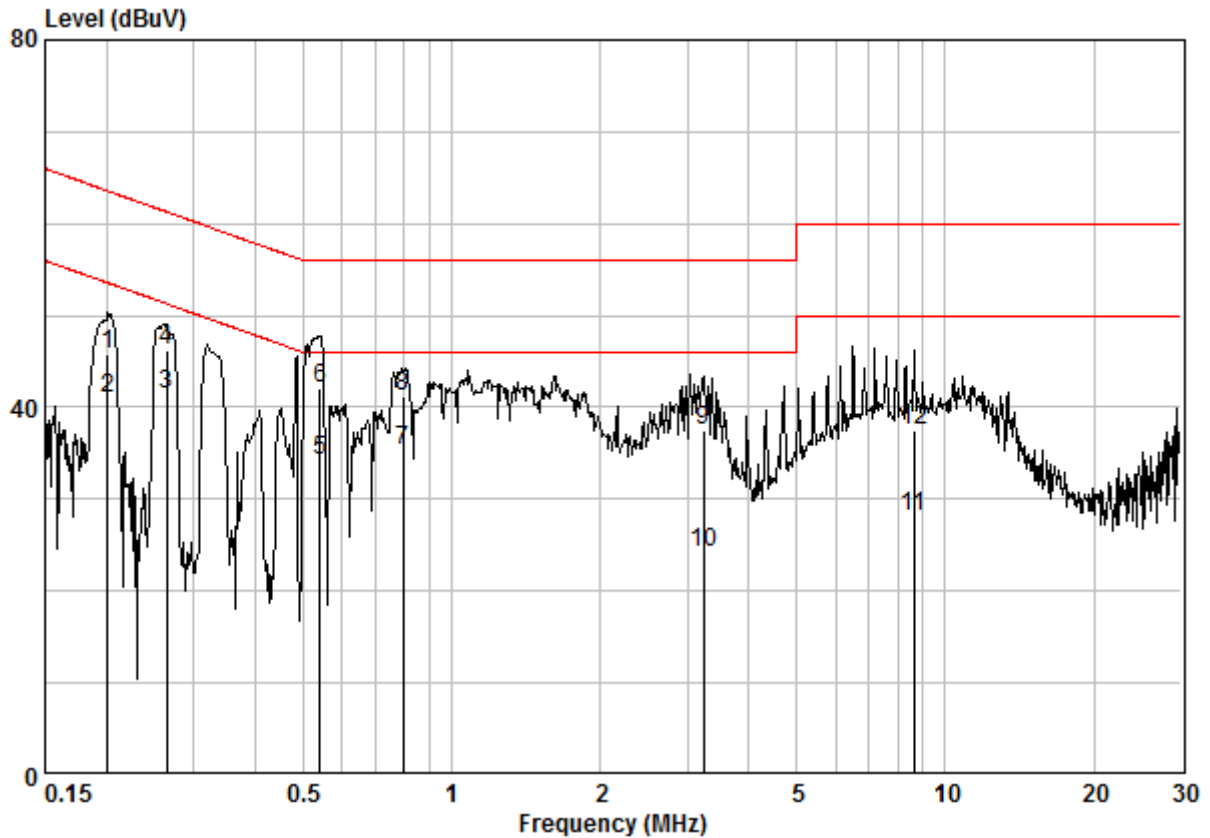
Mode:TX mode; Line:Live Line



Site : Shielding Room
Condition : CE LINE
Job.No : 00220IT
Test Mode : TX mode

	Freq	Cable Loss	LISN Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.19550	0.02	9.64	31.41	41.07	53.80	-12.73	AVERAGE
2	0.19550	0.02	9.64	33.95	43.61	63.80	-20.19	QP
3	0.26424	0.02	9.64	30.18	39.84	51.30	-11.45	AVERAGE
4	0.26424	0.02	9.64	35.10	44.76	61.30	-16.54	QP
5	0.32512	0.02	9.64	27.17	36.83	59.57	-22.75	QP
6	0.32512	0.02	9.64	19.46	29.12	49.57	-20.46	AVERAGE
7	0.53254	0.02	9.64	35.98	45.64	56.00	-10.36	QP
8 @	0.53254	0.02	9.64	30.63	40.30	46.00	-5.70	AVERAGE
9	0.79605	0.03	9.65	30.19	39.87	56.00	-16.13	QP
10	0.79605	0.03	9.65	12.32	21.99	46.00	-24.01	AVERAGE
11	6.488	0.06	9.78	11.43	21.27	50.00	-28.73	AVERAGE
12	6.488	0.06	9.78	22.06	31.90	60.00	-28.10	QP

Mode:TX mode; Line:Neutral Line



Site : Shielding Room
Condition : CE NEUTRAL
Job.No : 00220IT
Test Mode : TX mode

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.20075	0.02	9.63	36.06	45.71	63.58	-17.87	QP
2	0.20075	0.02	9.63	31.37	41.02	53.58	-12.56	AVERAGE
3	0.26424	0.02	9.63	31.69	41.34	51.30	-9.96	AVERAGE
4	0.26424	0.02	9.63	36.52	46.17	61.30	-15.13	QP
5	0.54068	0.02	9.63	24.48	34.13	56.00	-21.87	QP
6 @	0.54068	0.02	9.63	32.37	42.02	46.00	-3.98	AVERAGE
7	0.79799	0.03	9.64	25.55	35.22	46.00	-10.78	AVERAGE
8	0.79799	0.03	9.64	31.52	41.18	56.00	-14.82	QP
9	3.242	0.02	9.68	27.83	37.53	56.00	-18.47	QP
10	3.242	0.02	9.68	14.43	24.13	46.00	-21.87	AVERAGE
11	8.637	0.11	9.81	18.20	28.13	50.00	-21.87	AVERAGE
12	8.637	0.11	9.81	27.54	37.46	60.00	-22.54	QP



7.2 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)
Test Method: ANSI C63.10 (2013) Section 11.9.1.2
Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥ 50 hopping channels
	0.25 for $25 \leq$ 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

7.2.1 E.U.T. Operation

Operating Environment:

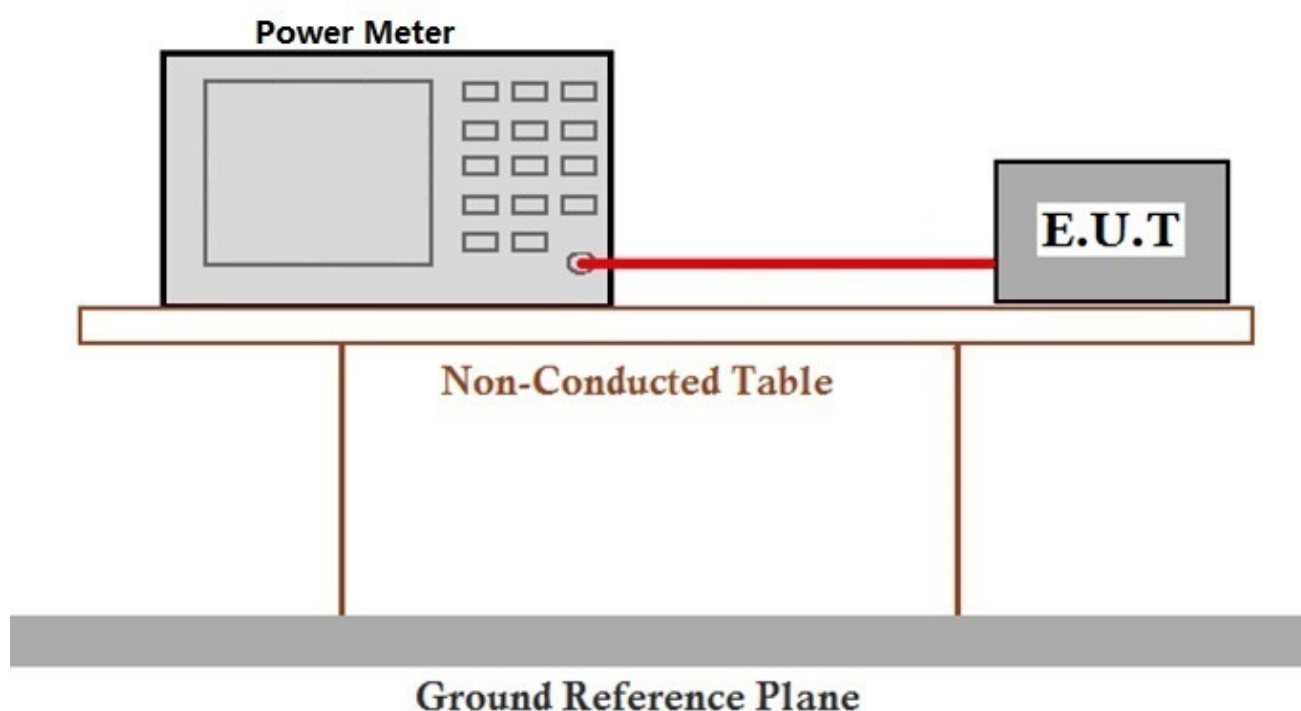
Temperature: 24.0 °C Humidity: 55 % RH Atmospheric Pressure: 1015 mbar

Test mode	Transmitting with all kind of modulations, data rates
-----------	---

The worst case Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b;

6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40)

7.2.2 Test Setup Diagram



7.2.3 Measurement Data

The detailed test data see: Appendix 15.247

7.3 Minimum 6dB Bandwidth

Test Requirement	47 CFR Part 15, Subpart C 15.247a(2)
Test Method:	ANSI C63.10 (2013) Section 11.8.1
Limit:	≥500 kHz

7.3.1 E.U.T. Operation

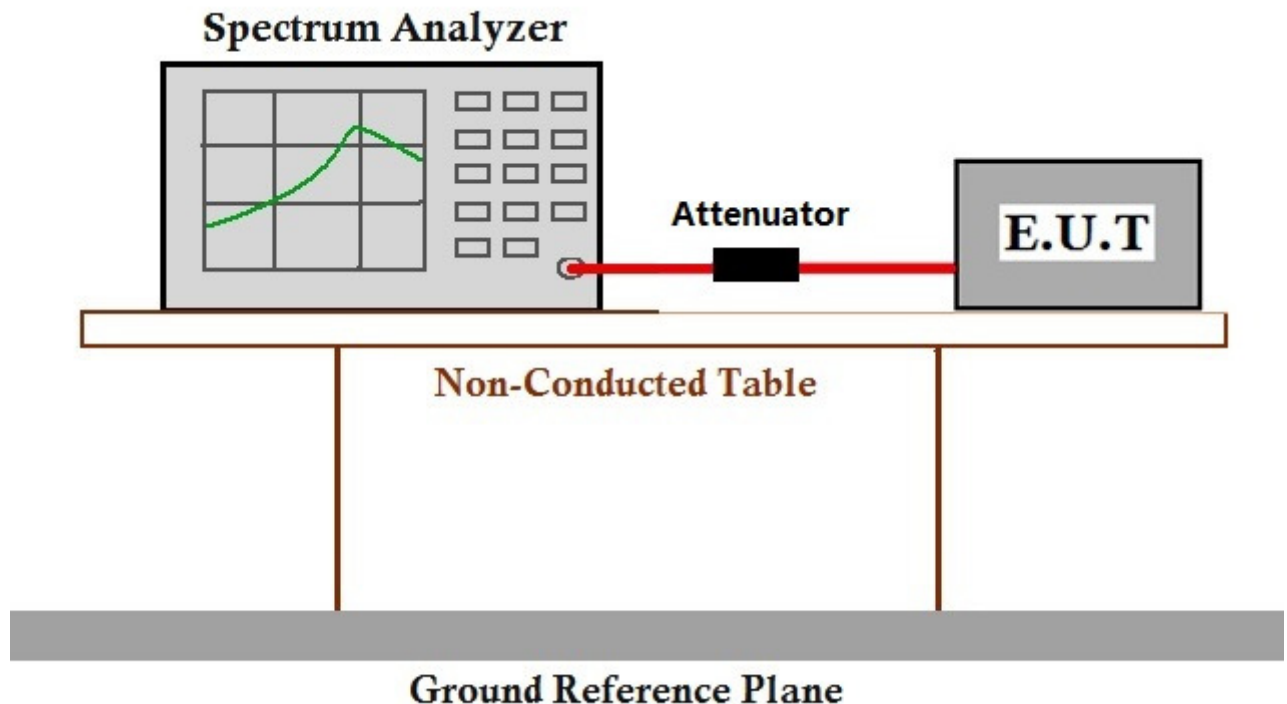
Operating Environment:

Temperature: 24.0 °C Humidity: 55 % RH Atmospheric Pressure: 1015 mbar

Test mode Transmitting with all kind of modulations, data rates

The worst case for final test: Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b;
 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40)

7.3.2 Test Setup Diagram



7.3.3 Measurement Data

The detailed test data see: Appendix 15.247

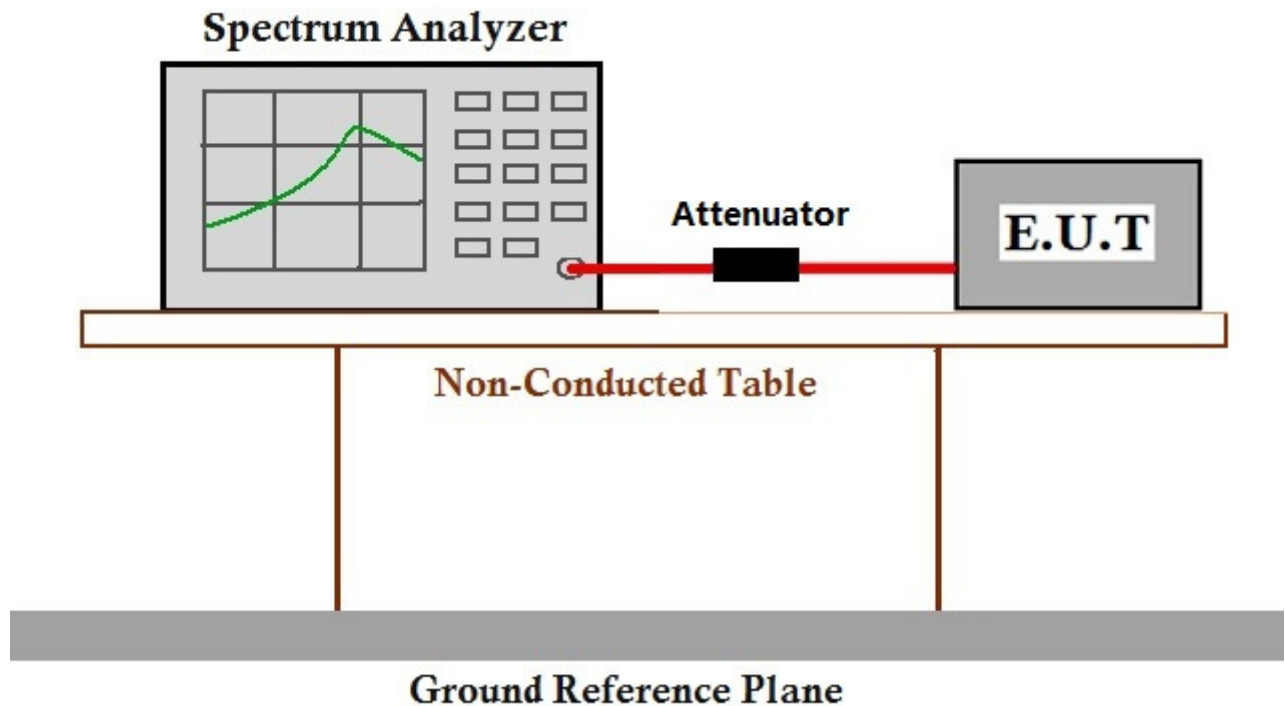
7.4 Power Spectrum Density

Test Requirement	47 CFR Part 15, Subpart C 15.247(e)
Test Method:	ANSI C63.10 (2013) Section 11.10.2
Limit:	≤8dBm in any 3 kHz band during any time interval of continuous transmission

7.4.1 E.U.T. Operation

Operating Environment:					
Temperature:	24.0 °C	Humidity:	55 % RH	Atmospheric Pressure:	1015 mbar
Test mode	Transmitting with all kind of modulations, data rates				
The worst case for final test:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40)				

7.4.2 Test Setup Diagram



7.4.3 Measurement Data

The detailed test data see: Appendix 15.247

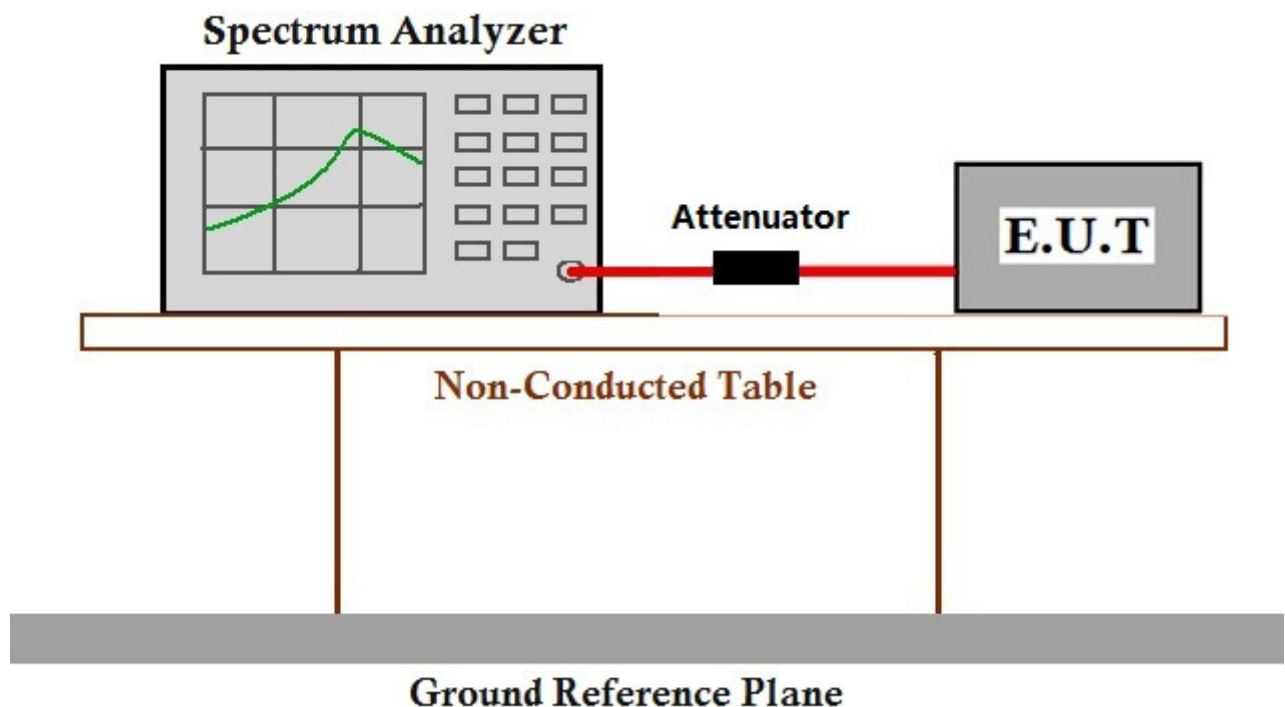
7.5 Conducted Spurious Emissions

Test Requirement	47 CFR Part 15, Subpart C 15.247(d)
Test Method:	ANSI C63.10 (2013) Section 11.11
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, based on either an RF conducted or a radiated measurement.

7.5.1 E.U.T. Operation

Operating Environment:					
Temperature:	24.0 °C	Humidity:	55 % RH	Atmospheric Pressure:	1015 mbar
Test mode	Transmitting with all kind of modulations, data rates				
The worst case for final test:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40)				

7.5.2 Test Setup Diagram



7.5.3 Measurement Data

The detailed test data see: Appendix 15.247



7.6 Radiated Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.247(d)

Test Method: ANSI C63.10 (2013) Section 6.10.4

Measurement Distance: 3m

Limit:

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.

7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar

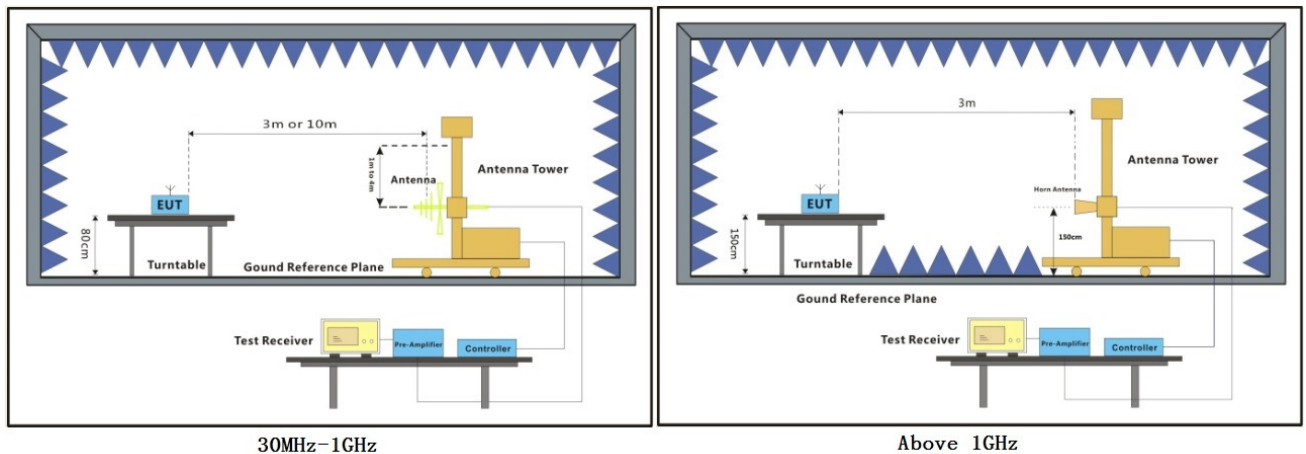
Test mode Transmitting with all kind of modulations, data rates.

The worst case for final test: Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b;
 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40)

For below 1GHz, through Pre-scan, find the 1Mbps of rate of 802.11b at lowest channel is the worst case.

Only the worst case is recorded in the report.

7.6.2 Test Setup Diagram



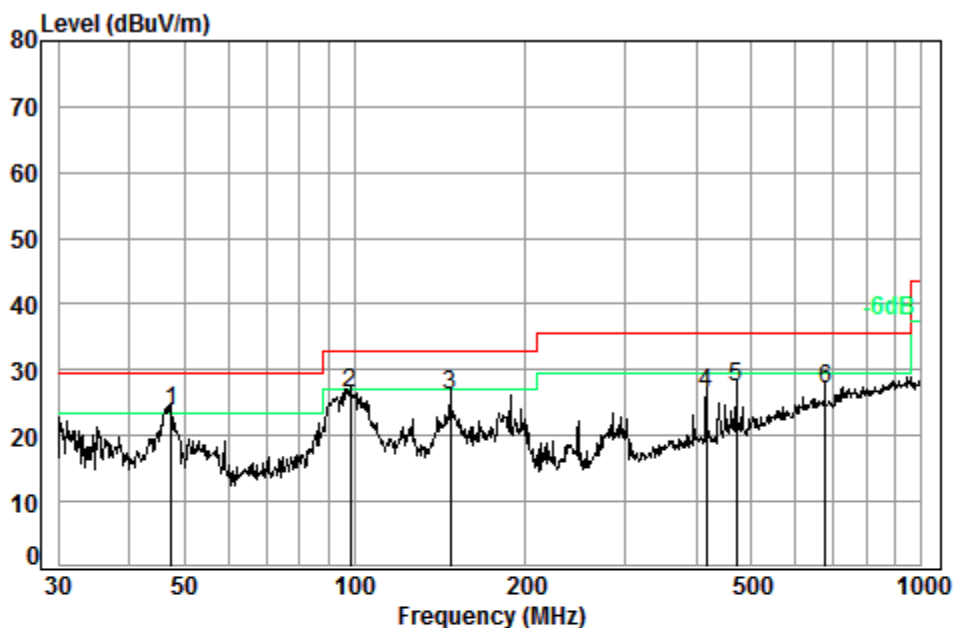


7.6.3 Measurement Data

- 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.

7.6.4 Radiated emission below 1GHz

30MHz~1GHz (QP)		
Test mode:	Transmitting	Vertical



Condition: 10m VERTICAL

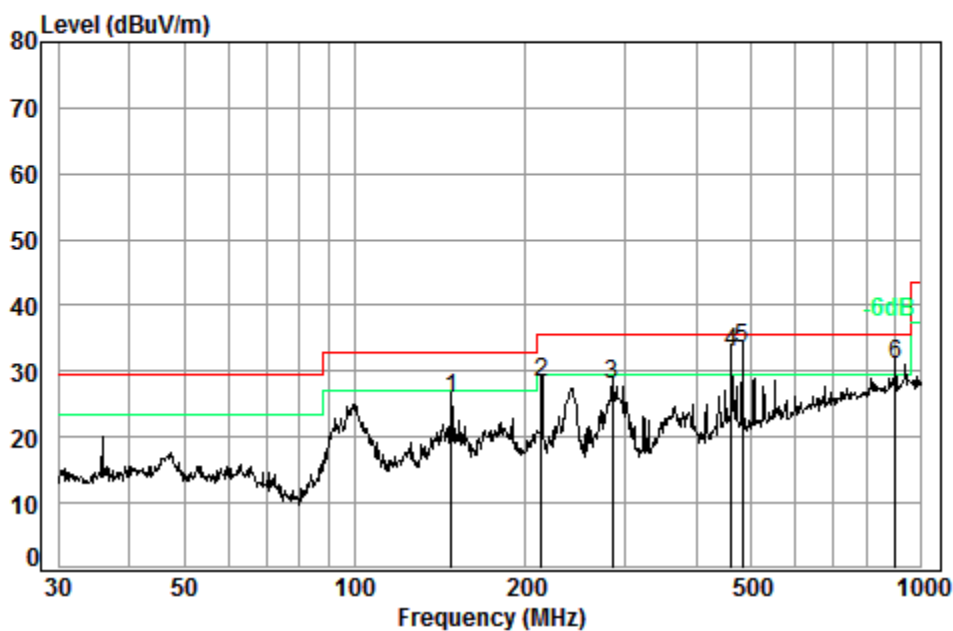
Job No. : 00220IT

Test Mode: TX mode

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	47.49	6.85	12.84	33.00	37.11	23.80	29.50	-5.70
2	98.49	7.20	9.29	32.80	42.72	26.41	33.00	-6.59
3	147.40	7.44	13.25	32.74	38.14	26.09	33.00	-6.91
4	417.64	8.35	15.35	32.60	35.26	26.36	35.60	-9.24
5	470.52	8.48	16.40	32.60	35.11	27.39	35.60	-8.21
6	675.21	9.09	19.84	32.60	30.73	27.06	35.60	-8.54



Test mode:	Transmitting	Horizontal
------------	--------------	------------



Condition: 10m HORIZONTAL

Job No. : 00220IT

Test Mode: TX mode

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	147.92	7.44	13.28	32.74	37.85	25.83	33.00	-7.17
2	213.76	7.67	9.77	32.68	43.54	28.30	35.60	-7.30
3	284.98	8.01	12.29	32.61	40.39	28.08	35.60	-7.52
4	462.35	8.46	16.32	32.60	40.79	32.97	35.60	-2.63
5 pp	483.91	8.52	16.57	32.60	40.85	33.34	35.60	-2.26
6	900.15	9.50	22.22	32.50	31.77	30.99	35.60	-4.61



For frequencies below 1GHz, the test was performed at a 10m test site. According to below formulate and the test data at 10m test distance,

$$L_3 / L_{10} = D_{10} / D_3$$

Note:

L_3 : Level @ 3m distance. Unit: uV/m;

L_{10} : Level @ 10m distance. Unit: uV/m;

D_3 : 3m distance. Unit: m

D_{10} : 10m distance. Unit: m

The level at 3m test distance is below:

Frequency (MHz)	Level @ 10m (dBuV/m)	Level @ 10m (uV/m)	Level @ 3m (uV/m)	Level @ 3m (dBuV/m)	Limit @ 3m (dBuV/m)	Margin (dB)	Ant. Polarization
47.49	23.80	15.49	51.63	34.26	40.00	-5.74	V
98.49	26.41	20.92	69.72	36.87	43.50	-6.63	V
147.40	26.09	20.16	67.20	36.55	43.50	-6.95	V
417.64	26.36	20.80	69.32	36.82	46.00	-9.18	V
470.52	27.39	23.42	78.05	37.85	46.00	-8.15	V
675.21	27.06	22.54	75.14	37.52	46.00	-8.48	V
147.92	25.83	19.57	65.22	36.29	43.50	-7.21	H
213.76	28.30	26.00	86.67	38.76	43.50	-4.74	H
284.98	28.08	25.35	84.50	38.54	46.00	-7.46	H
462.35	32.97	44.51	148.38	43.43	46.00	-2.57	H
483.91	33.34	46.45	154.84	43.80	46.00	-2.20	H
900.15	30.99	35.44	118.14	41.45	46.00	-4.55	H



7.6.5 Transmitter emission above 1GHz

Polarization:Horizontal; Modulation Type:802.11b; bandwidth:20MHz; Channel:Low

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3831.060	33.15	7.75	37.98	44.87	47.79	74.00	-26.21
4824.000	34.19	8.90	38.41	45.08	49.76	74.00	-24.24
6095.816	34.78	10.44	38.20	44.89	51.91	74.00	-22.09
7236.000	36.40	10.69	37.09	43.85	53.85	74.00	-20.15
9648.000	37.53	12.52	35.08	38.71	53.68	74.00	-20.32
12173.120	38.71	14.42	36.02	36.08	53.19	74.00	-20.81

Polarization:Vertical; Modulation Type:802.11b; bandwidth:20MHz; Channel:Low

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3972.178	33.53	7.80	38.00	45.69	49.02	74.00	-24.98
4824.000	34.19	8.90	38.41	47.06	51.74	74.00	-22.26
6122.333	34.80	10.40	38.18	44.82	51.84	74.00	-22.16
7236.000	36.40	10.69	37.09	43.76	53.76	74.00	-20.24
9648.000	37.53	12.52	35.08	38.89	53.86	74.00	-20.14
12458.220	38.88	14.18	36.70	36.69	53.05	74.00	-20.95

Polarization:Horizontal; Modulation Type:802.11b; bandwidth:20MHz; Channel:middle

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3842.163	33.18	7.76	37.98	45.01	47.97	74.00	-26.03
4874.000	34.28	8.97	38.44	45.97	50.78	74.00	-23.22
6016.949	34.71	10.54	38.28	45.30	52.27	74.00	-21.73
7311.000	36.37	10.72	37.02	43.14	53.21	74.00	-20.79
9748.000	37.55	12.58	35.03	38.10	53.20	74.00	-20.80
12676.420	38.86	14.65	37.22	36.80	53.09	74.00	-20.91

Polarization:Vertical; Modulation Type:802.11b; bandwidth:20MHz; Channel:middle

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo s (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3786.970	33.03	7.74	37.98	45.48	48.27	74.00	-25.73
4874.000	34.28	8.97	38.44	47.32	52.13	74.00	-21.87
6131.199	34.81	10.39	38.17	45.43	52.46	74.00	-21.54
7311.000	36.37	10.72	37.02	42.98	53.05	74.00	-20.95
9748.000	37.55	12.58	35.03	38.36	53.46	74.00	-20.54
11740.650	38.34	14.28	35.55	36.01	53.08	74.00	-20.92



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Polarization:Horizontal; Modulation Type:802.11b; bandwidth:20MHz; Channel:High

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3842.163	33.18	7.76	37.98	45.35	48.31	74.00	-25.69
4924.000	34.37	9.04	38.46	45.92	50.87	74.00	-23.13
6008.249	34.71	10.55	38.29	45.23	52.20	74.00	-21.80
7386.000	36.34	10.75	36.95	42.87	53.01	74.00	-20.99
9848.000	37.57	12.63	34.98	38.58	53.80	74.00	-20.20
12155.510	38.69	14.43	35.97	36.02	53.17	74.00	-20.83

Polarization:Vertical; Modulation Type:802.11b; bandwidth:20MHz; Channel:High

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3497.281	32.20	7.63	37.95	46.09	47.97	74.00	-26.03
4924.000	34.37	9.04	38.46	46.33	51.28	74.00	-22.72
6051.874	34.74	10.49	38.25	44.77	51.75	74.00	-22.25
7386.000	36.34	10.75	36.95	43.54	53.68	74.00	-20.32
9848.000	37.57	12.63	34.98	38.64	53.86	74.00	-20.14
12102.870	38.66	14.47	35.85	35.43	52.71	74.00	-21.29

Polarization:Horizontal; Modulation Type:802.11g; bandwidth:20MHz; Channel:Low

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3847.726	33.19	7.76	37.98	44.94	47.91	74.00	-26.09
4824.000	34.19	8.90	38.41	45.37	50.05	74.00	-23.95
6311.218	34.95	10.16	37.99	45.66	52.78	74.00	-21.22
7236.000	36.40	10.69	37.09	43.42	53.42	74.00	-20.58
9648.000	37.53	12.52	35.08	38.68	53.65	74.00	-20.35
12548.680	38.89	14.29	36.92	37.02	53.28	74.00	-20.72

Polarization:Vertical; Modulation Type:802.11g; bandwidth:20MHz; Channel:Low

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3842.163	33.18	7.76	37.98	44.93	47.89	74.00	-26.11
4824.000	34.19	8.90	38.41	46.29	50.97	74.00	-23.03
6122.333	34.80	10.40	38.18	45.35	52.37	74.00	-21.63
7236.000	36.40	10.69	37.09	43.84	53.84	74.00	-20.16
9648.000	37.53	12.52	35.08	38.84	53.81	74.00	-20.19
12015.620	38.61	14.55	35.64	36.01	53.53	74.00	-20.47



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Polarization:Horizontal; Modulation Type:802.11g; bandwidth:20MHz; Channel:middle

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3847.726	33.19	7.76	37.98	45.17	48.14	74.00	-25.86
4874.000	34.28	8.97	38.44	46.13	50.94	74.00	-23.06
5999.562	34.70	10.56	38.30	45.59	52.55	74.00	-21.45
7311.000	36.37	10.72	37.02	42.84	52.91	74.00	-21.09
9748.000	37.55	12.58	35.03	38.64	53.74	74.00	-20.26
12386.320	38.83	14.24	36.53	36.91	53.45	74.00	-20.55

Polarization:Vertical; Modulation Type:802.11g; bandwidth:20MHz; Channel:middle

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3983.689	33.56	7.80	38.00	45.89	49.25	74.00	-24.75
4874.000	34.28	8.97	38.44	45.60	50.41	74.00	-23.59
6060.637	34.75	10.48	38.24	44.57	51.56	74.00	-22.44
7311.000	36.37	10.72	37.02	43.59	53.66	74.00	-20.34
9748.000	37.55	12.58	35.03	38.54	53.64	74.00	-20.36
12120.390	38.67	14.46	35.89	35.92	53.16	74.00	-20.84

Polarization:Horizontal; Modulation Type:802.11g; bandwidth:20MHz; Channel:High

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3668.321	32.69	7.69	37.97	45.39	47.80	74.00	-26.20
4924.000	34.37	9.04	38.46	46.27	51.22	74.00	-22.78
6008.249	34.71	10.55	38.29	45.47	52.44	74.00	-21.56
7386.000	36.34	10.75	36.95	43.63	53.77	74.00	-20.23
9848.000	37.57	12.63	34.98	38.03	53.25	74.00	-20.75
12155.510	38.69	14.43	35.97	35.88	53.03	74.00	-20.97

Polarization:Vertical; Modulation Type:802.11g; bandwidth:20MHz; Channel:High

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3831.060	33.15	7.75	37.98	46.27	49.19	74.00	-24.81
4924.000	34.37	9.04	38.46	45.83	50.78	74.00	-23.22
6131.199	34.81	10.39	38.17	45.44	52.47	74.00	-21.53
7386.000	36.34	10.75	36.95	43.33	53.47	74.00	-20.53
9848.000	37.57	12.63	34.98	38.43	53.65	74.00	-20.35
12621.510	38.88	14.50	37.09	36.52	52.81	74.00	-21.19



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Polarization:Horizontal; Modulation Type:802.11n; bandwidth:20MHz; Channel:Low

Freq (MHz)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)	
3858.877	33.22	7.76	37.99	44.80	47.79	74.00	-26.21
4824.000	34.19	8.90	38.41	46.85	51.53	74.00	-22.47
5999.562	34.70	10.56	38.30	45.66	52.62	74.00	-21.38
7236.000	36.40	10.69	37.09	43.21	53.21	74.00	-20.79
9648.000	37.53	12.52	35.08	38.32	53.29	74.00	-20.71
12368.410	38.82	14.26	36.48	36.77	53.37	74.00	-20.63

Polarization:Vertical; Modulation Type:802.11n; bandwidth:20MHz; Channel:Low

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3858.877	33.22	7.76	37.99	45.18	48.17	74.00	-25.83
4824.000	34.19	8.90	38.41	46.26	50.94	74.00	-23.06
5999.562	34.70	10.56	38.30	44.71	51.67	74.00	-22.33
7236.000	36.40	10.69	37.09	43.24	53.24	74.00	-20.76
9648.000	37.53	12.52	35.08	38.84	53.81	74.00	-20.19
12350.530	38.81	14.27	36.44	37.00	53.64	74.00	-20.36

Polarization:Horizontal; Modulation Type:802.11n; bandwidth:20MHz; Channel:middle

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3842.163	33.18	7.76	37.98	45.00	47.96	74.00	-26.04
4874.000	34.28	8.97	38.44	45.33	50.14	74.00	-23.86
6122.333	34.80	10.40	38.18	45.40	52.42	74.00	-21.58
7311.000	36.37	10.72	37.02	43.06	53.13	74.00	-20.87
9748.000	37.55	12.58	35.03	38.41	53.51	74.00	-20.49
12279.260	38.77	14.33	36.27	36.52	53.35	74.00	-20.65

Polarization:Vertical; Modulation Type:802.11n; bandwidth:20MHz; Channel:middle

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3870.060	33.25	7.77	37.99	44.75	47.78	74.00	-26.22
4874.000	34.28	8.97	38.44	44.90	49.71	74.00	-24.29
6008.249	34.71	10.55	38.29	46.02	52.99	74.00	-21.01
7311.000	36.37	10.72	37.02	43.57	53.64	74.00	-20.36
9748.000	37.55	12.58	35.03	38.71	53.81	74.00	-20.19
12243.770	38.75	14.36	36.19	36.02	52.94	74.00	-21.06



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Polarization:Horizontal; Modulation Type:802.11n; bandwidth:20MHz; Channel:High

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limit (dB)
3903.804	33.34	7.78	37.99	45.40	48.53	74.00	-25.47
4924.000	34.37	9.04	38.46	45.92	50.87	74.00	-23.13
5836.872	34.60	10.10	38.33	45.35	51.72	74.00	-22.28
7386.000	36.34	10.75	36.95	43.69	53.83	74.00	-20.17
9848.000	37.57	12.63	34.98	38.11	53.33	74.00	-20.67
12226.070	38.74	14.37	36.14	36.33	53.30	74.00	-20.70

Polarization:Vertical; Modulation Type:802.11n; bandwidth:20MHz; Channel:High

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3842.163	33.18	7.76	37.98	44.80	47.76	74.00	-26.24
4924.000	34.37	9.04	38.46	45.90	50.85	74.00	-23.15
6016.949	34.71	10.54	38.28	45.36	52.33	74.00	-21.67
7386.000	36.34	10.75	36.95	43.59	53.73	74.00	-20.27
9848.000	37.57	12.63	34.98	38.55	53.77	74.00	-20.23
12350.530	38.81	14.27	36.44	36.96	53.60	74.00	-20.40

Polarization:Horizontal; Modulation Type:802.11n; bandwidth:40MHz; Channel:Low

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3842.163	33.18	7.76	37.98	44.48	47.44	74.00	-26.56
4844.000	34.23	8.92	38.42	45.97	50.70	74.00	-23.30
6016.949	34.71	10.54	38.28	44.94	51.91	74.00	-22.09
7266.000	36.39	10.70	37.06	43.58	53.61	74.00	-20.39
9688.000	37.54	12.54	35.06	38.88	53.90	74.00	-20.10
12368.410	38.82	14.26	36.48	36.31	52.91	74.00	-21.09

Polarization:Vertical; Modulation Type:802.11n; bandwidth:40MHz; Channel:Low

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3781.495	33.01	7.73	37.98	46.12	48.88	74.00	-25.12
4844.000	34.23	8.92	38.42	46.53	51.26	74.00	-22.74
5999.562	34.70	10.56	38.30	45.38	52.34	74.00	-21.66
7266.000	36.39	10.70	37.06	43.31	53.34	74.00	-20.66
9688.000	37.54	12.54	35.06	38.57	53.59	74.00	-20.41
12208.390	38.73	14.39	36.10	36.58	53.60	74.00	-20.40



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Polarization:Horizontal; Modulation Type:802.11n; bandwidth:40MHz; Channel:middle

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3909.457	33.36	7.78	37.99	44.93	48.08	74.00	-25.92
4874.000	34.28	8.97	38.44	45.64	50.45	74.00	-23.55
6008.249	34.71	10.55	38.29	44.90	51.87	74.00	-22.13
7311.000	36.37	10.72	37.02	43.72	53.79	74.00	-20.21
9748.000	37.55	12.58	35.03	38.66	53.76	74.00	-20.24
12350.530	38.81	14.27	36.44	36.67	53.31	74.00	-20.69

Polarization:Vertical; Modulation Type:802.11n; bandwidth:40MHz; Channel:middle

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3847.726	33.19	7.76	37.98	44.80	47.77	74.00	-26.23
4874.000	34.28	8.97	38.44	45.99	50.80	74.00	-23.20
6008.249	34.71	10.55	38.29	44.76	51.73	74.00	-22.27
7311.000	36.37	10.72	37.02	43.33	53.40	74.00	-20.60
9748.000	37.55	12.58	35.03	38.45	53.55	74.00	-20.45
12279.260	38.77	14.33	36.27	36.49	53.32	74.00	-20.68

Polarization:Horizontal; Modulation Type:802.11n; bandwidth:40MHz; Channel:High

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3853.298	33.21	7.76	37.99	44.71	47.69	74.00	-26.31
4904.000	34.33	9.01	38.45	45.51	50.40	74.00	-23.60
6148.967	34.82	10.37	38.15	45.68	52.72	74.00	-21.28
7356.000	36.36	10.74	36.98	43.18	53.30	74.00	-20.70
9808.000	37.56	12.61	35.00	38.46	53.63	74.00	-20.37
12102.870	38.66	14.47	35.85	36.09	53.37	74.00	-20.63

Polarization:Vertical; Modulation Type:802.11n; bandwidth:40MHz; Channel:High

Freq (MHz)	Antenna_ Factor (dB/m)	Cable_Lo ss (dB)	Preamp_ Gain (dB)	Read_Lev el (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limi t (dB)
3847.726	33.19	7.76	37.98	45.11	48.08	74.00	-25.92
4904.000	34.33	9.01	38.45	46.01	50.90	74.00	-23.10
6016.949	34.71	10.54	38.28	45.05	52.02	74.00	-21.98
7356.000	36.36	10.74	36.98	43.30	53.42	74.00	-20.58
9808.000	37.56	12.61	35.00	37.86	53.03	74.00	-20.97
12368.410	38.82	14.26	36.48	36.51	53.11	74.00	-20.89

7.7 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.247(d)
Test Method: ANSI C63.10 (2013) Section 6.10.5
Measurement Distance: 3m

7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar

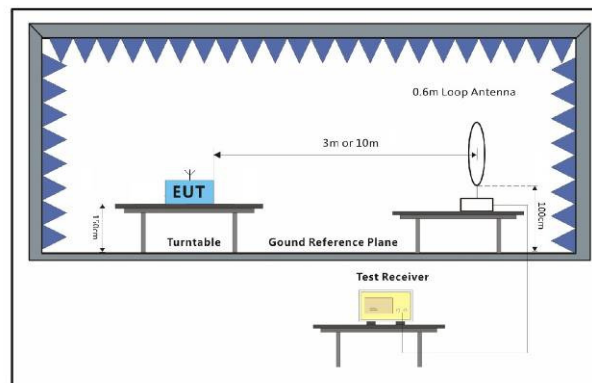
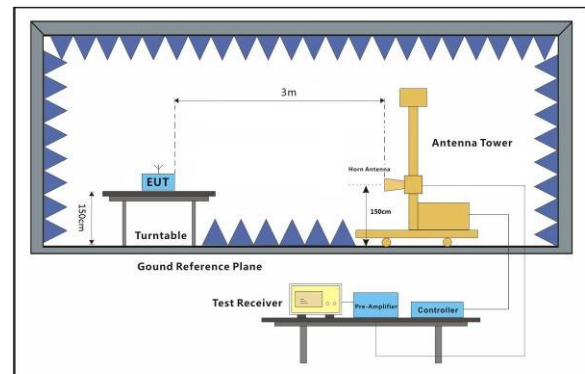
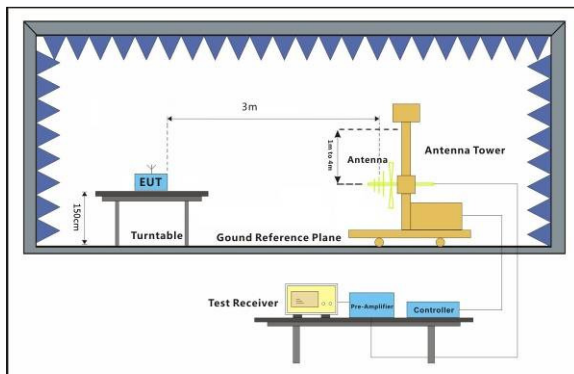
Test mode Transmitting with all kind of modulations, data rates.

The worst case for final test: Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b;
6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40)

For below 1GHz, through Pre-scan, find the 1Mbps of rate of 802.11b at lowest channel is the worst case.

Only the worst case is recorded in the report.

7.7.2 Test Setup Diagram

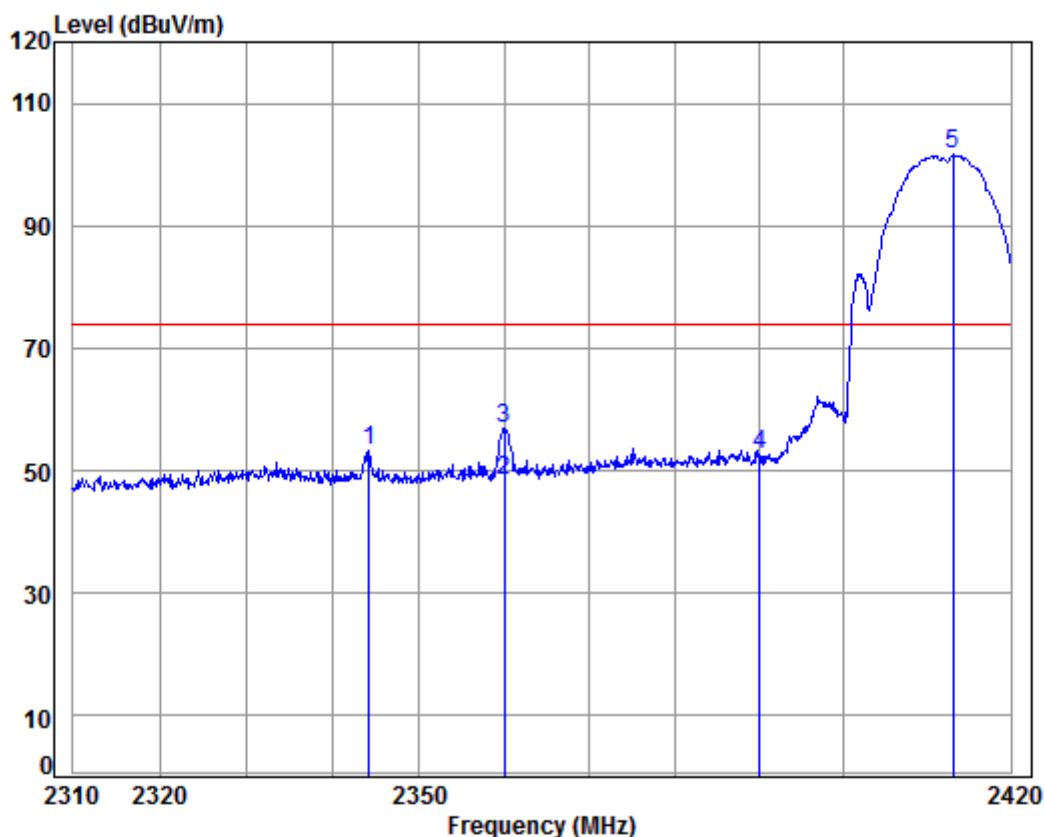




7.7.3 Measurement Data

- 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 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.

Polarization:Horizontal; Modulation Type:802.11b; bandwidth:20MHz; Channel:Low



Condition: 3m Horizontal

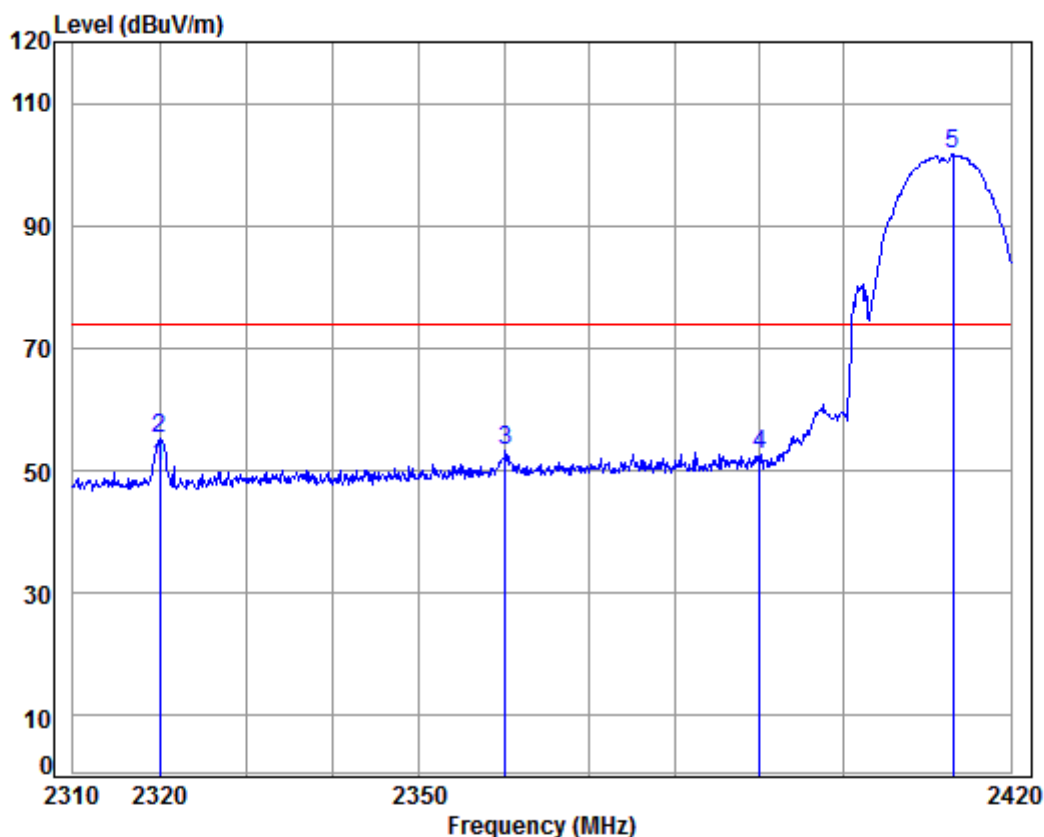
Job No: : 00220IT

Mode: : 2412 Bandedge

: B

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2344.208	5.30	28.94	37.97	57.06	53.33	74.00	-20.67	Peak
2 av	2359.965	5.31	28.99	37.96	51.93	48.27	54.00	-5.73	Average
3	2359.965	5.31	28.99	37.96	60.71	57.05	74.00	-16.95	Peak
4	2390.000	5.34	29.08	37.96	56.34	52.80	74.00	-21.20	Peak
5 pp	2413.030	5.35	29.15	37.96	105.00	101.54	74.00	27.54	Peak

Polarization:Vertical; Modulation Type:802.11b; bandwidth:20MHz; Channel:Low



Condition: 3m Vertical

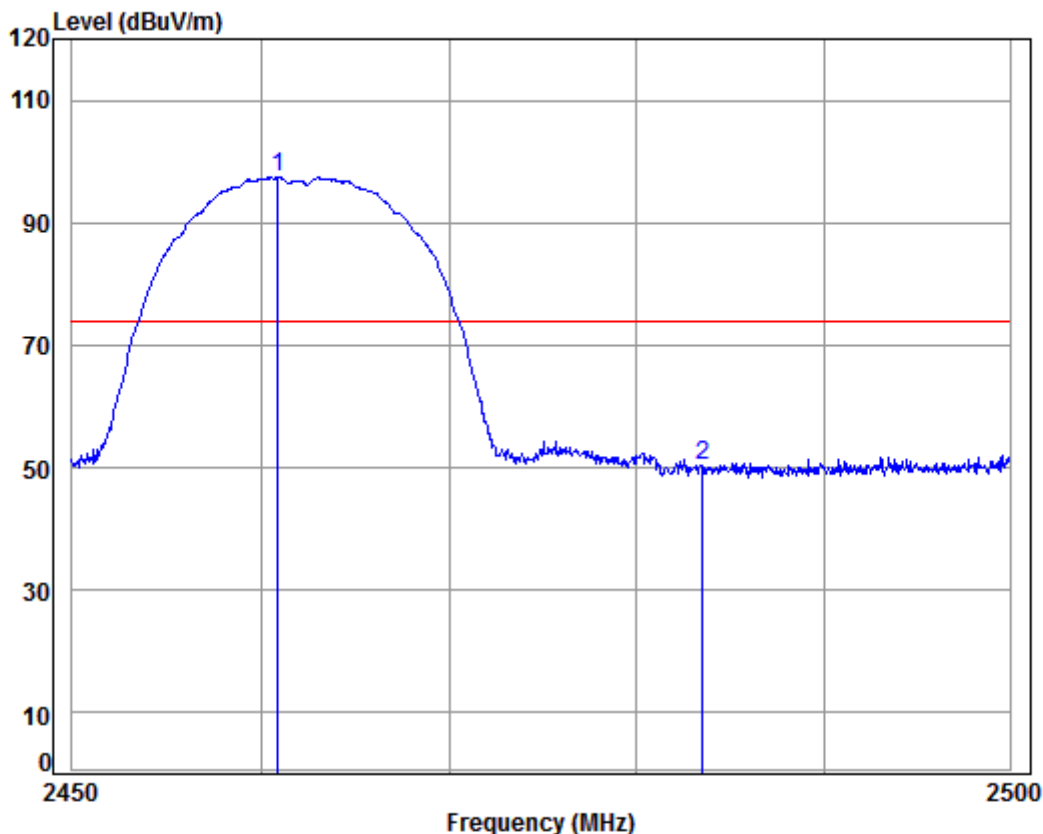
Job No: : 00220IT

Mode: : 2412 Bandedge

: B

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 av	2320.016	5.28	28.86	37.97	54.46	50.63	54.00	-3.37 Average
2	2320.016	5.28	28.86	37.97	59.20	55.37	74.00	-18.63 Peak
3	2360.075	5.31	28.99	37.96	56.82	53.16	74.00	-20.84 Peak
4	2390.000	5.34	29.08	37.96	56.22	52.68	74.00	-21.32 Peak
5 pp	2413.030	5.35	29.15	37.96	105.04	101.58	74.00	27.58 Peak

Polarization:Horizontal; Modulation Type:802.11b; bandwidth:20MHz; Channel:High



Condition: 3m Horizontal

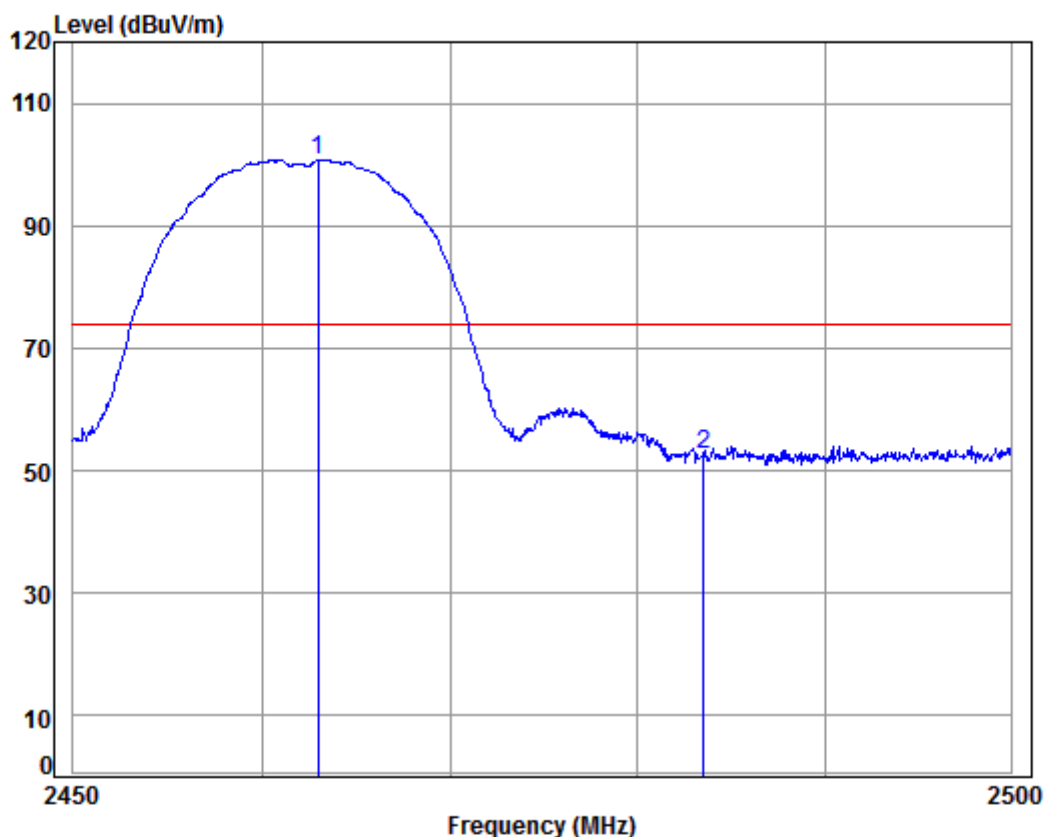
Job No: : 00220IT

Mode: : 2462 Bandedge

: B

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2460.914	5.39	29.29	37.95	100.68	97.41	74.00	23.41	Peak
2	2483.500	5.41	29.35	37.95	53.63	50.44	74.00	-23.56	Peak

Polarization:Vertical; Modulation Type:802.11b; bandwidth:20MHz; Channel:High



Condition: 3m Vertical

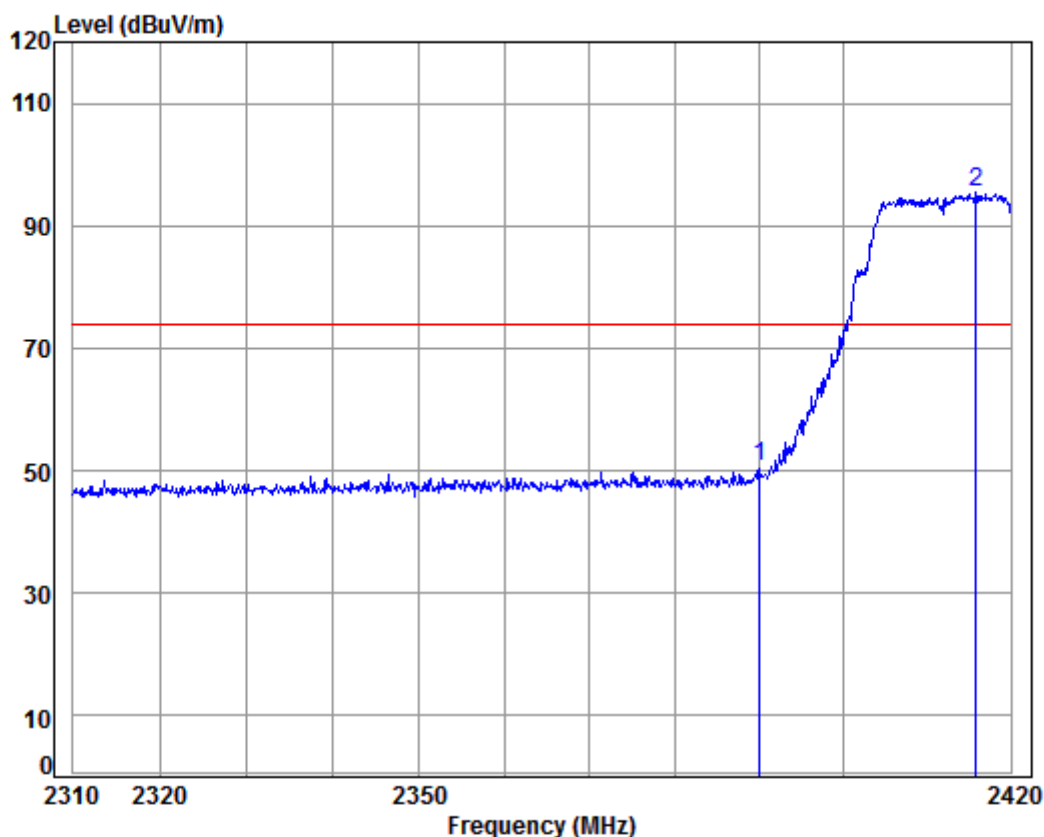
Job No: : 00220IT

Mode: : 2462 Bandedge

: B

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2462.953	5.39	29.29	37.95	104.02	100.75	74.00	26.75	Peak
2	2483.500	5.41	29.35	37.95	55.87	52.68	74.00	-21.32	Peak

Polarization:Horizontal; Modulation Type:802.11g; bandwidth:20MHz; Channel:Low



Condition: 3m Horizontal

Job No: : 00220IT

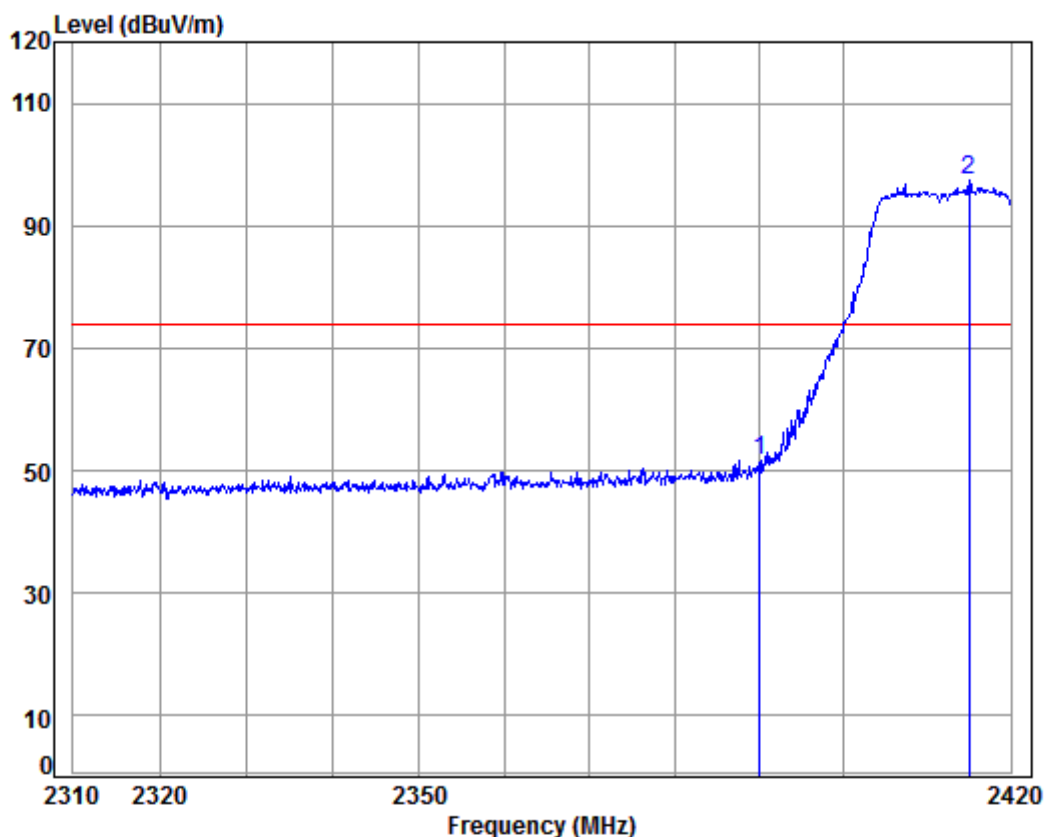
Mode: : 2412 Bandedge

: G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2390.000	5.34	29.08	37.96	54.09	50.55	74.00	-23.45	Peak
2 pp	2415.838	5.36	29.15	37.96	99.06	95.61	74.00	21.61	Peak



Polarization:Vertical; Modulation Type:802.11g; bandwidth:20MHz; Channel:Low



Condition: 3m Vertical

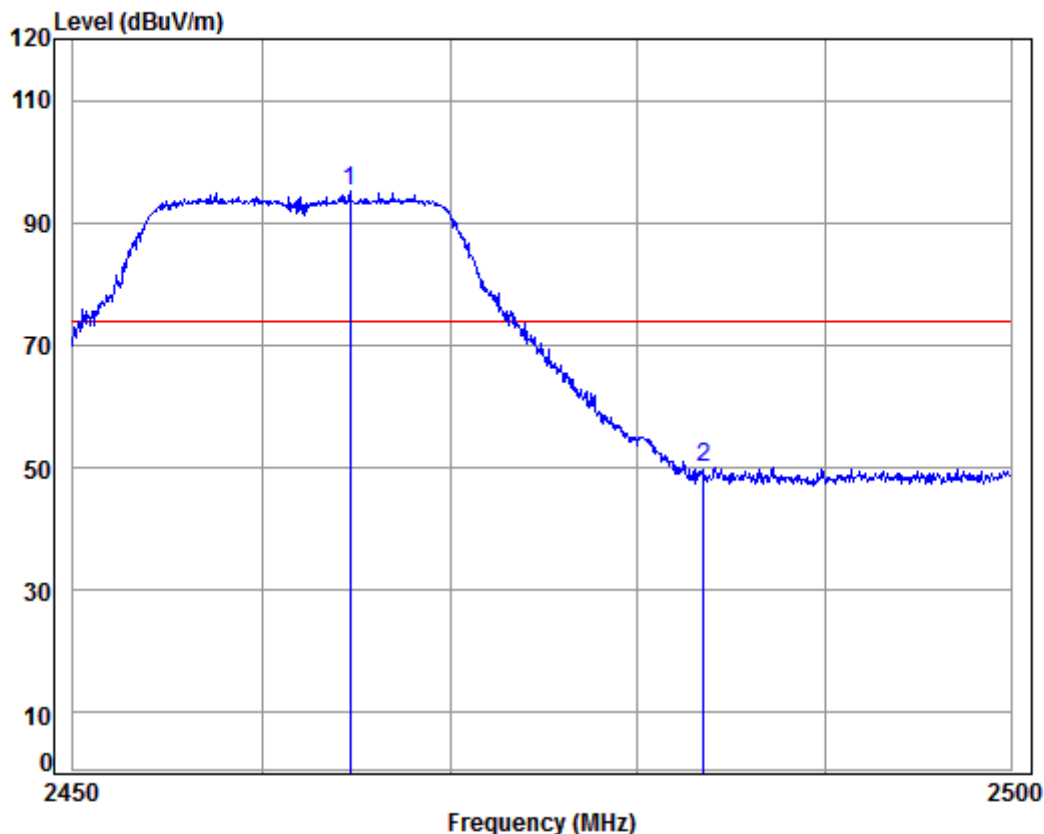
Job No: : 00220IT

Mode: : 2412 Bandedge

: G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2390.000	5.34	29.08	37.96	55.16	51.62	74.00	-22.38	Peak
2 pp	2414.939	5.36	29.15	37.96	100.82	97.37	74.00	23.37	Peak

Polarization:Horizontal; Modulation Type:802.11g; bandwidth:20MHz; Channel:High



Condition: 3m Horizontal

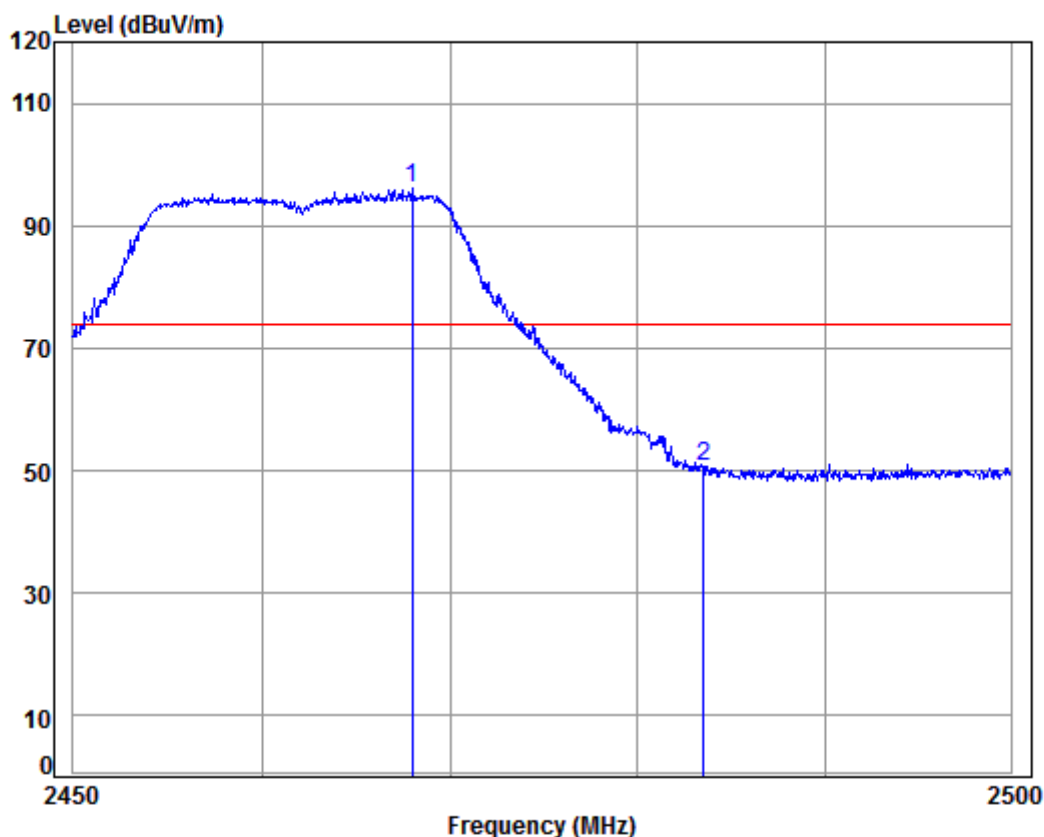
Job No: : 00220IT

Mode: : 2462 Bandedge

: G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2464.645	5.39	29.30	37.95	98.41	95.15	74.00	21.15	Peak
2	2483.500	5.41	29.35	37.95	53.29	50.10	74.00	-23.90	Peak

Polarization:Vertical; Modulation Type:802.11g; bandwidth:20MHz; Channel:High



Condition: 3m Vertical

Job No: : 00220IT

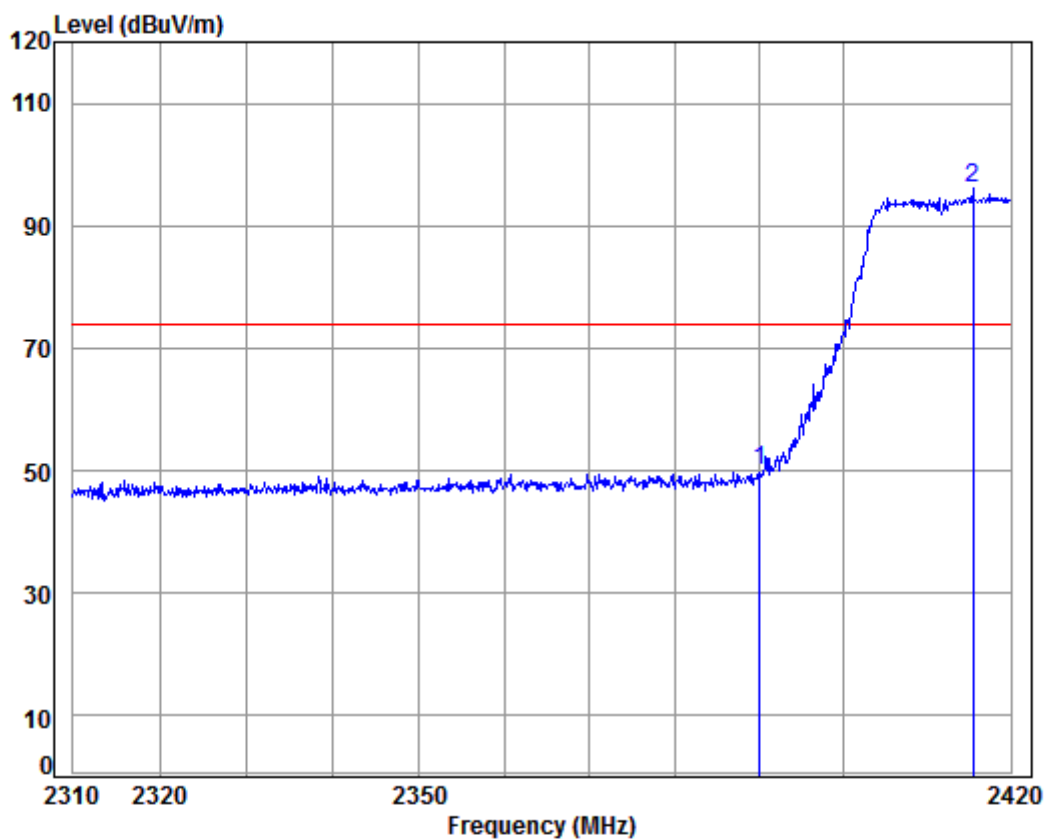
Mode: : 2462 Bandedge

: G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2467.983	5.40	29.31	37.95	99.53	96.29	74.00	22.29	Peak
2	2483.500	5.41	29.35	37.95	53.88	50.69	74.00	-23.31	Peak



Polarization:Horizontal; Modulation Type:802.11n; bandwidth:20MHz; Channel:Low



Condition: 3m Horizontal

Job No: : 00220IT

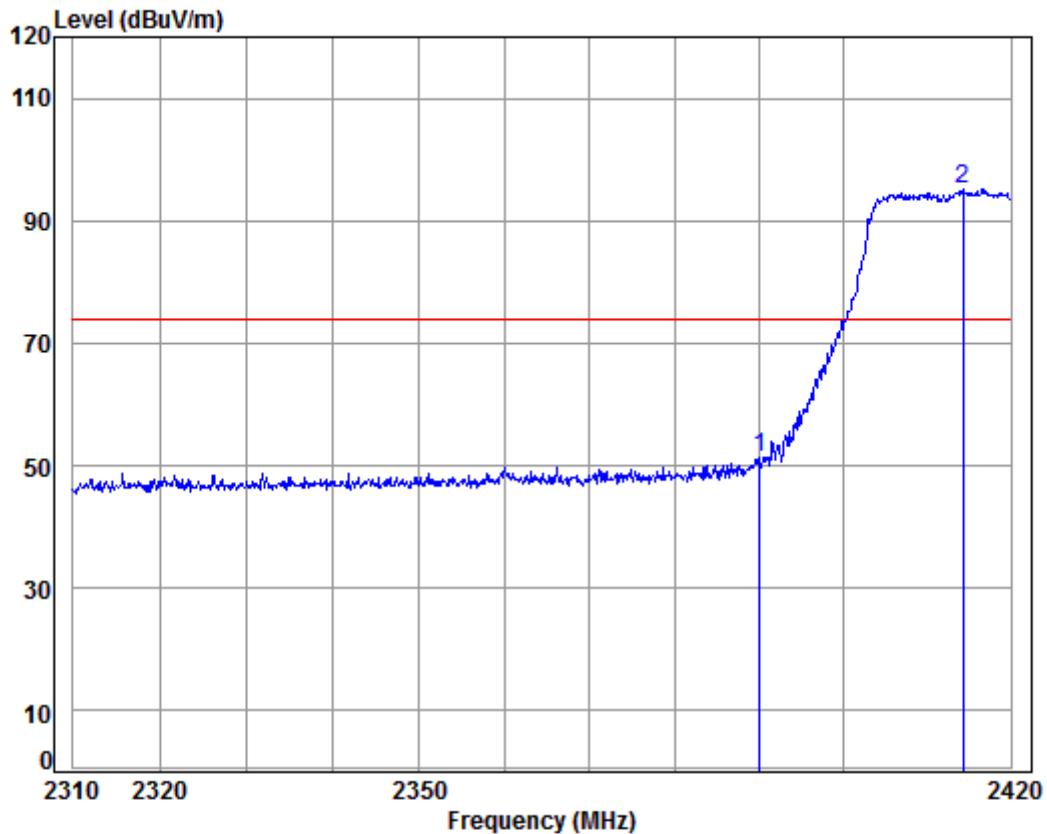
Mode: : 2412 Bandedge

: N20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2390.000	5.34	29.08	37.96	53.67	50.13	74.00	-23.87	Peak
2 pp	2415.501	5.36	29.15	37.96	99.56	96.11	74.00	22.11	Peak



Polarization:Vertical; Modulation Type:802.11n; bandwidth:20MHz; Channel:Low



Condition: 3m Vertical

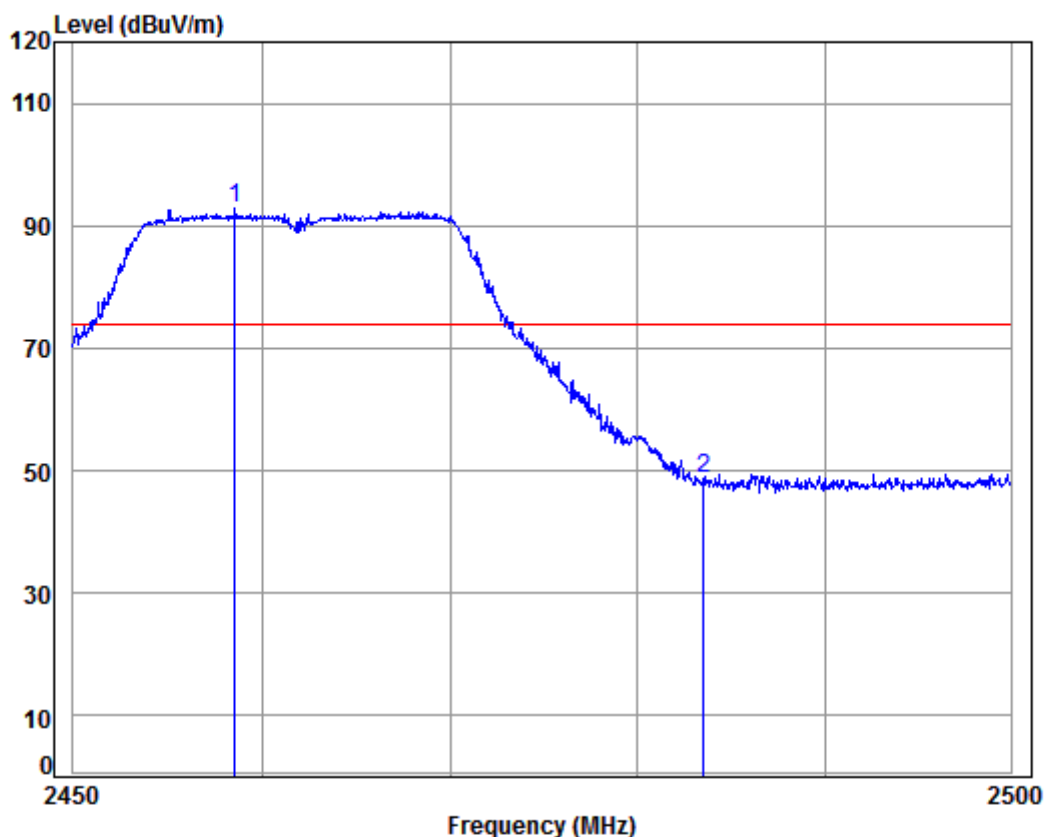
Job No: : 00220IT

Mode: : 2412 Bandedge

: N20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2390.000	5.34	29.08	37.96	54.82	51.28	74.00	-22.72	Peak
2 pp	2414.265	5.36	29.15	37.96	98.48	95.03	74.00	21.03	Peak

Polarization:Horizontal; Modulation Type:802.11n; bandwidth:20MHz; Channel:High



Condition: 3m Horizontal

Job No: : 00220IT

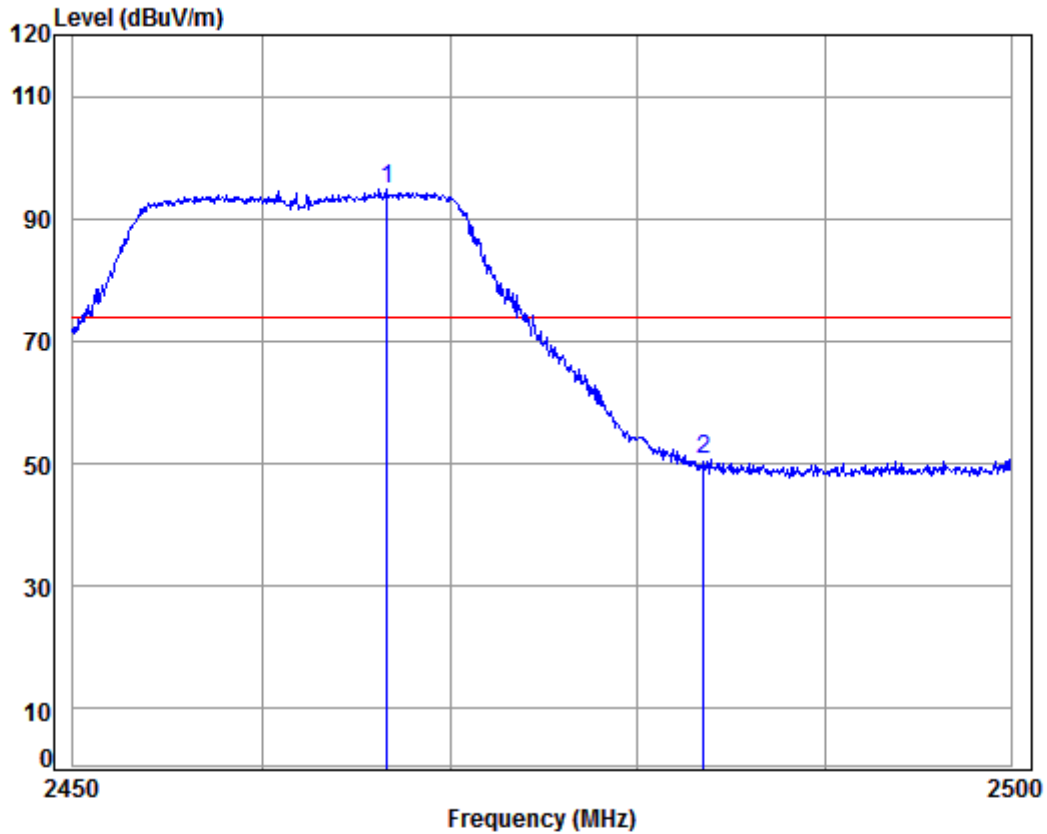
Mode: : 2462 Bandedge

: N20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2458.578	5.39	29.28	37.95	96.26	92.98	74.00	18.98	Peak
2	2483.500	5.41	29.35	37.95	52.06	48.87	74.00	-25.13	Peak



Polarization:Vertical; Modulation Type:802.11n; bandwidth:20MHz; Channel:High



Condition: 3m Vertical

Job No: : 00220IT

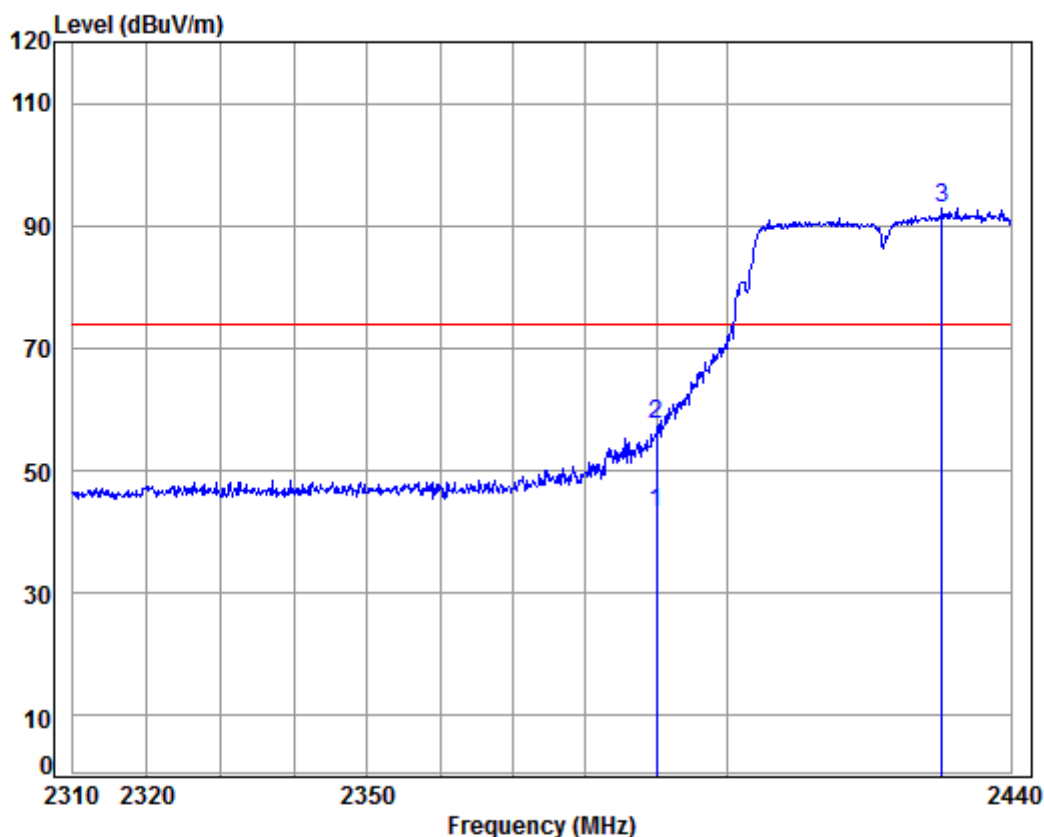
Mode: : 2462 Bandedge

: N20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2466.638	5.40	29.30	37.95	98.05	94.80	74.00	20.80	Peak
2	2483.500	5.41	29.35	37.95	53.88	50.69	74.00	-23.31	Peak



Polarization:Horizontal; Modulation Type:802.11n; bandwidth:40MHz; Channel:Low



Condition: 3m Horizontal

Job No: : 00220IT

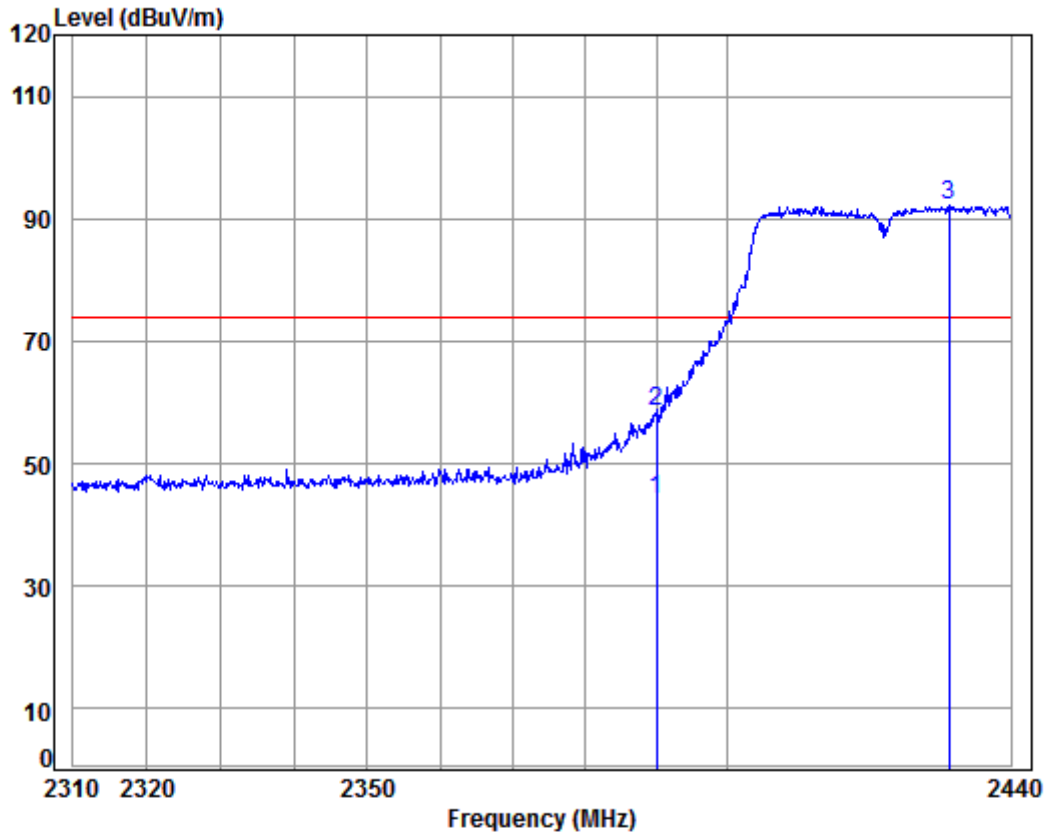
Mode: : 2422 Bandedge

: N40

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 av	2390.000	5.34	29.08	37.96	46.56	43.02	54.00	-10.98 Average
2	2390.000	5.34	29.08	37.96	60.94	57.40	74.00	-16.60 Peak
3 pp	2430.267	5.37	29.20	37.96	96.37	92.98	74.00	18.98 Peak



Polarization:Vertical; Modulation Type:802.11n; bandwidth:40MHz; Channel:Low



Condition: 3m Vertical

Job No: : 00220IT

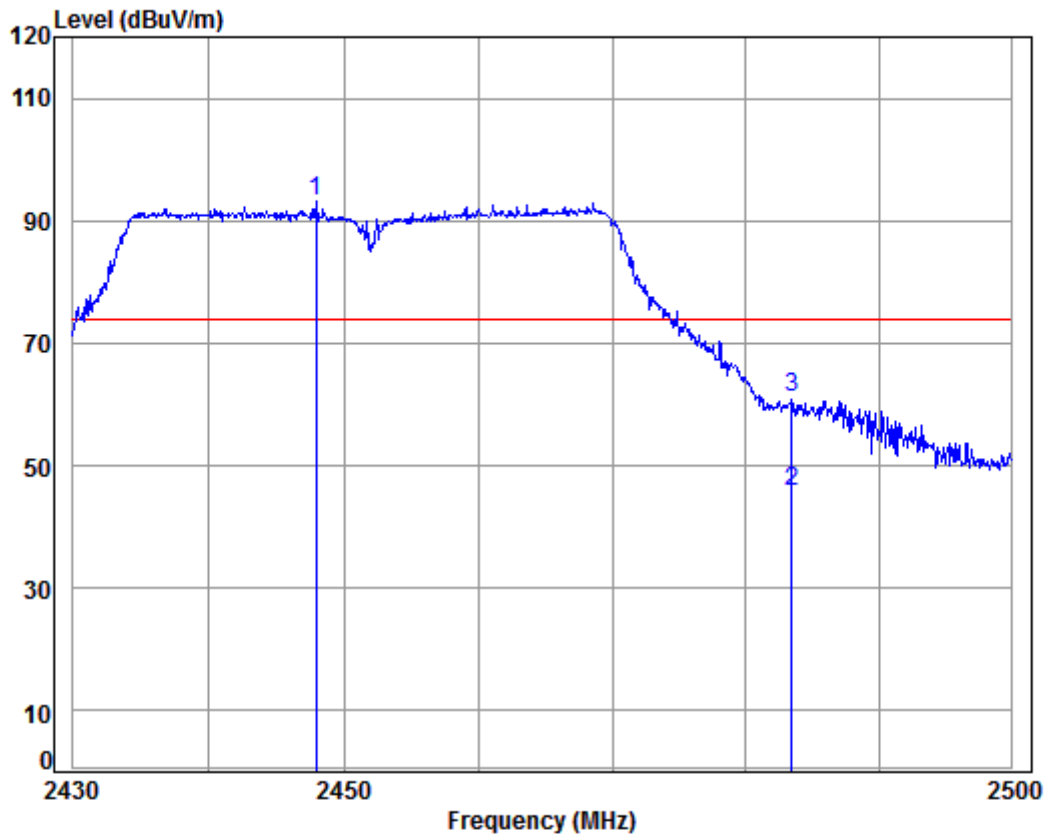
Mode: : 2422 Bandedge

: N40

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 av	2390.000	5.34	29.08	37.96	47.55	44.01	54.00	-9.99 Average
2	2390.000	5.34	29.08	37.96	62.15	58.61	74.00	-15.39 Peak
3 pp	2431.199	5.37	29.20	37.96	95.56	92.17	74.00	18.17 Peak



Polarization:Horizontal; Modulation Type:802.11n; bandwidth:40MHz; Channel:High



Condition: 3m Horizontal

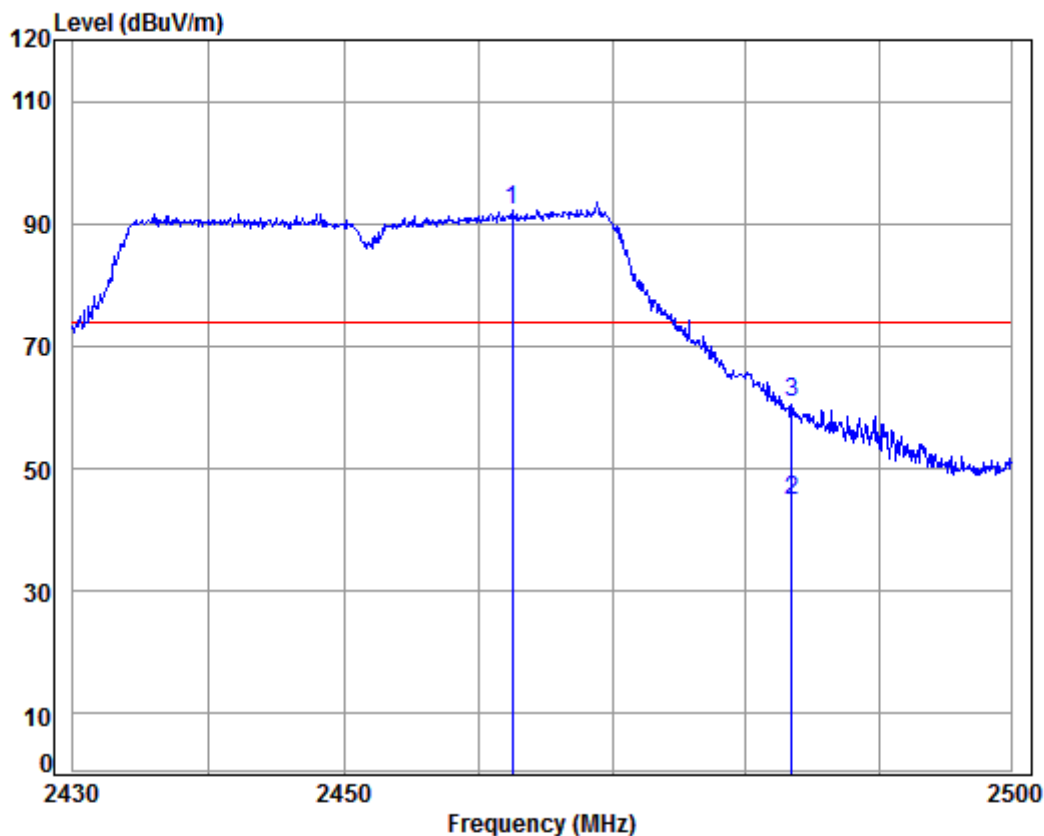
Job No: : 00220IT

Mode: : 2452 Bandedge

: N40

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	pp 2447.940	5.38	29.25	37.96	96.40	93.07	74.00	19.07 Peak
2	av 2483.500	5.41	29.35	37.95	48.86	45.67	54.00	-8.33 Average
3	2483.500	5.41	29.35	37.95	64.26	61.07	74.00	-12.93 Peak

Polarization:Vertical; Modulation Type:802.11n; bandwidth:40MHz; Channel:High



Condition: 3m Vertical

Job No: : 00220IT

Mode: : 2452 Bandedge

: N40

	Freq	Cable Loss	Ant Factor	Preamplifier Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2462.513	5.39	29.29	37.95	95.36	92.09	74.00	18.09	Peak
2 av	2483.500	5.41	29.35	37.95	48.12	44.93	54.00	-9.07	Average
3	2483.500	5.41	29.35	37.95	64.07	60.88	74.00	-13.12	Peak

7.8 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)
 Test Method: ANSI C63.10 (2013) Section 11.13.3.2

7.8.1 E.U.T. Operation

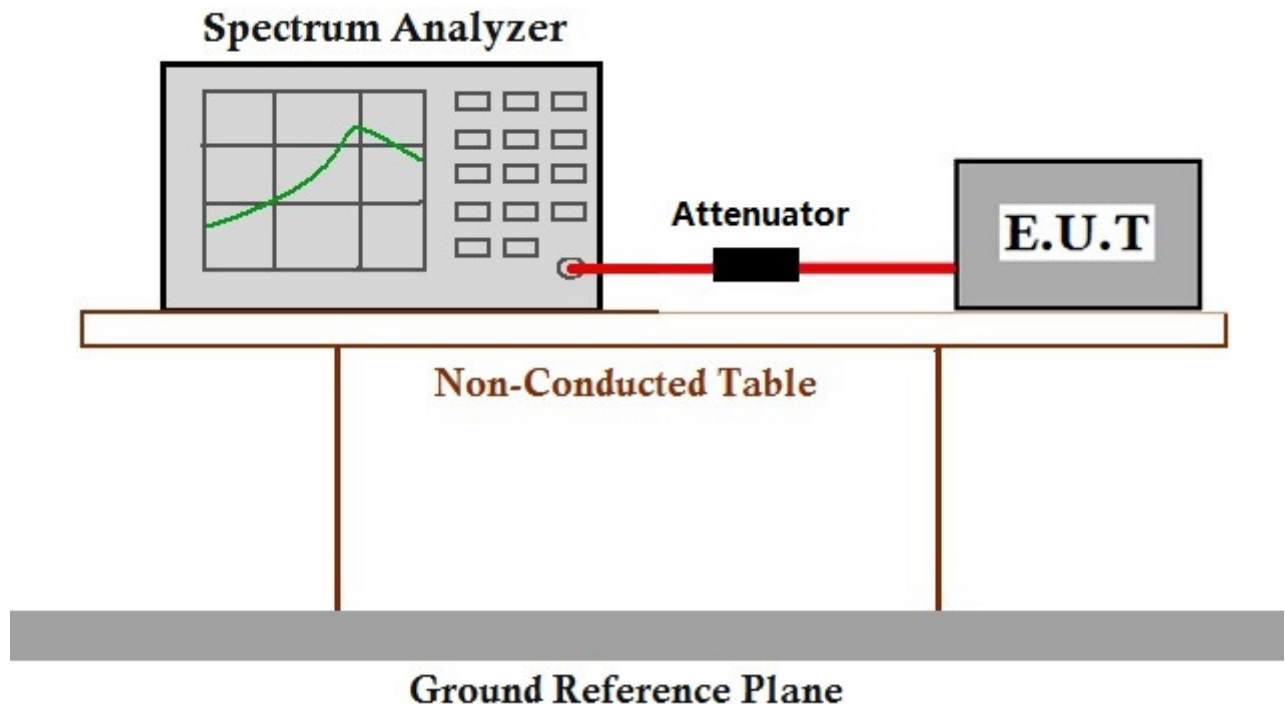
Operating Environment:

Temperature: 24 °C Humidity: 55 % RH Atmospheric Pressure: 1015 mbar

Test mode Transmitting with all kind of modulations, data rates

The worst case Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b;
 for final test: 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40)

7.8.2 Test Setup Diagram



7.8.3 Measurement Data

The detailed test data see: Appendix 15.247

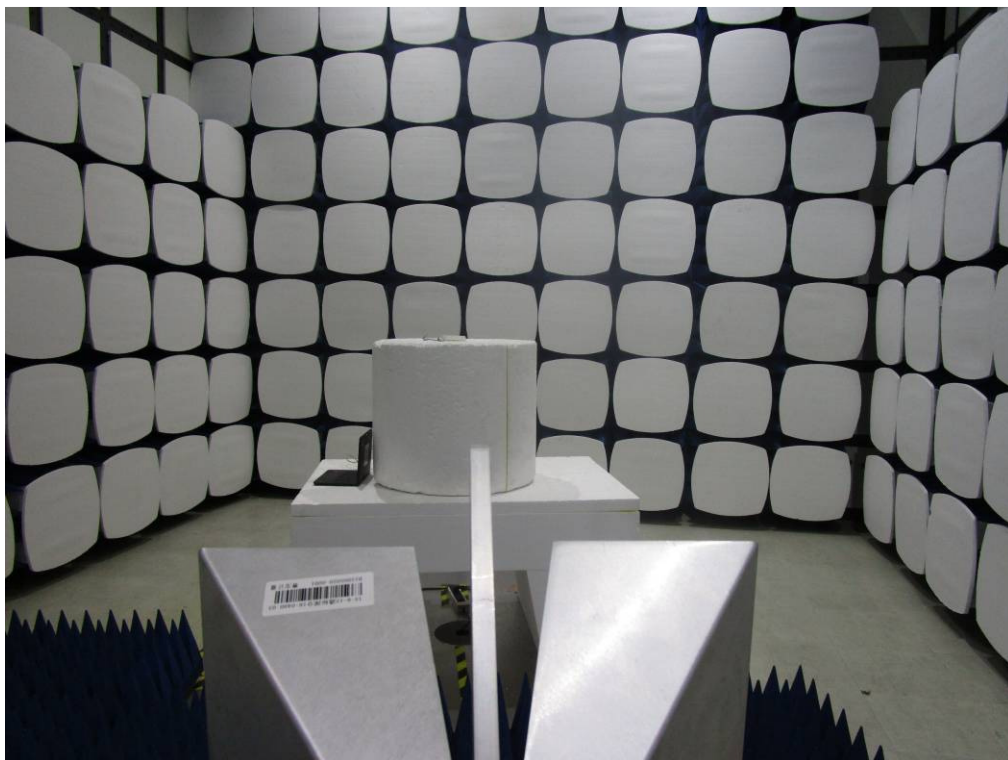
8 Photographs

8.1 Conducted Disturbance at AC Power Line(150kHz-30MHz) Test Setup



8.2 Radiated Spurious Emissions Test Setup





8.3 EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for HKES1701000220IT.

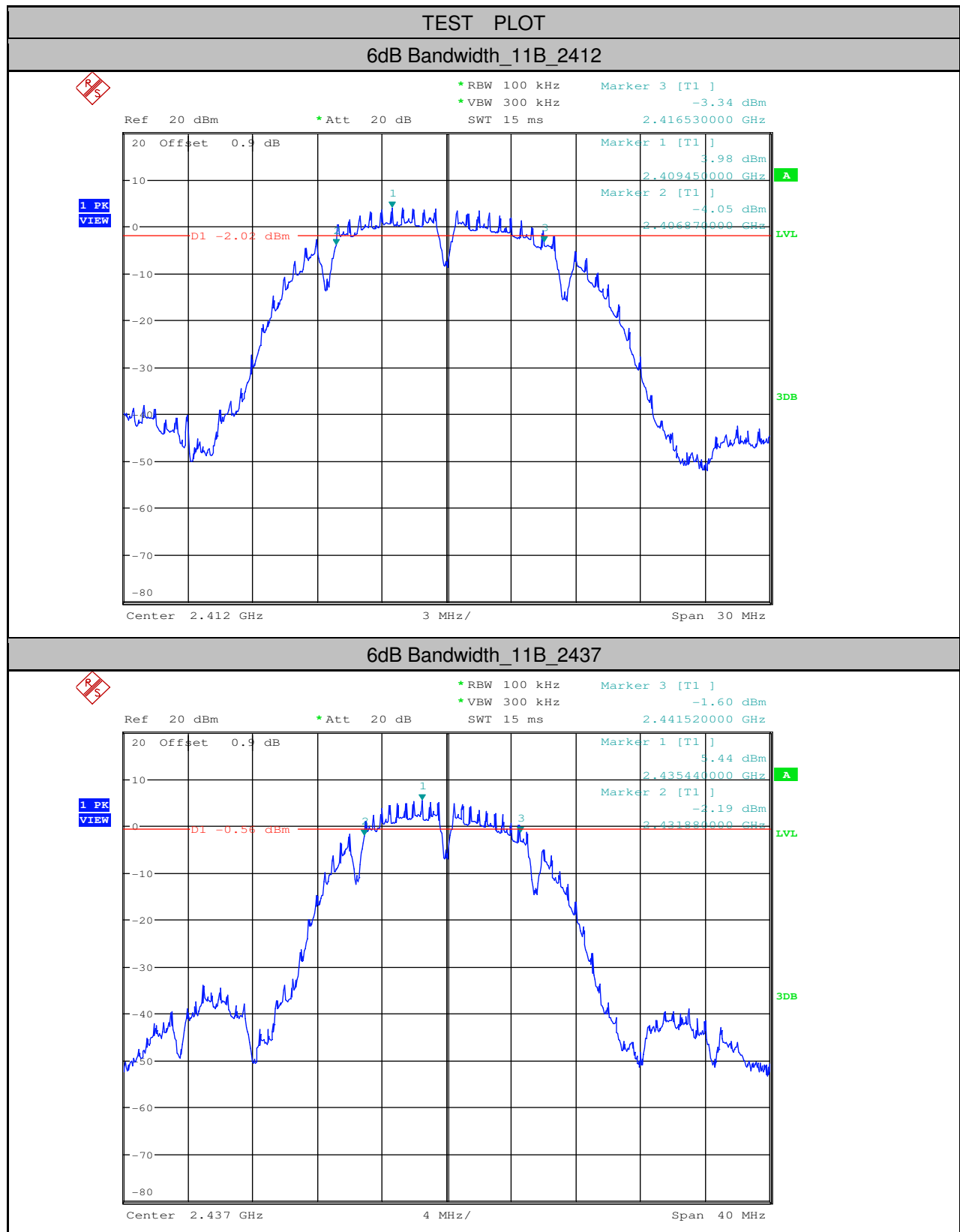


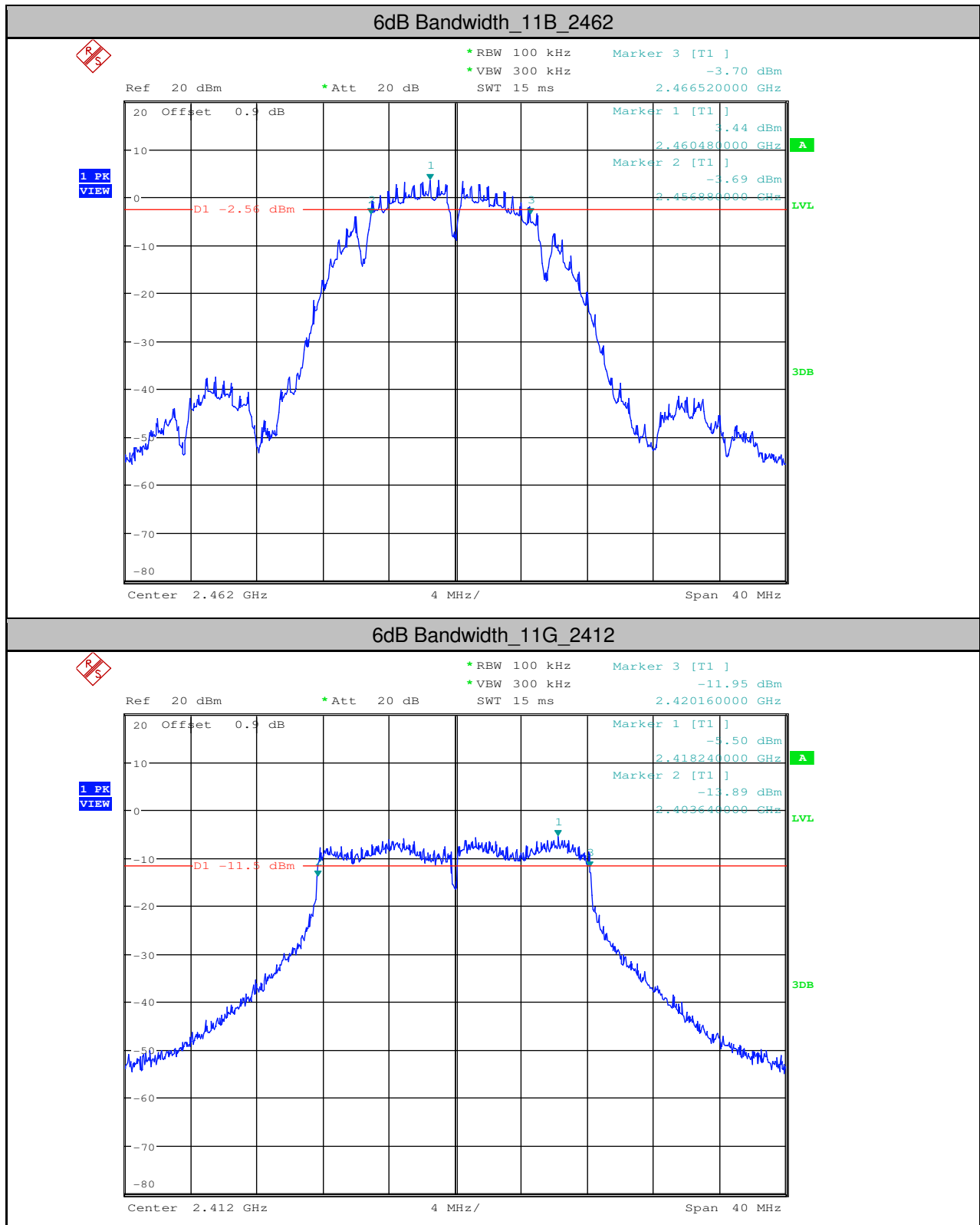
9 Appendix

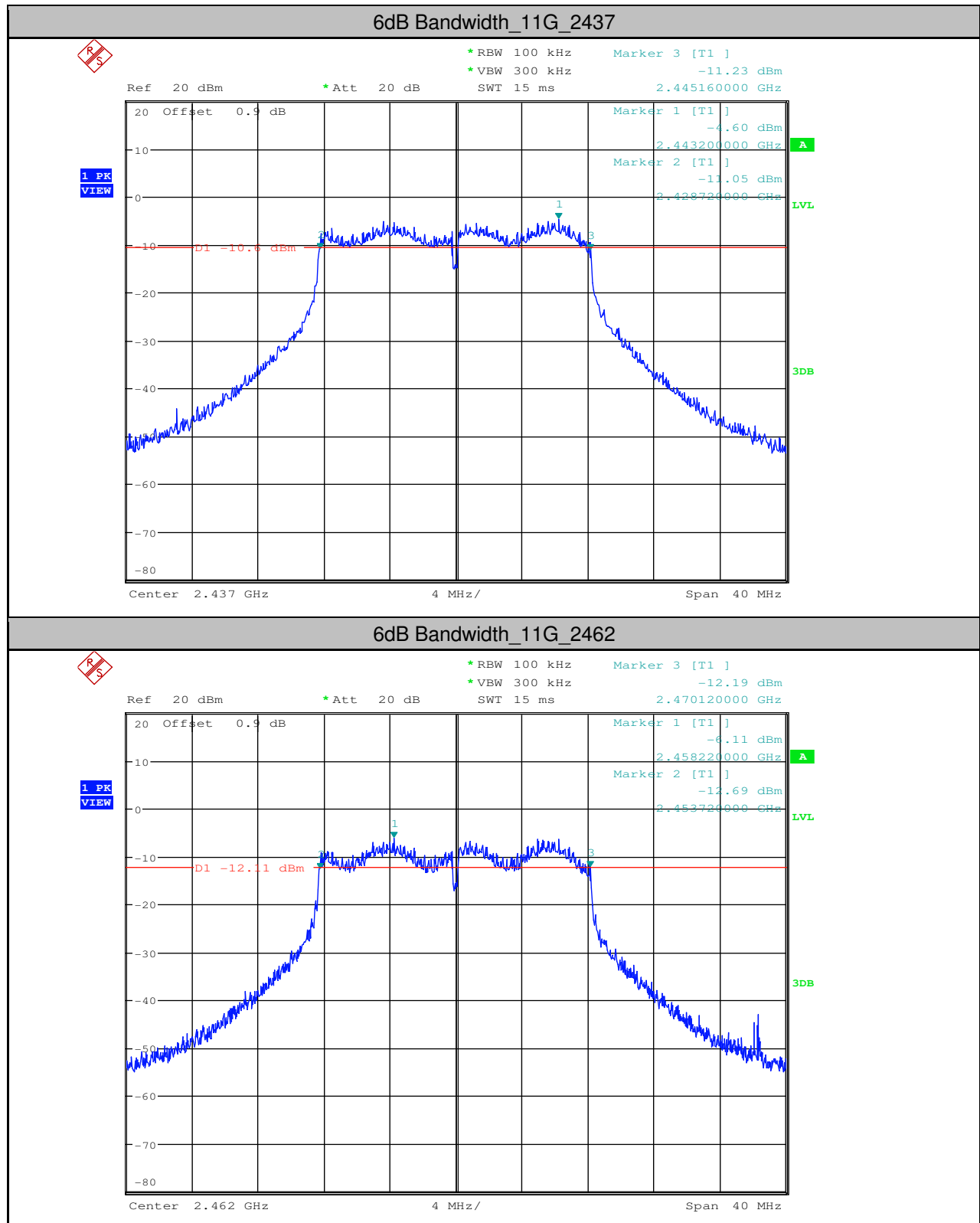
9.1 Appendix 15.247

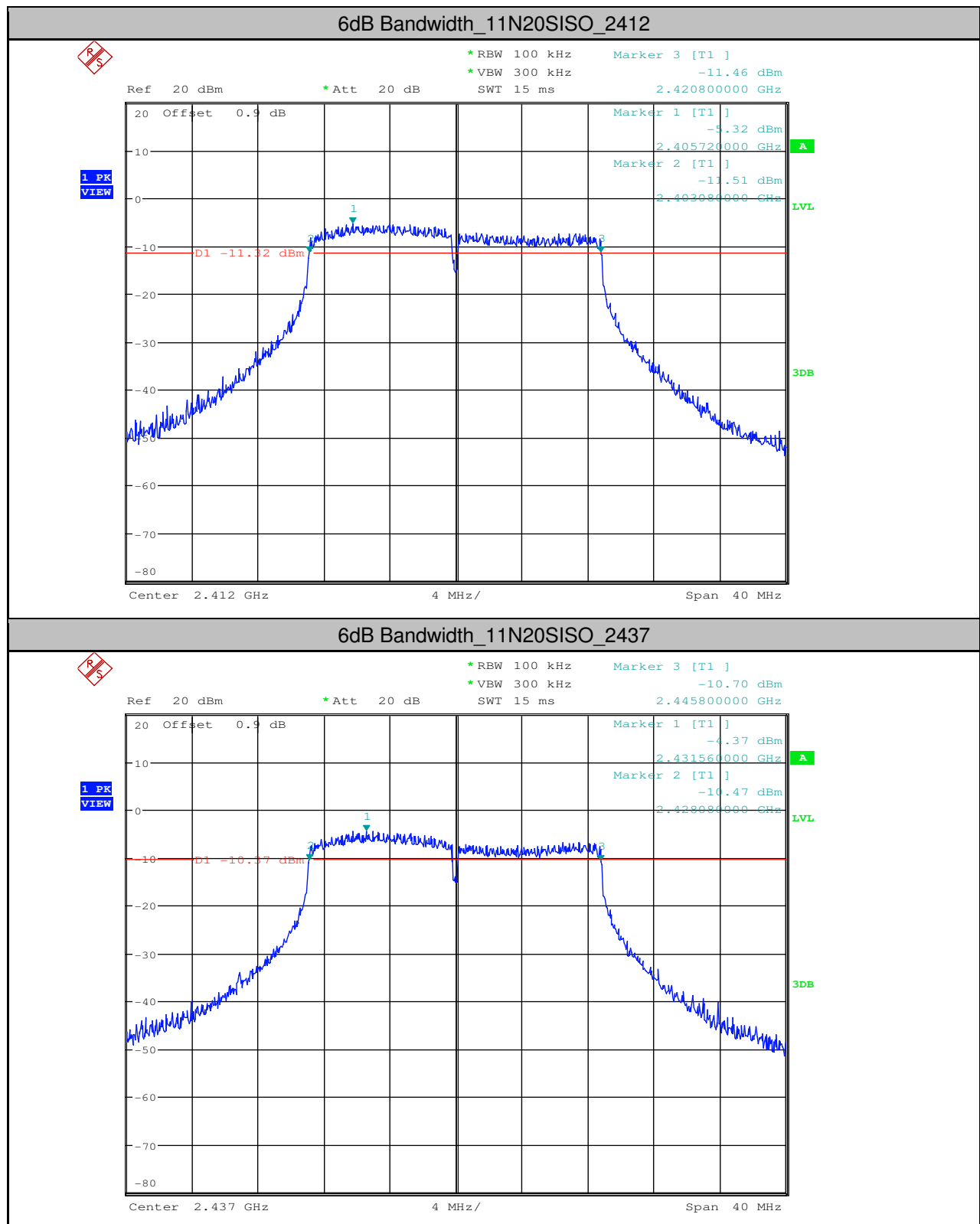
1.6dB Bandwidth

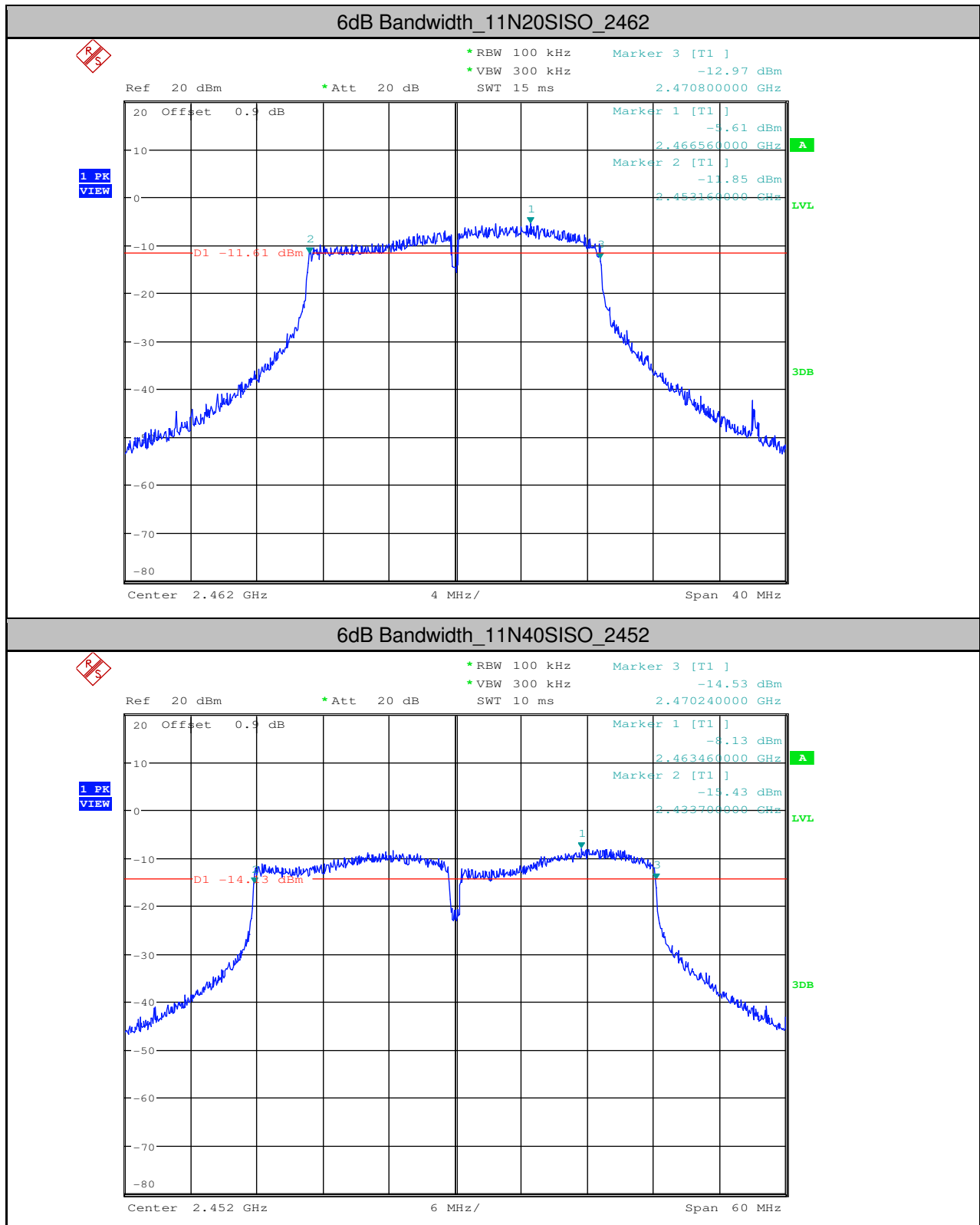
Test Mode	Test Channel	EBW[MHz]	Limit	Verdict
11B	2412	9.660	≥ 0.5	PASS
11B	2437	9.640	≥ 0.5	PASS
11B	2462	9.640	≥ 0.5	PASS
11G	2412	16.520	≥ 0.5	PASS
11G	2437	16.440	≥ 0.5	PASS
11G	2462	16.400	≥ 0.5	PASS
11N20SISO	2412	17.720	≥ 0.5	PASS
11N20SISO	2437	17.720	≥ 0.5	PASS
11N20SISO	2462	17.640	≥ 0.5	PASS
11N40SISO	2452	36.540	≥ 0.5	PASS
11N40SISO	2422	36.600	≥ 0.5	PASS
11N40SISO	2437	36.540	≥ 0.5	PASS

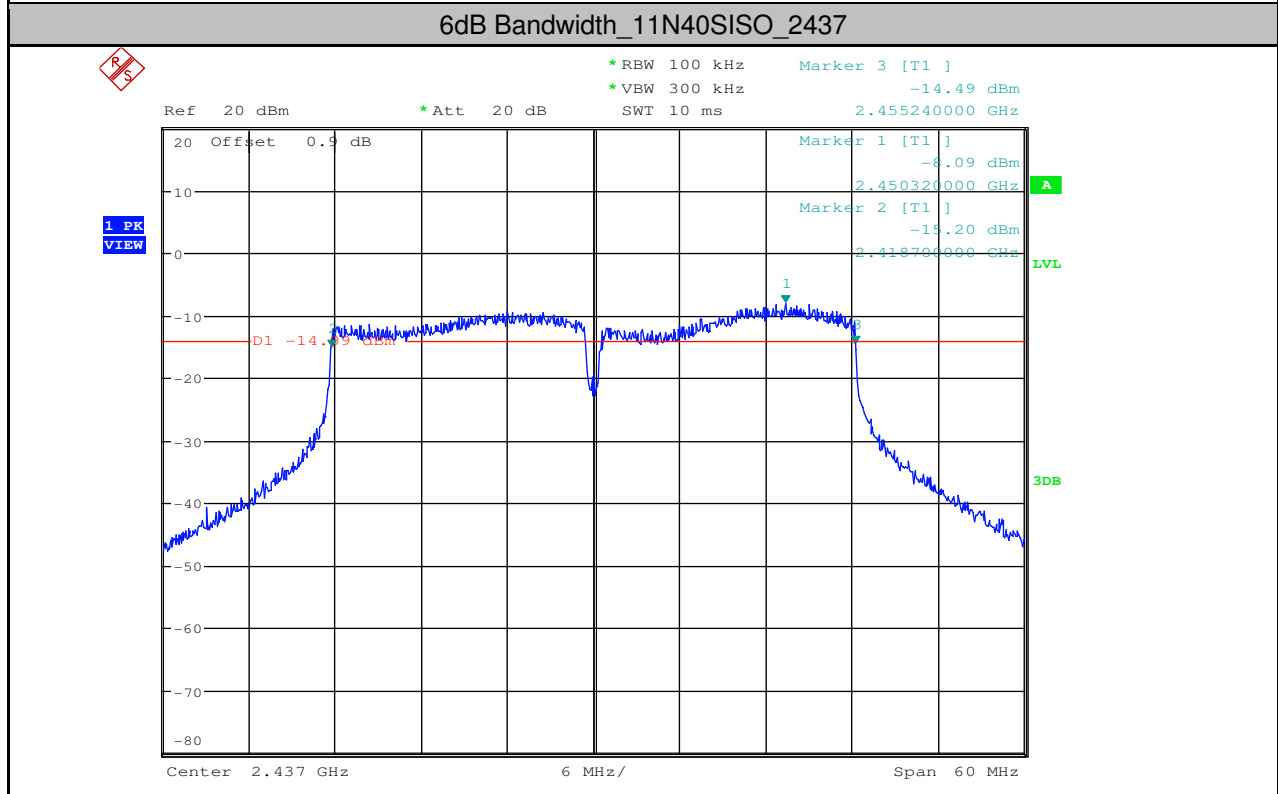
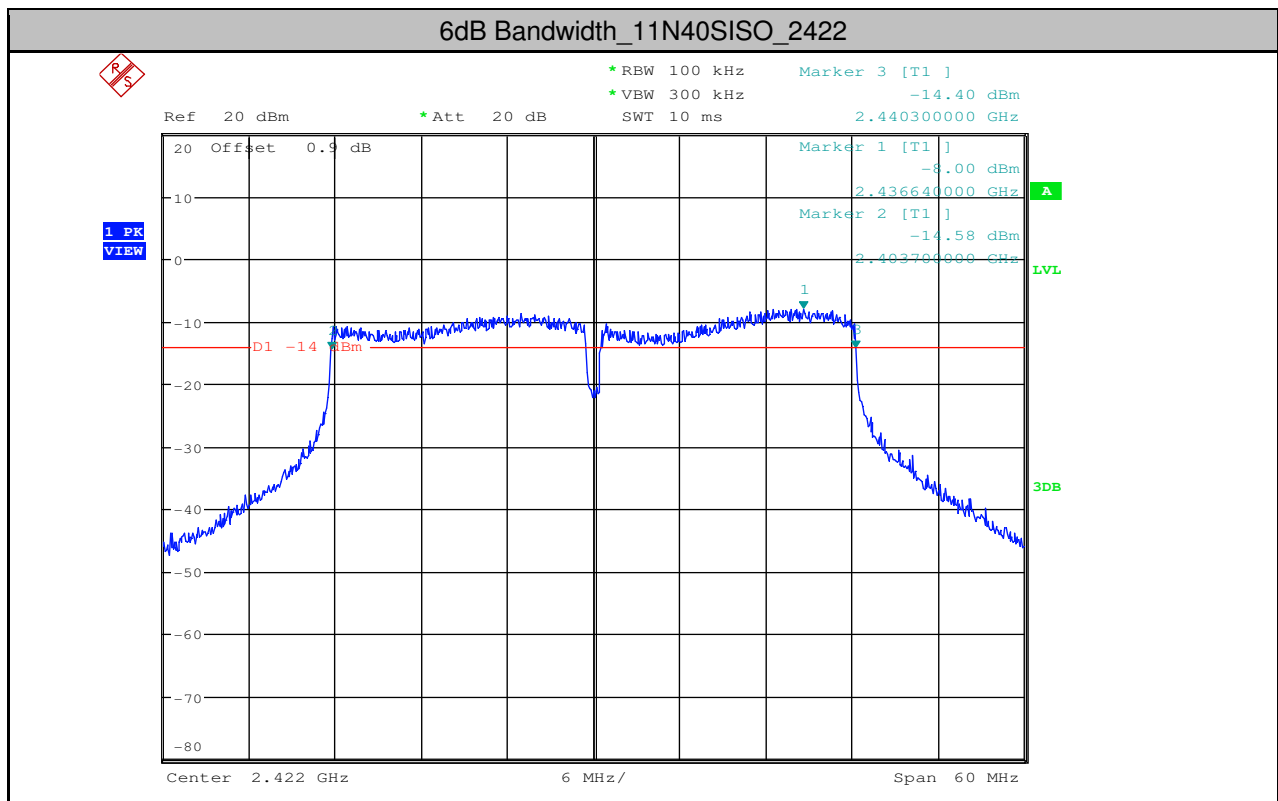














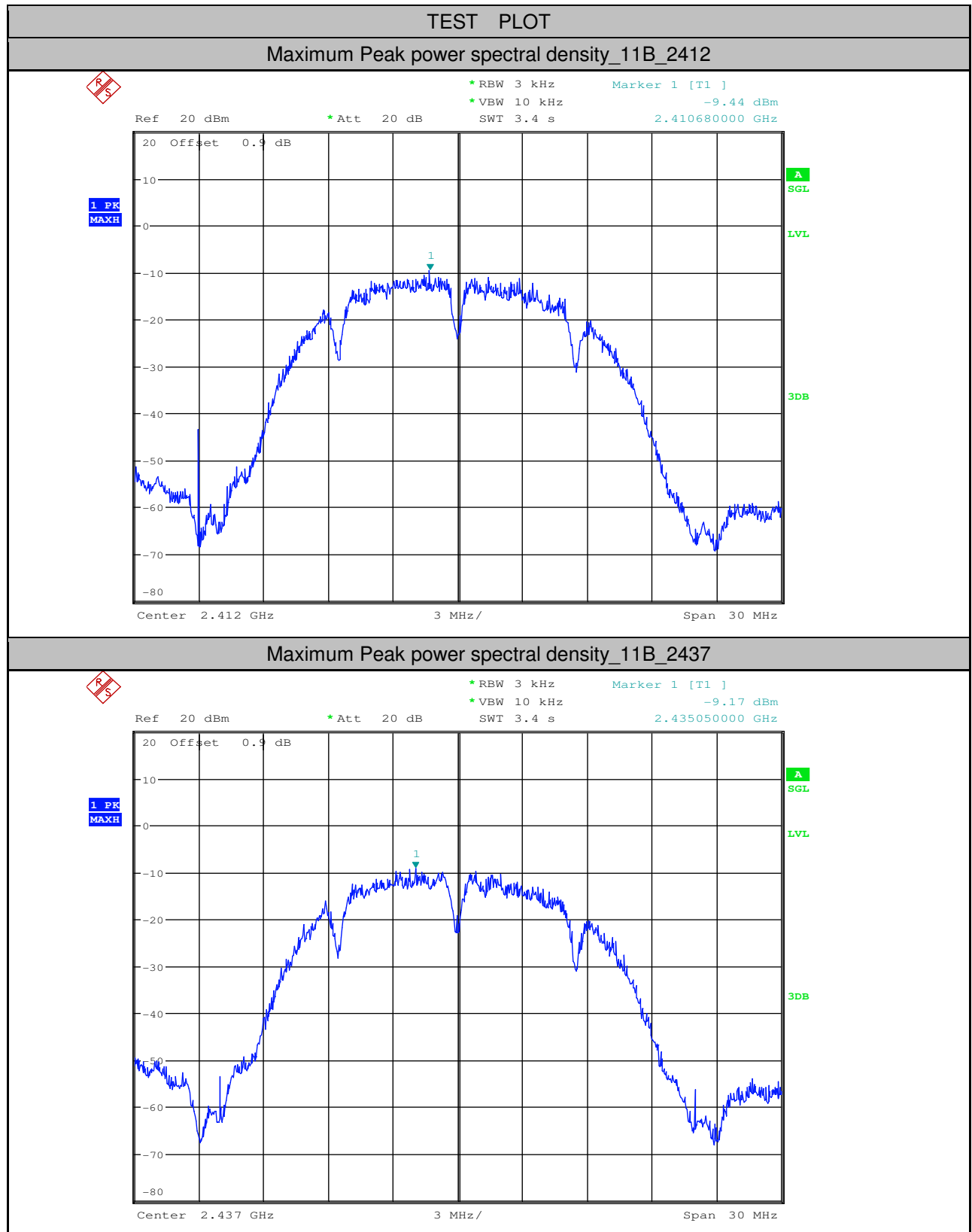
3.Maximum peak conducted output power

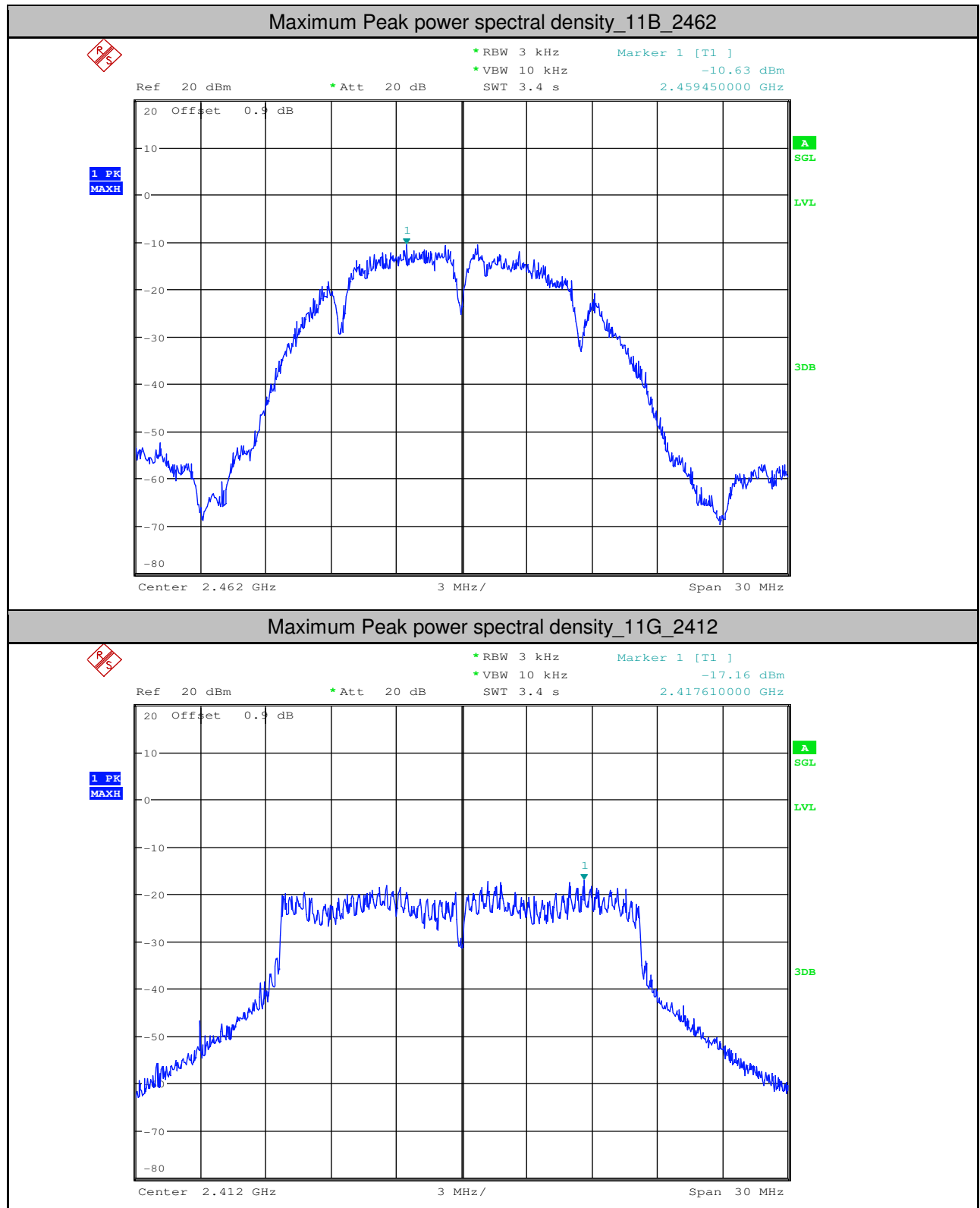
Test Mode	Test Channel	Power[dBm]	Limit[dBm]	Verdict
11B	2412	16.71	<30	PASS
11B	2437	17.63	<30	PASS
11B	2462	16.04	<30	PASS
11G	2412	16.88	<30	PASS
11G	2437	17.31	<30	PASS
11G	2462	15.85	<30	PASS
11N20SISO	2412	17.31	<30	PASS
11N20SISO	2437	17.76	<30	PASS
11N20SISO	2462	16.38	<30	PASS
11N40SISO	2422	17.05	<30	PASS
11N40SISO	2437	16.6	<30	PASS
11N40SISO	2452	17.01	<30	PASS

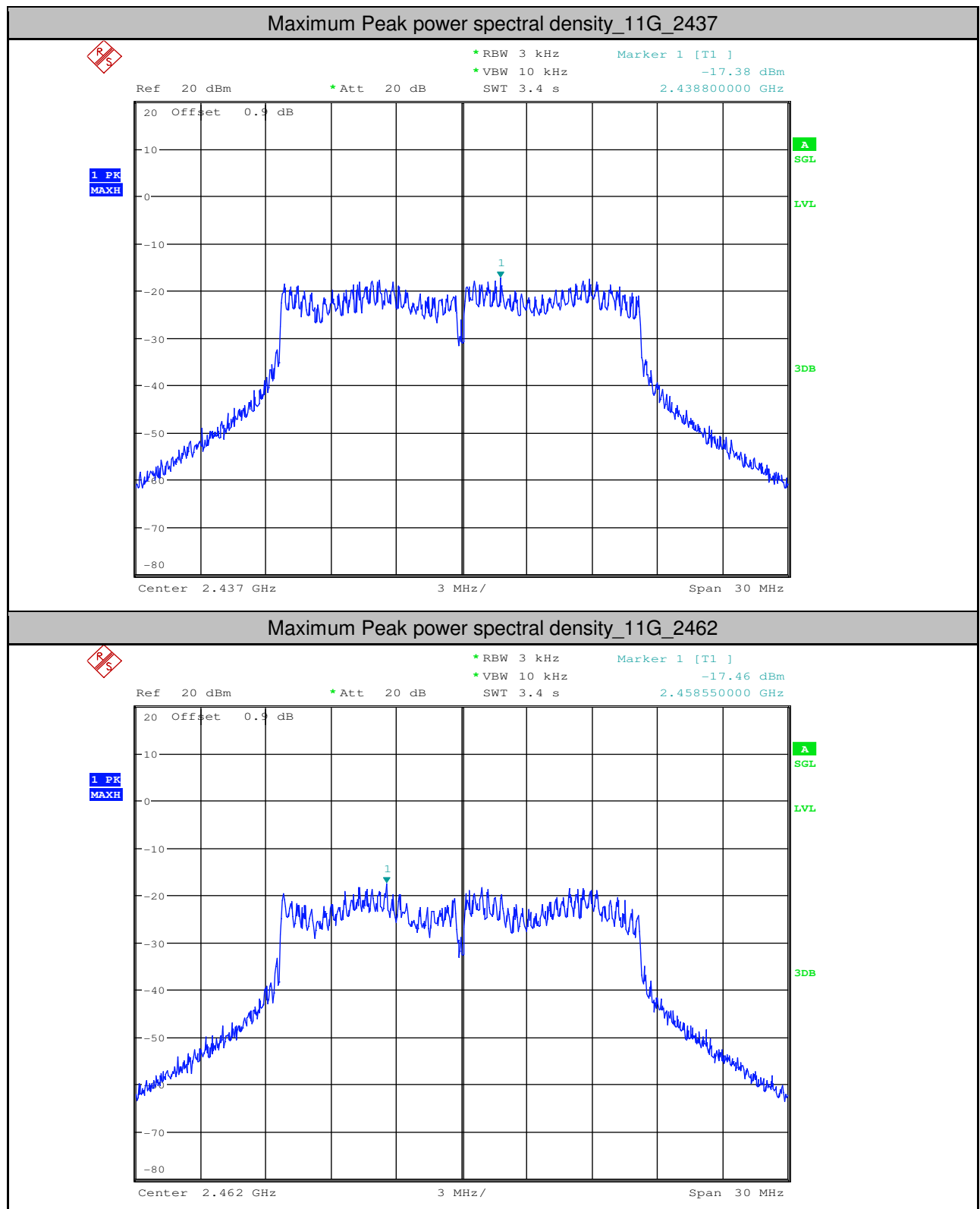


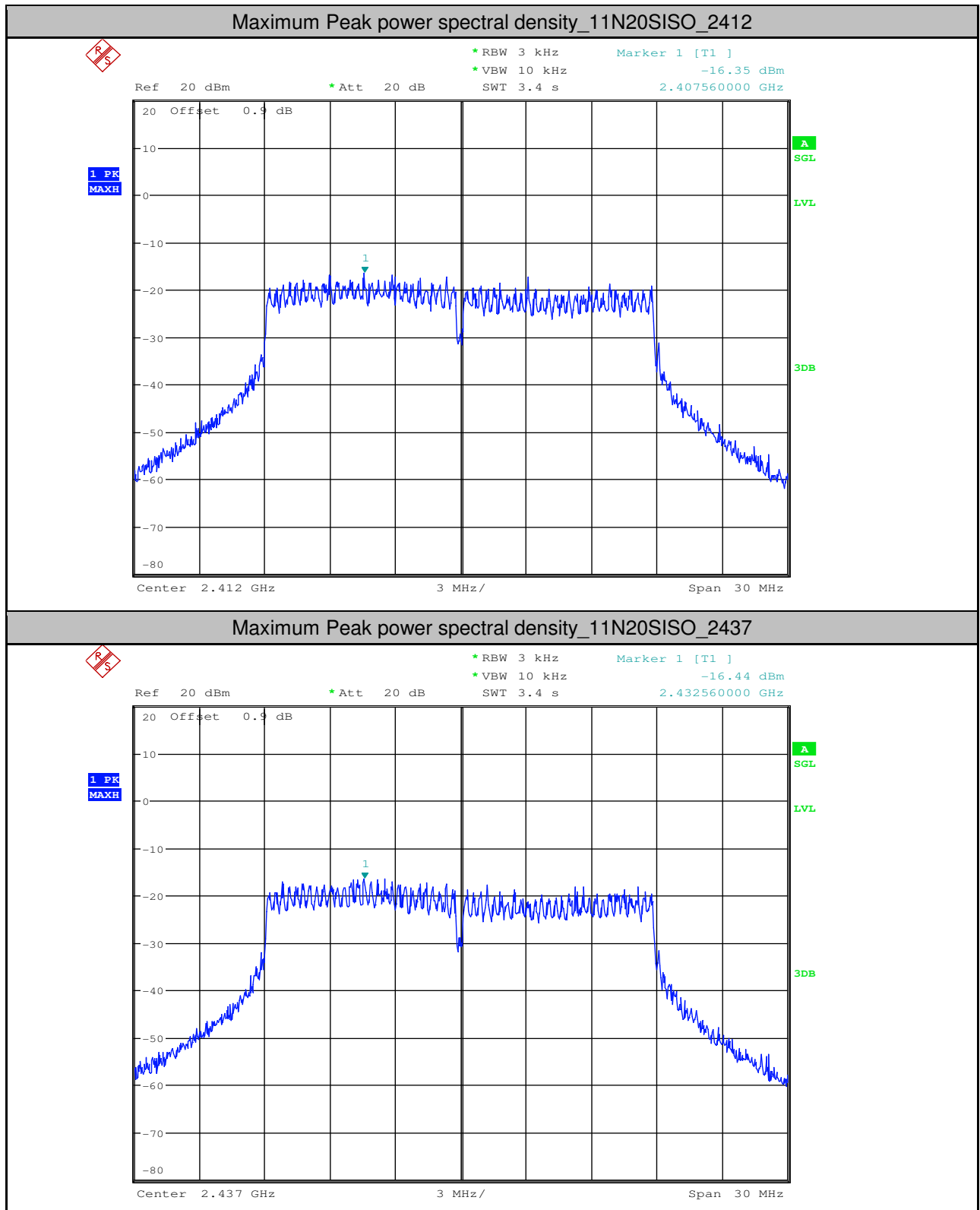
4. Maximum Peak power spectral density

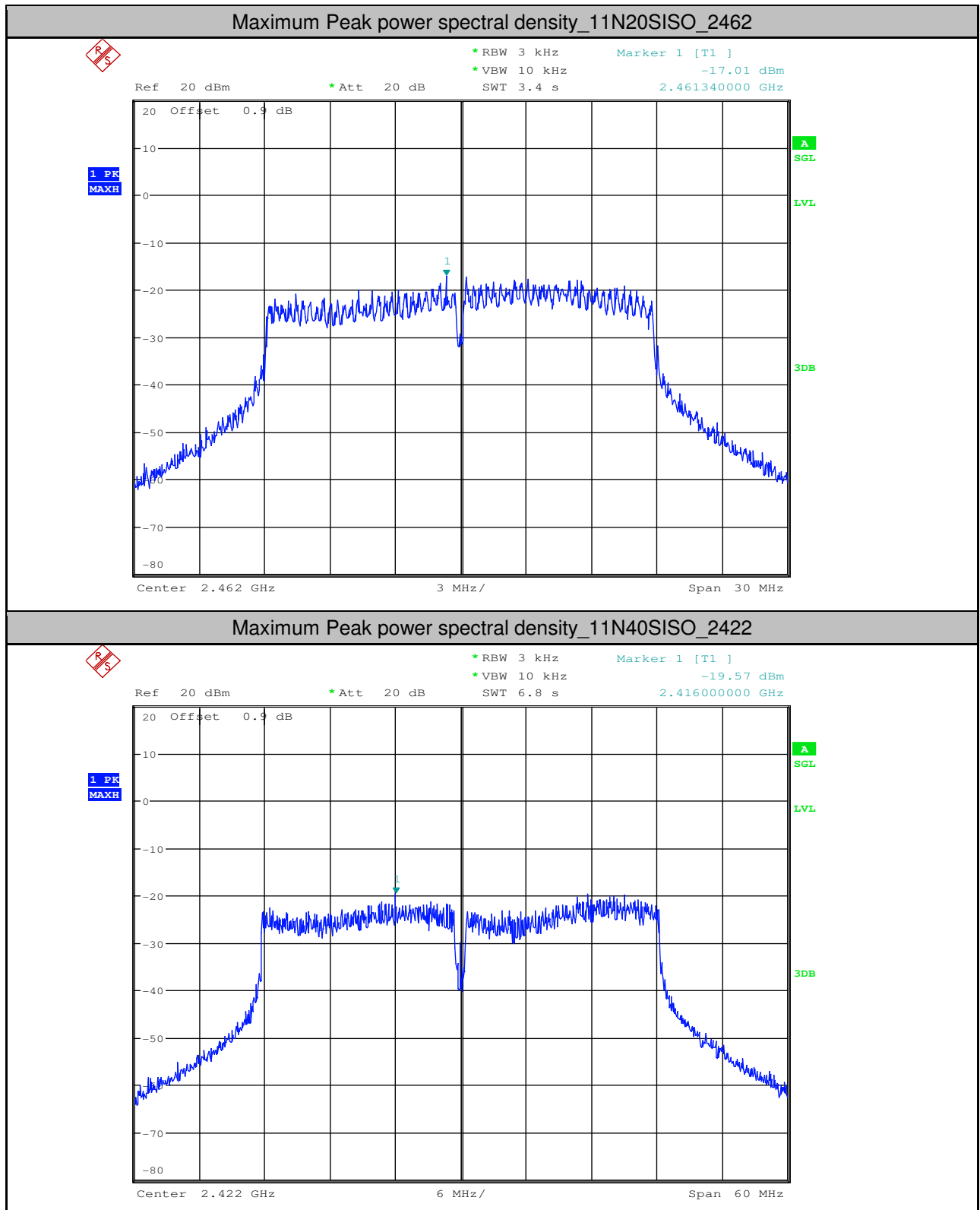
Test Mode	Test Channel	PSD[dBm/MHz]	Limit[dBm/MHz]	Verdict
11B	2412	-9.44	<8.00	PASS
11B	2437	-9.17	<8.00	PASS
11B	2462	-10.63	<8.00	PASS
11G	2412	-17.16	<8.00	PASS
11G	2437	-17.38	<8.00	PASS
11G	2462	-17.46	<8.00	PASS
11N20SISO	2412	-16.35	<8.00	PASS
11N20SISO	2437	-16.44	<8.00	PASS
11N20SISO	2462	-17.01	<8.00	PASS
11N40SISO	2422	-19.57	<8.00	PASS
11N40SISO	2437	-18.83	<8.00	PASS
11N40SISO	2452	-18.79	<8.00	PASS

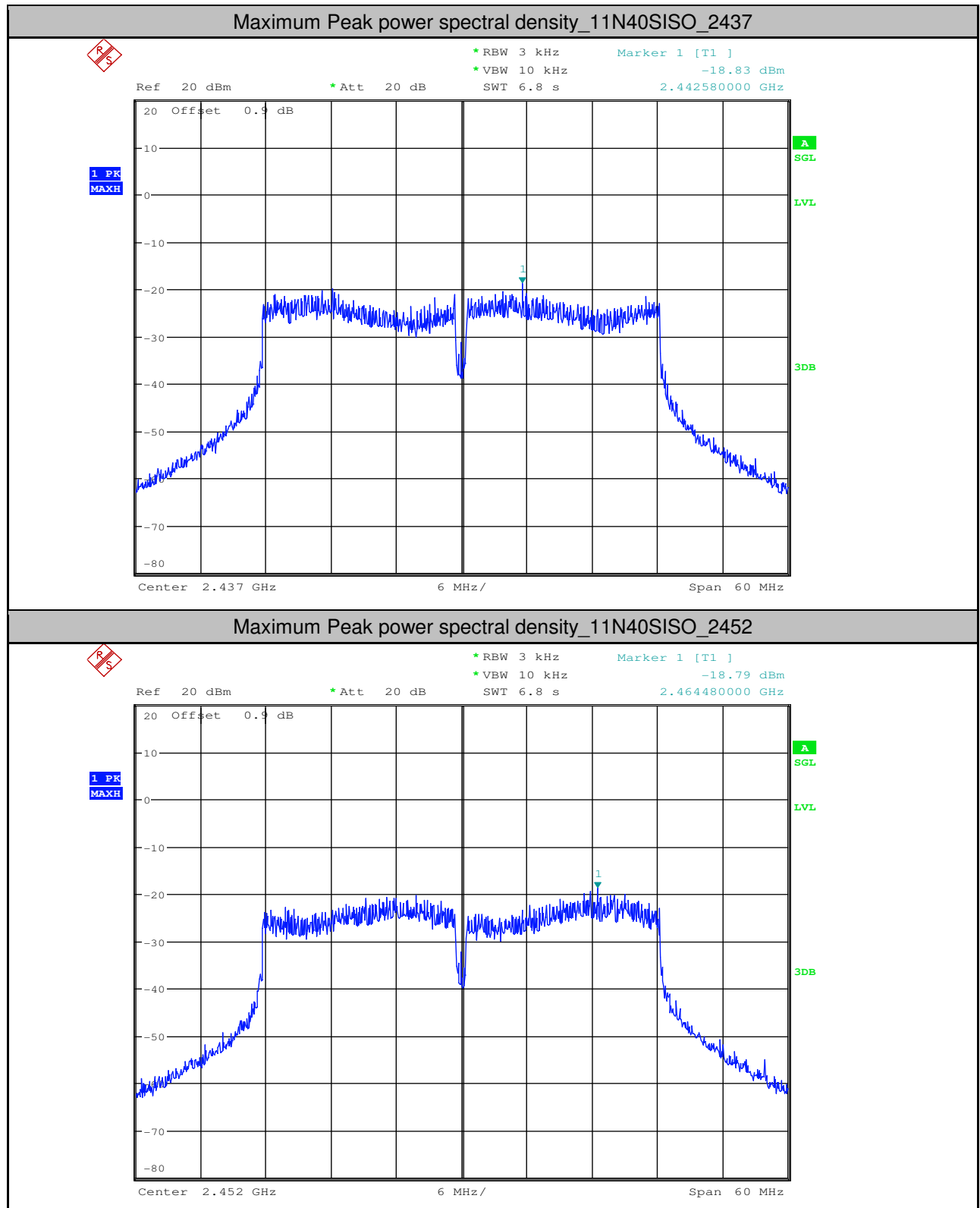








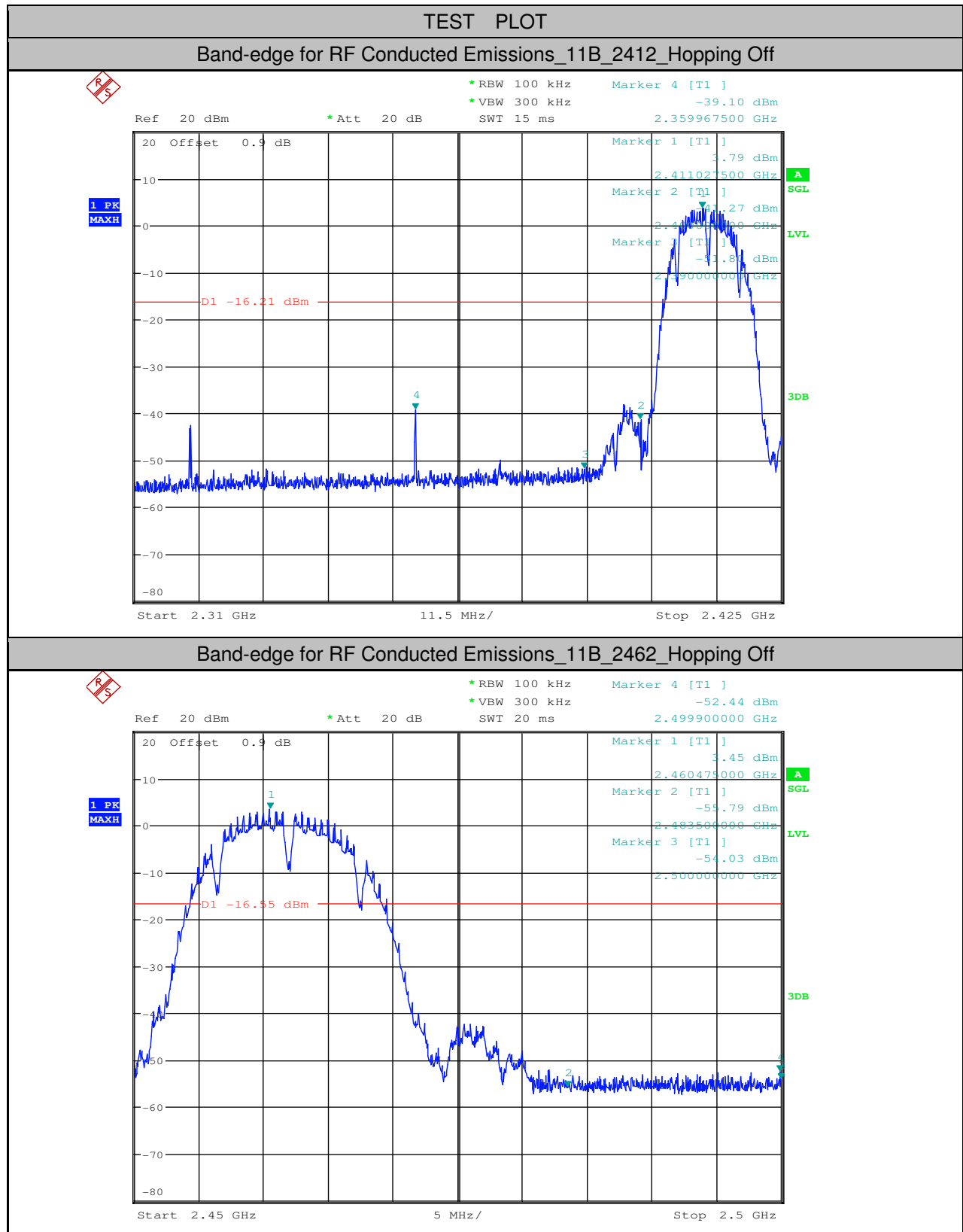


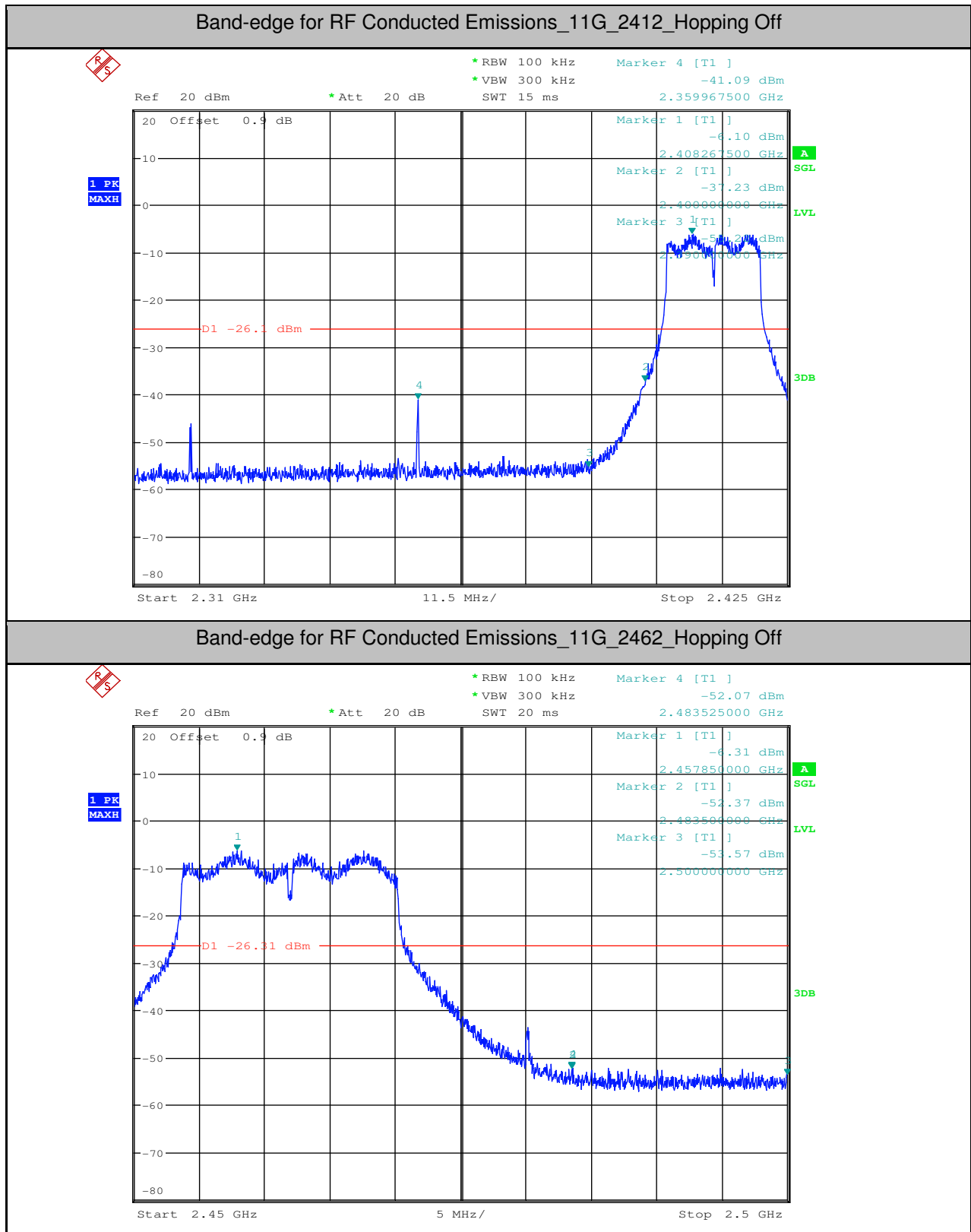




5. Band-edge for RF Conducted Emissions

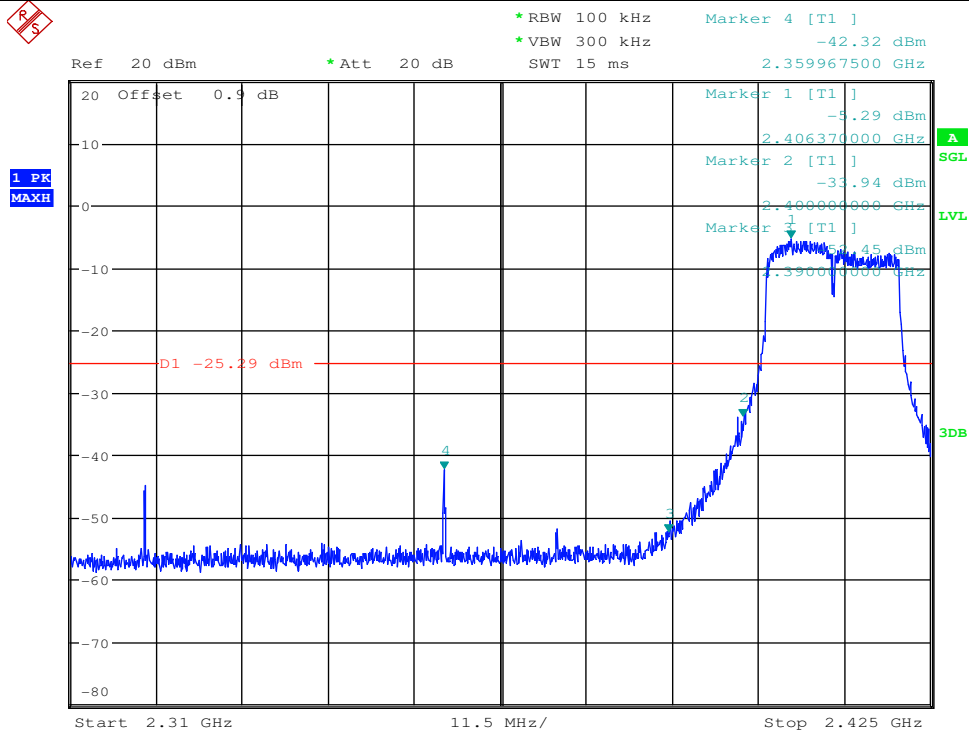
Test Mode	Test Channel	Carrier Power[dBm]	Max. Spurious Level [dBm]	Limit [dBm]	Verdict
11B	2412	3.790	-39.100	<-16.21	PASS
11B	2462	3.450	-52.437	<-16.55	PASS
11G	2412	-6.100	-41.090	<-26.1	PASS
11G	2462	-6.310	-52.067	<-26.31	PASS
11N20SISO	2412	-5.290	-42.318	<-25.29	PASS
11N20SISO	2462	-5.520	-51.481	<-25.52	PASS
11N40SISO	2422	-7.570	-42.760	<-27.57	PASS
11N40SISO	2452	-8.040	-46.091	<-28.04	PASS



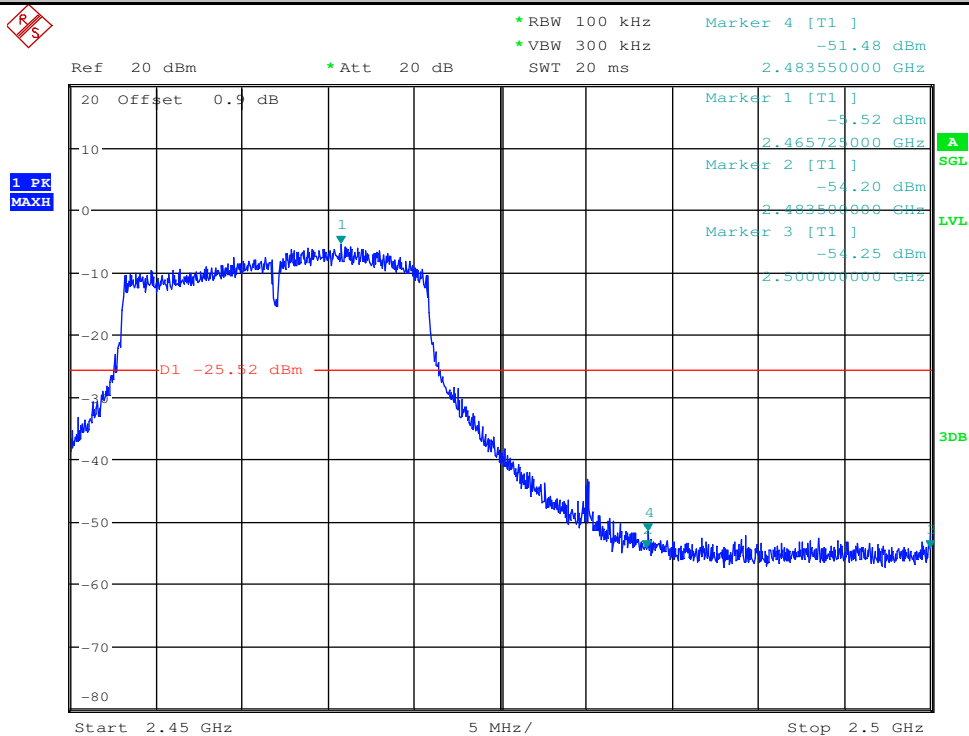


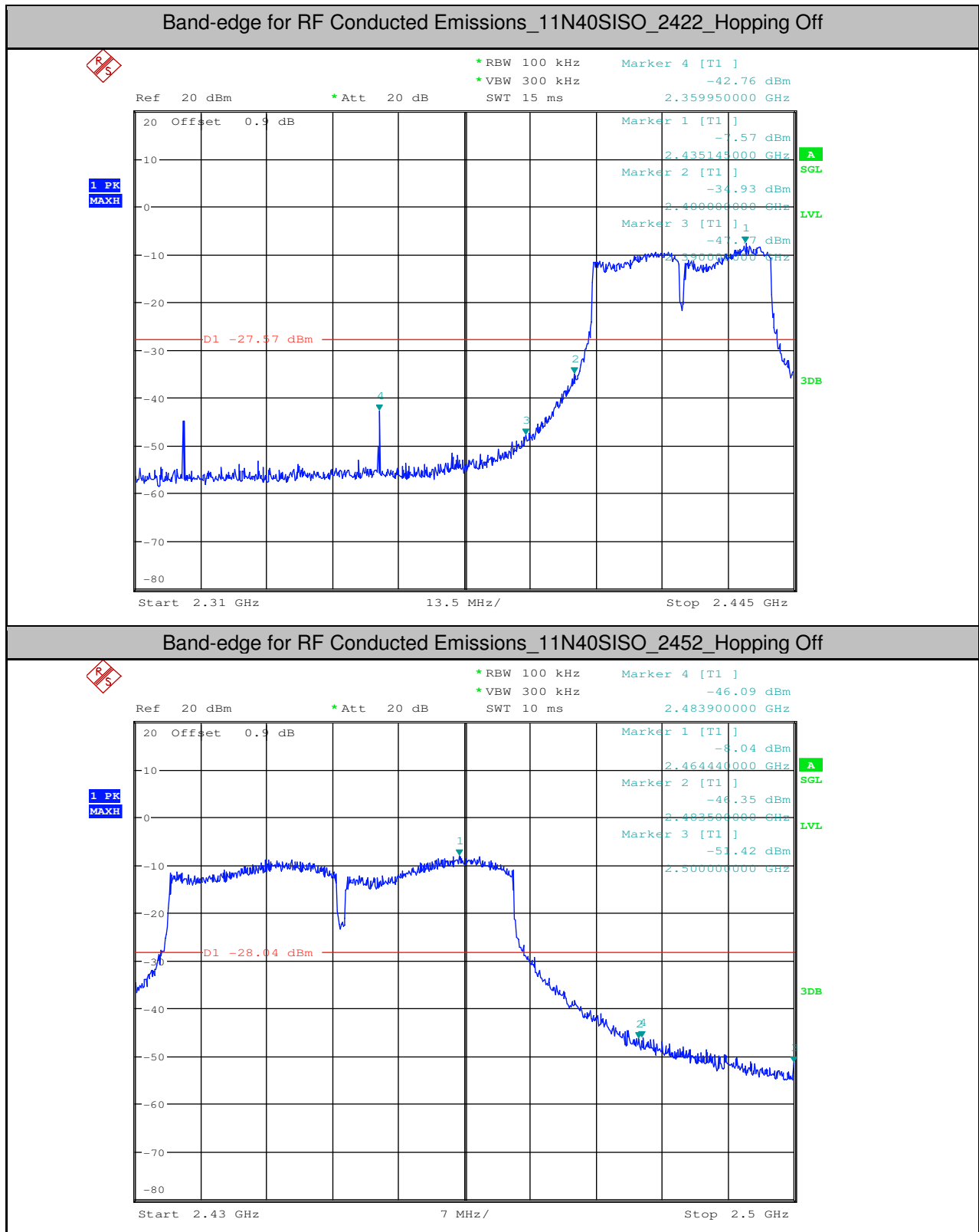


Band-edge for RF Conducted Emissions_11N20SISO_2412_Hopping Off



Band-edge for RF Conducted Emissions_11N20SISO_2462_Hopping Off







6.RF Conducted Spurious Emissions

Test Mode	Test Channel	StartFre [MHz]	StopFre [MHz]	RBW [kHz]	VBW [kHz]	Pref[dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
11B	2412	30	10000	1000	3000	4.03	-35.140	<-15.97	PASS
11B	2412	10000	25000	1000	3000	4.03	-55.130	<-15.97	PASS
11B	2437	30	10000	1000	3000	4.8	-34.260	<-15.2	PASS
11B	2437	10000	25000	1000	3000	4.8	-55.300	<-15.2	PASS
11B	2462	30	10000	1000	3000	3.67	-37.020	<-16.33	PASS
11B	2462	10000	25000	1000	3000	3.67	-55.100	<-16.33	PASS
11G	2412	30	10000	1000	3000	-5.76	-44.140	<-25.76	PASS
11G	2412	10000	25000	1000	3000	-5.76	-54.950	<-25.76	PASS
11G	2437	30	10000	1000	3000	-4.76	-43.970	<-24.76	PASS
11G	2437	10000	25000	1000	3000	-4.76	-55.290	<-24.76	PASS
11G	2462	30	10000	1000	3000	-6.57	-40.800	<-26.57	PASS
11G	2462	10000	25000	1000	3000	-6.57	-55.330	<-26.57	PASS
11N20SISO	2412	30	10000	1000	3000	-5.12	-41.330	<-25.12	PASS
11N20SISO	2412	10000	25000	1000	3000	-5.12	-54.990	<-25.12	PASS
11N20SISO	2437	30	10000	1000	3000	-5.05	-41.280	<-25.05	PASS
11N20SISO	2437	10000	25000	1000	3000	-5.05	-54.970	<-25.05	PASS
11N20SISO	2462	30	10000	1000	3000	-5.8	-40.550	<-25.8	PASS
11N20SISO	2462	10000	25000	1000	3000	-5.8	-54.680	<-25.8	PASS
11N40SISO	2422	30	10000	1000	3000	-8.57	-42.100	<-28.57	PASS
11N40SISO	2422	10000	25000	1000	3000	-8.57	-55.100	<-28.57	PASS
11N40SISO	2437	30	10000	1000	3000	-8.98	-40.740	<-28.98	PASS
11N40SISO	2437	10000	25000	1000	3000	-8.98	-55.230	<-28.98	PASS
11N40SISO	2452	30	10000	1000	3000	-8.41	-41.640	<-28.41	PASS
11N40SISO	2452	10000	25000	1000	3000	-8.41	-55.270	<-28.41	PASS

