TEST REPORT

FCC ID: 2A5UI-BM5WR

Product: LCD monitors

Model No.: BM5 Ⅲ WR

Additional Model No.: PT6L,LH5U,LH5W,BM5WR,BM5 Ⅳ WR ,BM5 Ⅴ WR , LH5H Ⅱ,LH5H Ⅲ,LH5H Ⅴ, LH5P Ⅱ,LH5P Ⅲ,BM7 Ⅱ WR ,BM7 Ⅲ WR ,RH8,OEYEWR, OEYEWR Ⅱ,KEYGRIP Ⅱ,BKEY,BKEY Ⅱ,BKEYⅢ,Shooter,Shooter Ⅱ, Shooter Ⅲ , LH7P,LH7P Ⅱ,LH7H,LH7H Ⅱ,LH8P,LH8P Ⅱ,LH8H,LH8H Ⅱ

Trade Mark: PortKeys

Report No.: WSCT-A2LA-R&E220300105A-Wi-Fi

Issued Date: 01 April 2022

Issued for:

SHENZHEN PORTKEYS ELECTRONIC TECHNOLOGY CO.,LTD
ROOM 201, BUILDING 1 , NO. 101, SHANGWEI ROAD, SHANGWEI VILLAGE, ZHANGKENGJING COMMUNITY, GUANHU STREET, LONGHUA DISTRICT, SHENZHEN FOTAN NT

Issued By:

WORLD STANDARDIZATION CERTIFICATION & TESTING GROUP (SHENZHEN) CO., LTD.
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Note: In recognition of the successful completion of the A2LA evaluation process, (including an assessment of the laboratory's compliance with A2LA's ENERGY STAR ® Accreditation Program requirements 1) accreditation is granted to this laboratory to perform the following tests: EMC, electromagnetic compatibility, telecommunications and Energy Star.

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1. GENERAL INFORMATION

Product:	LCD monitors
Model No.:	BM5 Ⅲ WR
Additional Model:	PT6L,LH5U,LH5W,BM5WR,BM5 Ⅳ WR ,BM5 Ⅴ WR , LH5H Ⅱ,LH5H Ⅲ, LH5H Ⅴ, LH5P Ⅱ,LH5P Ⅲ,BM7 Ⅱ WR ,BM7 Ⅲ WR ,RH8,OEYEWR,OEYEWR Ⅱ,KEYGRIP Ⅱ,BKEY,BKEY Ⅱ,BKEY Ⅲ,Shooter,Shooter Ⅱ, Shooter Ⅲ ,LH7P, LH7PⅡ,LH7H,LH7H Ⅱ,LH8P,LH8P Ⅱ,LH8H,LH8H Ⅱ
Applicant:	SHENZHEN PORTKEYS ELECTRONIC TECHNOLOGY CO.,LTD
Address:	Room 201, Building 1 , No. 101, ShangWei Road, ShangWei Village, ZhangKengJing Community, GuanHu Street, LongHua District, ShenZhen
Manufacturer:	SHENZHEN PORTKEYS ELECTRONIC TECHNOLOGY CO.,LTD
Address:	Room 201, Building 1 , No. 101, ShangWei Road, ShangWei Village, ZhangKengJing Community, GuanHu Street, LongHua District, ShenZhen
Data of receipt	11March 2022
Date of Test:	11March 2022 to 30March 2022
Applicable Standards:	FCC Rules Part15 Subpart C.

The above equipment has been tested by World Standardization Certification & Testing Group Co., Ltd. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By: Wang Xiang **(Wang Xiang)**

Check By: Chen Xu **(Chen Xu)**

Approved By: **(Wang Fengbing)**

Date: 01 April 2022

1.1. GENERAL DESCRIPTION OF EUT

Equipment Type:	LCD monitors
Test Model:	BM5 Ⅲ WR
Additional Model:	PT6L,LH5U,LH5W,BM5WR,BM5 Ⅳ WR ,BM5 Ⅴ WR , LH5H Ⅱ,LH5H Ⅲ,LH5H Ⅴ, LH5P Ⅱ,LH5P Ⅲ,BM7 Ⅱ WR ,BM7 Ⅲ WR , RH8,OEYEWR,OEYEWR Ⅱ,KEYGRIP Ⅱ,BKEY,BKEY Ⅱ,BKEY Ⅲ, Shooter,Shooter Ⅱ, Shooter Ⅲ ,LH7P,LH7PⅡ,LH7H,LH7H Ⅱ,LH8P, LH8P Ⅱ,LH8H,LH8H Ⅱ
Trade Mark	PortKeys
Hardware version:	NA
Software version:	N/A
Extreme Temp. Tolerance	0℃ to +40℃
Power Supply	DC 12V
Operating Frequency	2412-2462MHz
Channels	11
Channel Spacing	5MHz
Modulation Type	CCK for IEEE 802.11b OFDM for IEEE 802.11g/n HT-20/n HT-40
Antenna Type:	RP-SMA
Antenna gain:	0.78dBi
Deviation	None
Condition of Test Sample	Normal

Models difference

BM5 Ⅲ WR ,PT6L,LH5U,LH5W,BM5WR,BM5 IV WR ,BM5 V WR , LH5H II,LH5H III,LH5H V, LH5P II,LH5P III,BM7 II WR ,BM7 III WR ,RH8,OEYEWR,OEYEWR II,KEYGRIP II,BKEY,BKEY II,BKEY III,Shooter,Shooter II, Shooter III ,LH7P,LH7PII,LH7H,LH7H II,LH8P,LH8P II,LH8H, LH8H II are series models, only the appearance size is different,the main test is BM5 Ⅲ WR.

1.2. FACILITIES AND ACCREDITATIONS

All measurement facilities used to collect the measurement data are located at Building A-B, Baoshi Science & Technology Park, Baoshi Road, Bao'an District, Shenzhen, Guangdong, China of the WORLD STANDARDIZATION CERTIFICATION & TESTING GROUP (SHENZHEN) CO., LTD.

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

1.2.1. ACCREDITATIONS

China National Accreditation Service for Conformity Assessment (CNAS)
Registration number NO: L3732

American Association for Laboratory Accreditation(A2LA)

Registration NO：5768.01

Copies of granted accreditation certificates are available for downloading from our web site, **http://www.wsct-cert.com**

2. TEST DESCRIPTION

2.1 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y ± U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %。

No.	Item	Uncertainty
1	Conducted Emission Test	±3.2dB
2	RF power, conducted	±0.16dB
3	Spurious emissions, conducted	±0.21dB
4	All emissions, radiated(<1G)	±4.7dB
5	All emissions, radiated(>1G)	±4.7dB
6	Temperature	±0.5°C
7	Humidity	±2%

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	802.11b
Mode 2	802.11g
Mode 3	802.11n20
Mode 4	802.11n40

For Conducted Emission	
Final Test Mode	Description
Mode 1	802.11b

For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11b
Mode 2	802.11g
Mode 3	802.11n20
Mode 4	802.11n40

Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

(2) The EUT use new battery.

(3)The data rate was set in 1Mbps, 6 Mbps, 6.5 Mbps and 13.5M for radiated emission due to the highest RF output power.

(4) Record the worst case of each test item in this report.

(5) When we test it, the duty cycle ≥ 98%

2.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

Test software Version	N/A

Frequency(802.11b/g/n20)	2412 MHz	2437 MHz	2462 MHz
Frequency(802.11n40)	2422 MHz	2437 MHz	2452 MHz

2.4 CONFIGURATION OF SYSTEM UNDER TEST

Mode 1:

Mode 2:

(EUT: LCD monitors)

2.5 DESCRIPTION OF SUPPORT UNITS (CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
1	DC source	/	/	/	/
2	Camera	/	/	/	/

Note:

(1) All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

(2) Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

3. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission Test	PASS	Complies
15.247(a)(2) Limit	Spectrum bandwidth of a Orthogonal Frequency Division Multiplex System Limit: 6dB bandwidth>500kHz	PASS	Complies
15.247(b)	Maximum peak outputpower Limit: max. 30dBm	PASS	Complies
15.109,15.205 & 15.209	Transmitter Radiated Emission Limit: Table 15.209	PASS	Complies
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Complies
15.247(d)	Band edge Limit: 30dB less than Reference level Restricted band limit: Table 15.209	PASS	Complies

NOTE:

(1)" N/A" denotes test is not applicable in this test report.

4. MEASUREMENT INSTRUMENTS

NAME OF EQUIPMENT	MANUFACTURER	MODEL	SERIAL NUMBER	Calibration Date	Calibration Due.
EMI Test Receiver	R&S	ESCI	100005	2021-11-05	2022-11-04
LISN	AFJ	LS16	16010222119	2021-11-05	2022-11-04
LISN(EUT)	Mestec	AN3016	04/10040	2021-11-05	2022-11-04
Universal Radio Communication Tester	R&S	CMU 200	1100.0008.02	2021-11-05	2022-11-04
Coaxial cable	Megalon	LMR400	N/A	2021-11-05	2022-11-04
GPIB cable	Megalon	GPIB	N/A	2021-11-05	2022-11-04
Spectrum Analyzer	R&S	FSU	100114	2021-11-05	2022-11-04
Pre Amplifier	H.P.	HP8447E	2945A02715	2021-11-05	2022-11-04
Pre-Amplifier	CDSI	PAP-1G18-38	--	2021-11-05	2022-11-04
Bi-log Antenna	SUNOL Sciences	JB3	A021907	2021-11-05	2022-11-04
9*6*6 Anechoic	--	--	--	2021-11-05	2022-11-04
Horn Antenna	COMPLIANCE ENGINEERING	CE18000	--	2021-11-05	2022-11-04
Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-631	2021-11-05	2022-11-04
Cable	TIME MICROWAVE	LMR-400	N-TYPE04	2021-11-05	2022-11-04
System-Controller	CCS	N/A	N/A	N.C.R	N.C.R
Turn Table	CCS	N/A	N/A	N.C.R	N.C.R
Antenna Tower	CCS	N/A	N/A	N.C.R	N.C.R
RF cable	Murata	MXHQ87WA3000	-	2021-11-05	2022-11-04
Loop Antenna	EMCO	6502	00042960	2021-11-05	2022-11-04
Horn Antenna	SCHWARZBECK	BBHA 9170	1123	2021-11-05	2022-11-04
Power meter	Anritsu	ML2487A	6K00003613	2021-11-05	2022-11-04
Power sensor	Anritsu	MX248XD	--	2021-11-05	2022-11-04

5. EMC EMISSION TEST

5.1 CONDUCTED EMISSION MEASUREMENT

5.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

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

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

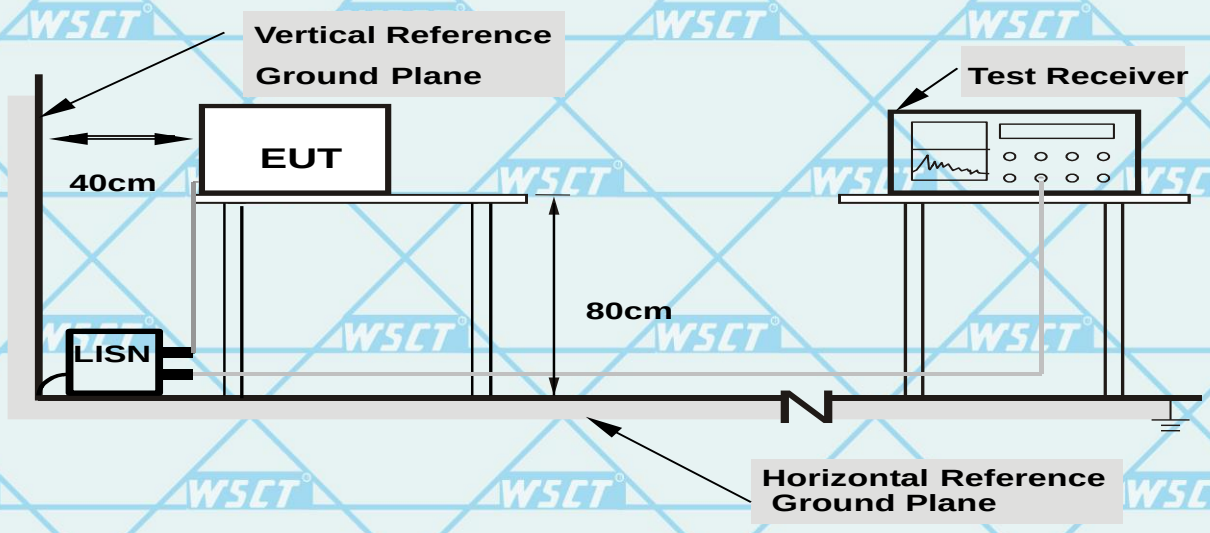
5.1.2 TEST PROCEDURE

a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

5.1.3 DEVIATION FROM TEST STANDARD

No deviation

5.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

5.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

5.1.6 TEST RESULTS

NOTE:The EUT is powered by a DC source, so conducted emissions are not applicable.

5.2 RADIATED EMISSION MEASUREMENT

5.2.1 Radiated Emission Limits (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/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

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 1Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

5.2.2 TEST PROCEDURE

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

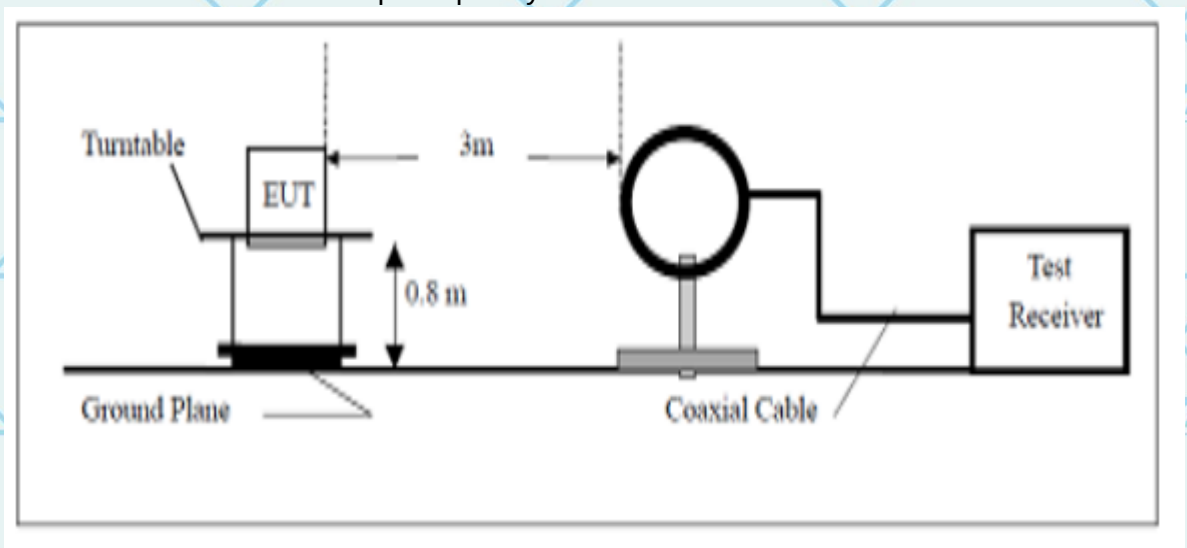
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

5.2.3 DEVIATION FROM TEST STANDARD

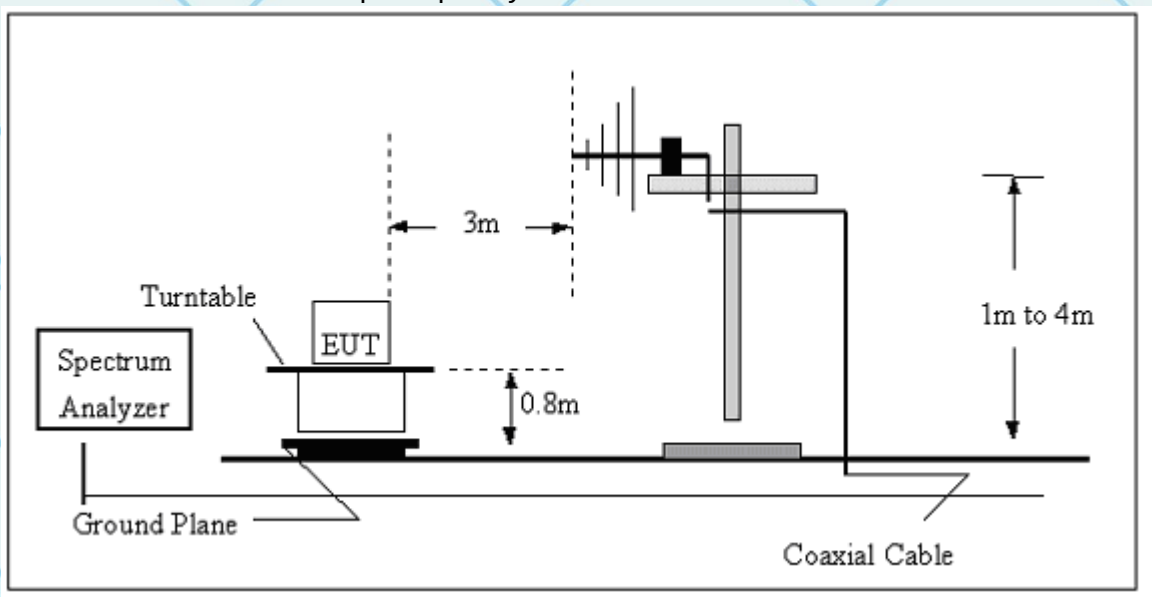
No deviation

5.2.4 TEST SETUP

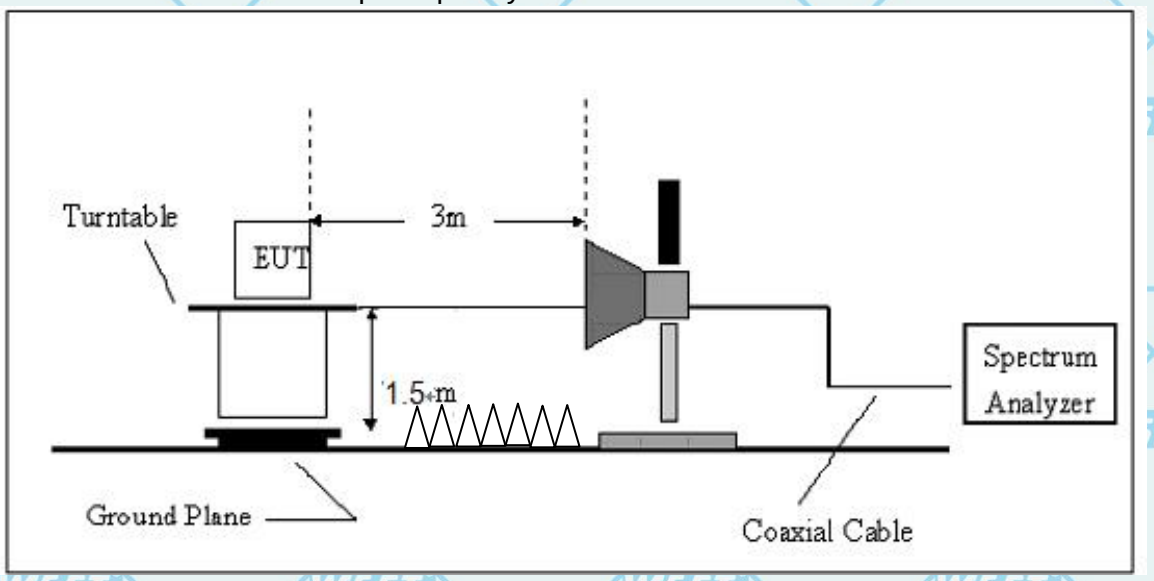
（A）Radiated Emission Test-Up Frequency Below 30MHz



（B）Radiated Emission Test-Up Frequency 30MHz~1GHz



（C）Radiated Emission Test-Up Frequency Above 1GHz



5.2.5 **EUT OPERATING CONDITIONS**

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.2.5.1 RESULTS (Below 30 MHz)

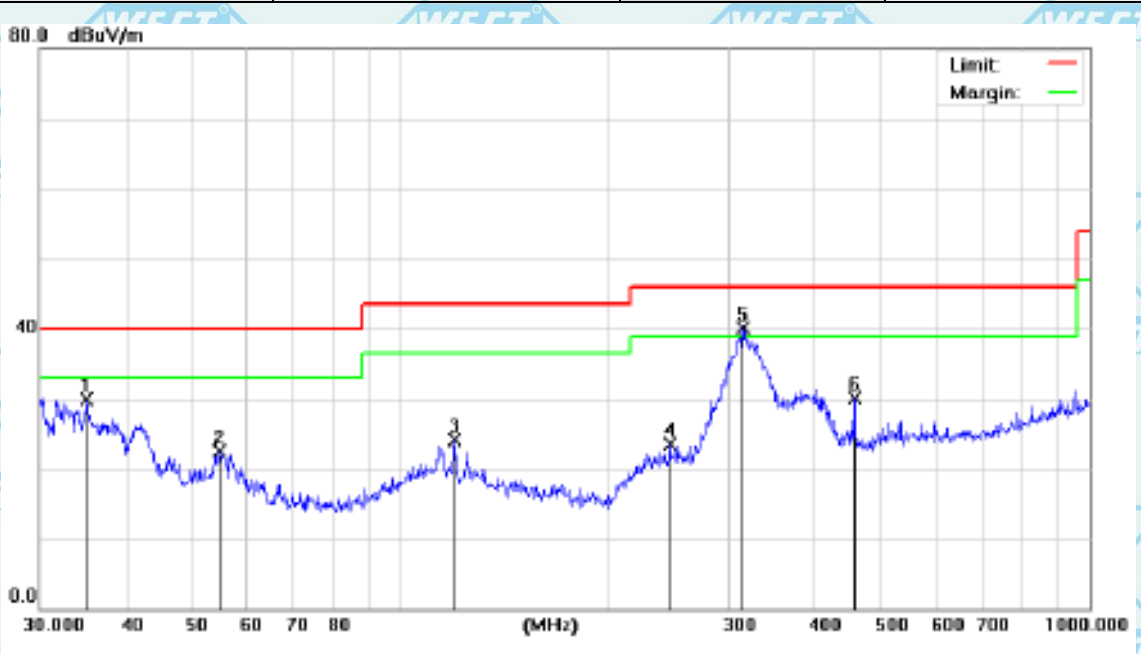
Temperature	20 ℃	Relative Humidity	48%
Pressure	1010 hPa	Test Mode	Mode 1

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	P
--	--	--	--	P

NOTE:
No result in this part for margin above 20dB.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuV) + distance extrapolation factor.
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

5.2.5.2 TEST RESULTS (Between 30M – 1000 MHz)

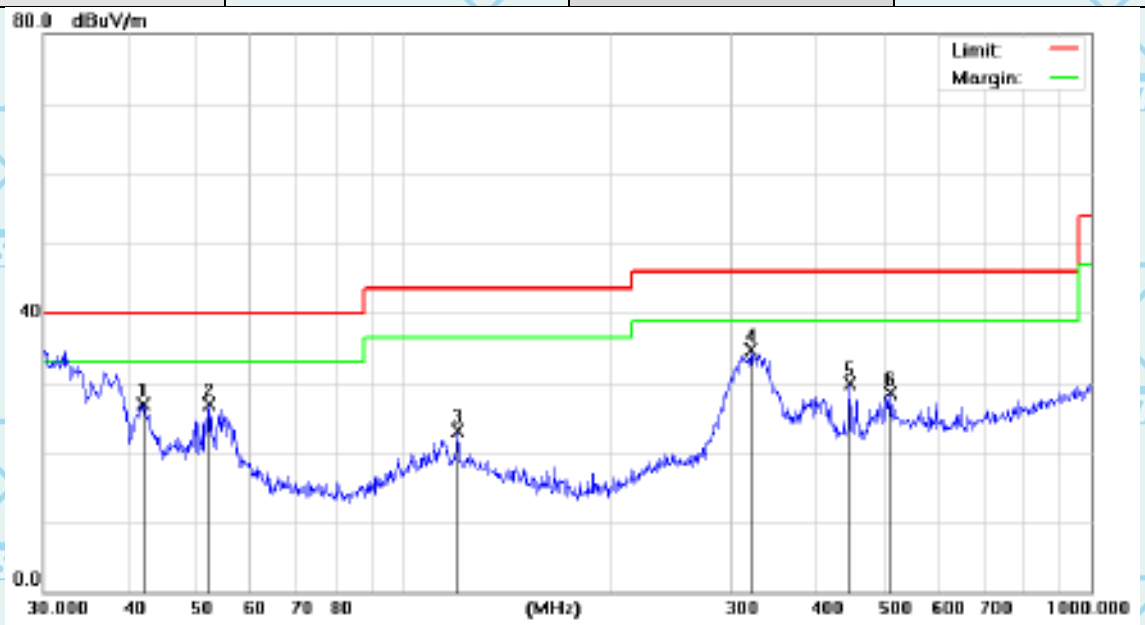
Temperature	20 ℃	Relative Humidity	48%
Pressure	1010 hPa	Polarization :	Horizontal
Test Mode	Mode 1		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		35.1278	27.05	2.80	29.85	40.00	-10.15	QP
2		54.6429	28.04	-5.57	22.47	40.00	-17.53	QP
3		119.8556	26.87	-2.82	24.05	43.50	-19.45	QP
4		245.9509	28.49	-4.91	23.58	46.00	-22.42	QP
5	*	314.3765	42.27	-2.07	40.20	46.00	-5.80	QP
6		455.9058	30.02	0.06	30.08	46.00	-15.92	QP

Remark: All the modes have been investigated, and only worst mode is presented in this report.

Temperature	20 ℃	Relative Humidity	48%
Pressure	1010 hPa	Polarization :	Vertical
Test Mode	Mode 1		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		41.8596	27.69	-0.80	26.89	40.00	-13.11	QP
2		52.2079	32.23	-5.28	26.95	40.00	-13.05	QP
3		119.8556	25.97	-2.82	23.15	43.50	-20.35	QP
4	*	319.9370	36.79	-2.00	34.79	46.00	-11.21	QP
5		446.4141	29.89	-0.05	29.84	46.00	-16.16	QP
6		511.8352	27.74	0.67	28.41	46.00	-17.59	QP

Remark: All the modes have been investigated, and only worst mode is presented in this report.

5.2.5.3 TEST RESULTS (1GHz to 25GHz)

Temperature	20 ℃	Relative Humidity	48%
Pressure	1010 hPa	Test Mode	Mode 1 TX
Frequency	2412MHz		

Freq. (MHz)	Ant. Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4824	V	60.95	39.70	74	54	-13.05	-14.30
7236	V	58.08	39.88	74	54	-15.92	-14.12
4824	H	58.29	39.72	74	54	-15.71	-14.28
7236	H	58.09	39.09	74	54	-15.91	-14.91

Remark:
All emissions not reported were more than 20dB below the specified limit or in the noise floor.
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

Temperature	20 ℃	Relative Humidity	48%
Pressure	1010 hPa	Test Mode	Mode 1 TX
Frequency	2437MHz		

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4874	V	59.91	40.07	74	54	-14.09	-13.93
7311	V	59.47	39.51	74	54	-14.53	-14.49
4874	H	58.80	39.01	74	54	-15.20	-14.99
7311	H	58.31	39.31	74	54	-15.69	-14.69

Remark:
All emissions not reported were more than 20dB below the specified limit or in the noise floor.
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

Temperature	20 ℃	Relative Humidity	48%
Pressure	1010 hPa	Test Mode	Mode 1 TX
Frequency	2462MHz		

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4924	V	60.35	39.67	74	54	-13.65	-14.33
7386	V	58.79	39.21	74	54	-15.21	-14.79
4924	H	58.06	40.81	74	54	-15.94	-13.19
7386	H	58.79	39.79	74	54	-15.21	-14.21

Remark:
All emissions not reported were more than 20dB below the specified limit or in the noise floor.
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

Temperature	20 ℃	Relative Humidity	48%
Pressure	1010 hPa	Test Mode	Mode2 TX
Frequency	2412MHz		

Freq. (MHz)	Ant. Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4824	V	60.40	39.27	74	54	-13.60	-14.73
7236	V	59.78	40.39	74	54	-14.22	-13.61
4824	H	59.15	40.11	74	54	-14.85	-13.89
7236	H	58.79	39.79	74	54	-15.21	-14.21

Remark:
All emissions not reported were more than 20dB below the specified limit or in the noise floor.
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

Temperature	20 ℃	Relative Humidity	48%
Pressure	1010 hPa	Test Mode	Mode 2 TX
Frequency	2437MHz		

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4874	V	58.70	40.23	74	54	-15.30	-13.77
7311	V	59.51	40.24	74	54	-14.49	-13.76
4874	H	58.30	39.69	74	54	-15.70	-14.31
7311	H	59.74	40.74	74	54	-14.26	-13.26

Remark:
All emissions not reported were more than 20dB below the specified limit or in the noise floor.
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

Temperature	20 ℃	Relative Humidity	48%
Pressure	1010 hPa	Test Mode	Mode 2 TX
Frequency	2462MHz		

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4924	V	58.91	40.96	74	54	-15.09	-13.04
7386	V	58.40	39.92	74	54	-15.60	-14.08
4924	H	58.76	39.53	74	54	-15.24	-14.47
7386	H	59.77	40.77	74	54	-14.23	-13.23

Remark:
All emissions not reported were more than 20dB below the specified limit or in the noise floor.
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

Temperature	20 ℃	Relative Humidity	48%
Pressure	1010 hPa	Test Mode	Mode3 TX
Frequency	2412MHz		

Freq. (MHz)	Ant. Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4824	V	59.49	41.50	74	54	-14.51	-12.50
7236	V	59.80	39.31	74	54	-14.20	-14.69
4824	H	59.61	40.34	74	54	-14.39	-13.66
7236	H	59.56	40.56	74	54	-14.44	-13.44

Remark:
All emissions not reported were more than 20dB below the specified limit or in the noise floor.
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

Temperature	20 ℃	Relative Humidity	48%
Pressure	1010 hPa	Test Mode	Mode 3 TX
Frequency	2437MHz		

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4874	V	60.13	40.32	74	54	-13.87	-13.68
7311	V	59.10	39.91	74	54	-14.90	-14.09
4874	H	58.10	39.12	74	54	-15.90	-14.88
7311	H	59.34	40.34	74	54	-14.66	-13.66

Remark:
All emissions not reported were more than 20dB below the specified limit or in the noise floor.
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

Temperature	20 ℃	Relative Humidity	48%
Pressure	1010 hPa	Test Mode	Mode 3 TX
Frequency	2462MHz		

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4924	V	59.23	40.55	74	54	-14.77	-13.45
7386	V	58.06	39.56	74	54	-15.94	-14.44
4924	H	58.62	39.67	74	54	-15.38	-14.33
7386	H	59.64	40.64	74	54	-14.36	-13.36

Remark:
All emissions not reported were more than 20dB below the specified limit or in the noise floor.
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

Temperature	20 ℃	Relative Humidity	48%
Pressure	1010 hPa	Test Mode	Mode4 TX
Frequency	2422MHz		

Freq. (MHz)	Ant. Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4844	V	60.72	39.71	74	54	-13.28	-14.29
7266	V	58.94	40.56	74	54	-15.06	-13.44
4844	H	59.33	39.89	74	54	-14.67	-14.11
7266	H	59.39	40.39	74	54	-14.61	-13.61

Remark:
All emissions not reported were more than 20dB below the specified limit or in the noise floor.
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

Temperature	20 ℃	Relative Humidity	48%
Pressure	1010 hPa	Test Mode	Mode 4 TX
Frequency	2437MHz		

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4874	V	60.83	39.70	74	54	-13.17	-14.30
7311	V	58.50	40.87	74	54	-15.50	-13.13
4874	H	59.39	40.34	74	54	-14.61	-13.66
7311	H	58.62	39.62	74	54	-15.38	-14.38

Remark:
All emissions not reported were more than 20dB below the specified limit or in the noise floor.
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

Temperature	20 ℃	Relative Humidity	48%
Pressure	1010 hPa	Test Mode	Mode 4 TX
Frequency	2452MHz		

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4904	V	58.63	41.89	74	54	-15.37	-12.11
7356	V	58.71	40.30	74	54	-15.29	-13.70
4904	H	59.68	39.68	74	54	-14.32	-14.32
7356	H	59.19	40.19	74	54	-14.81	-13.81

Remark:
All emissions not reported were more than 20dB below the specified limit or in the noise floor.
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

6. ANTENNA APPLICATION

6.1 Antenna requirement

The EUT'S antenna is met the requirement of FCC part 15C section 15.203 and 15.247

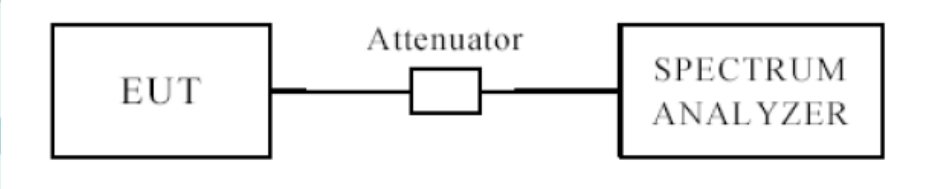
FCC part 15C section 15.247 requirements: Systems operating in the 2402-2480MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

6.2 Result

The EUT's antenna RP-SMA Antenna, The antenna's gain is 0.78dBi and meets the requirement.

7. 6DB BANDWIDTH MEASUREMENT

7.1 TEST SETUP



7.2 LIMITS OF 6DB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is >500 kHz

7.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 100 kHz
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

7.4 TEST RESULT

6dB Occupied Bandwidth

Mode		802.11b	Humidity		56% RH
Temperature		24 deg. C,			
Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	6 dB Bandwidth (kHz)	Minimum Limit (MHz)	Pass/ Fail
1	2412	1	13173.1	0.5	Pass
6	2437	1	13076.9	0.5	Pass
11	2462	1	13269.2	0.5	Pass

Mode		802.11g	Humidity		56% RH
Temperature		24 deg. C,			
Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	6 dB Bandwidth (kHz)	Minimum Limit (MHz)	Pass/ Fail
1	2412	6	18076.9	0.5	Pass
6	2437	6	18077.9	0.5	Pass
11	2462	6	17980.8	0.5	Pass

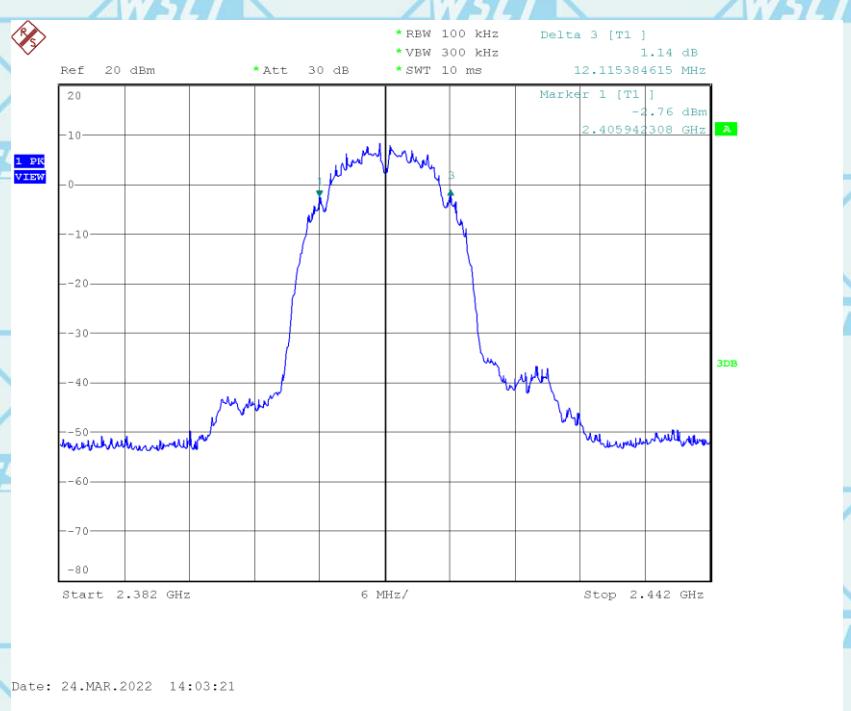
Mode	802.11n20	Humidity	56% RH
Temperature	24 deg. C,		

Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	6 dB Bandwidth (kHz)	Minimum Limit (MHz)	Pass/ Fail
1	2412	6.5	18173.1	0.5	Pass
6	2437	6.5	17980.8	0.5	Pass
11	2462	6.5	18076.9	0.5	Pass

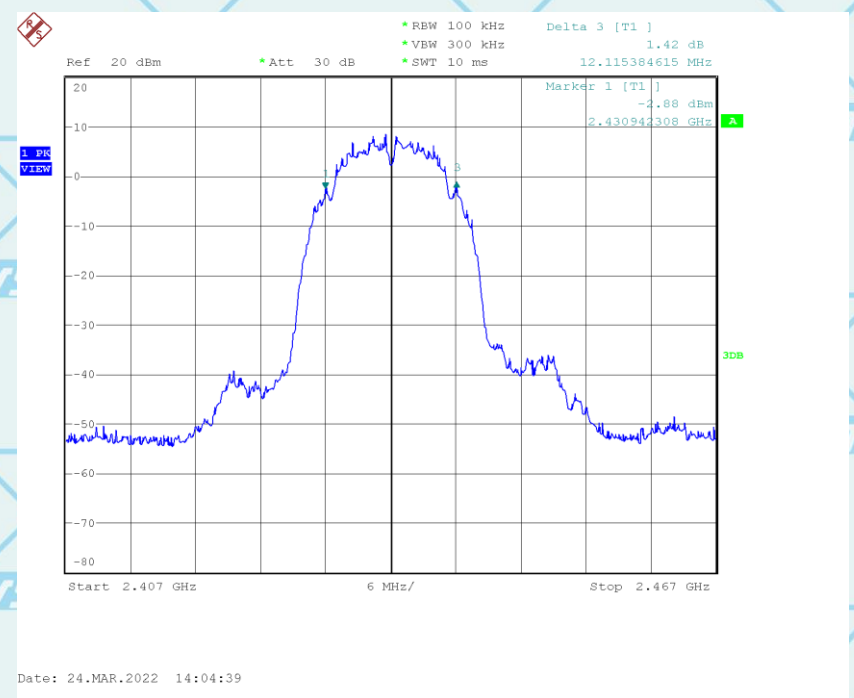
Mode	802.11n40	Humidity	56% RH
Temperature	24 deg. C,		

Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	6 dB Bandwidth (kHz)	Minimum Limit (MHz)	Pass/ Fail
3	2422	13.5	32948.7	0.5	Pass
6	2437	13.5	32692.3	0.5	Pass
9	2452	13.5	33333.3	0.5	Pass

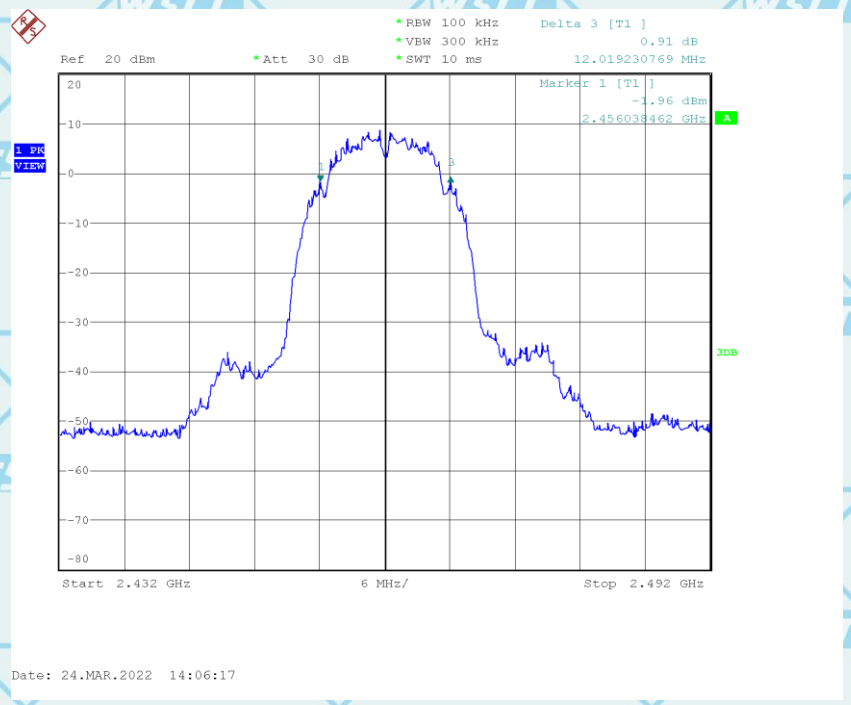
802.11b at 1Mbps of CH1



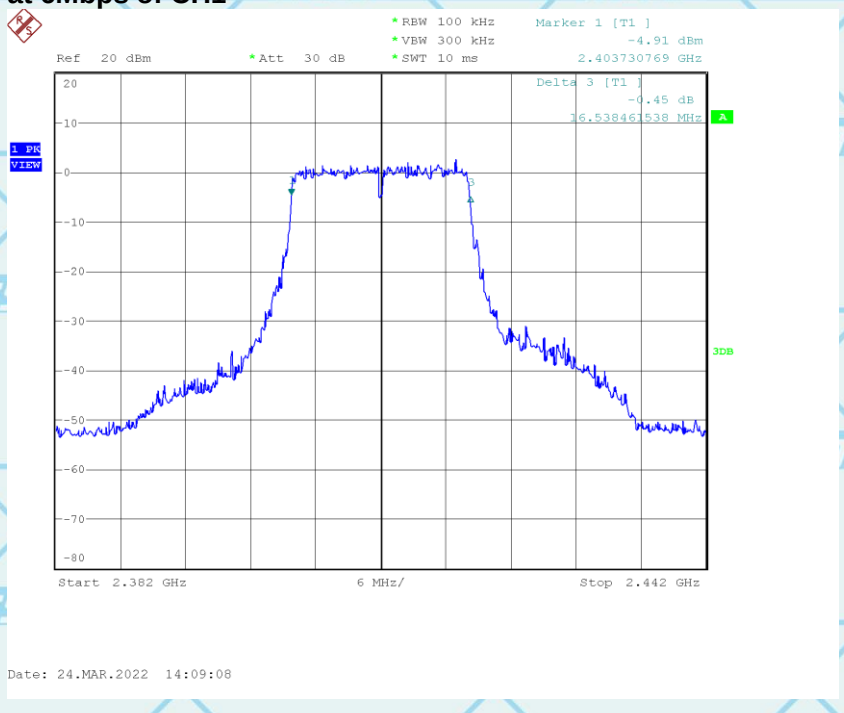
802.11b at 1Mbps of CH6



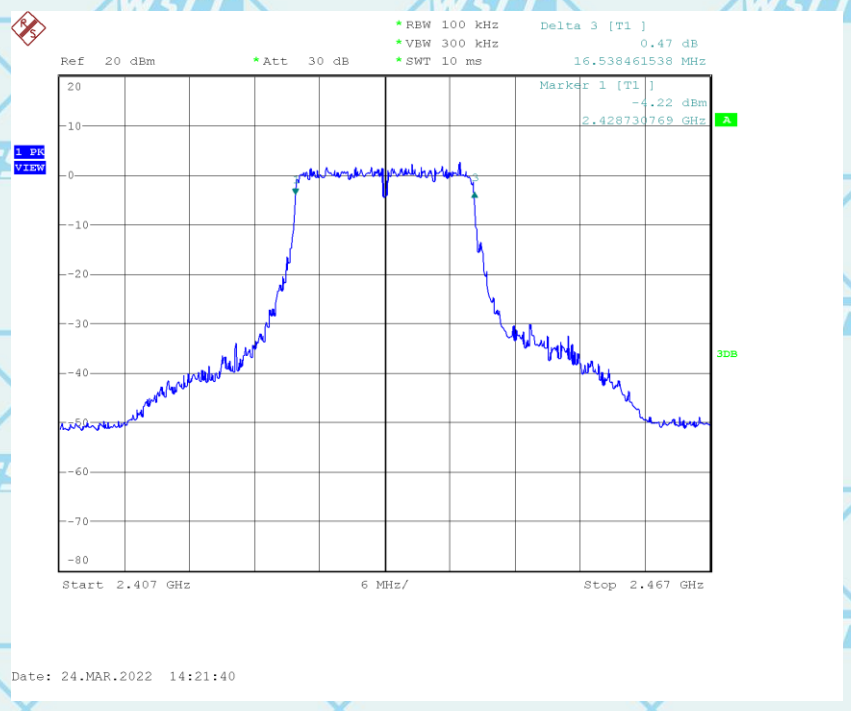
802.11b at 1Mbps of CH11



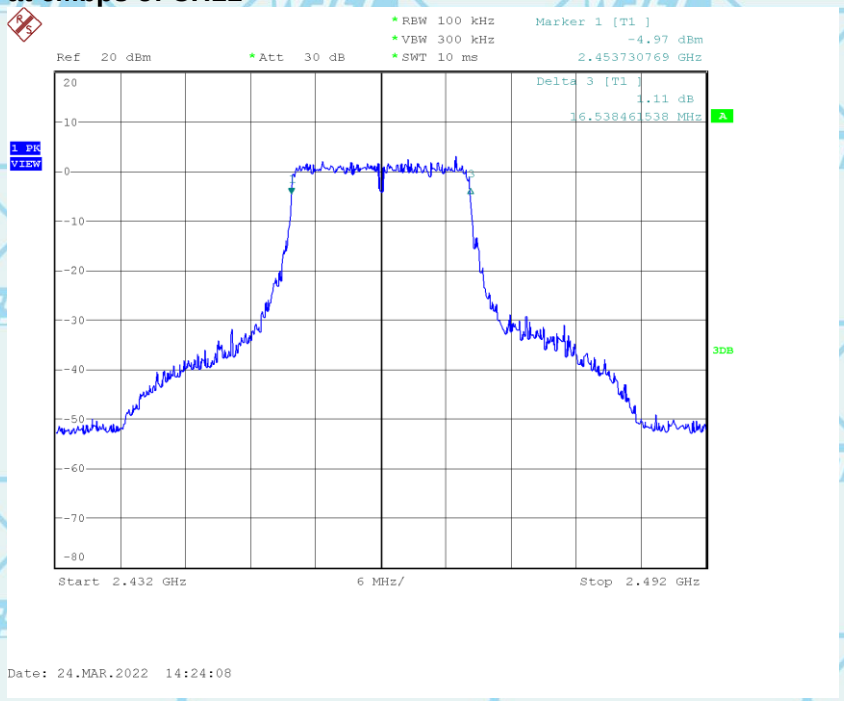
802.11g at 6Mbps of CH1



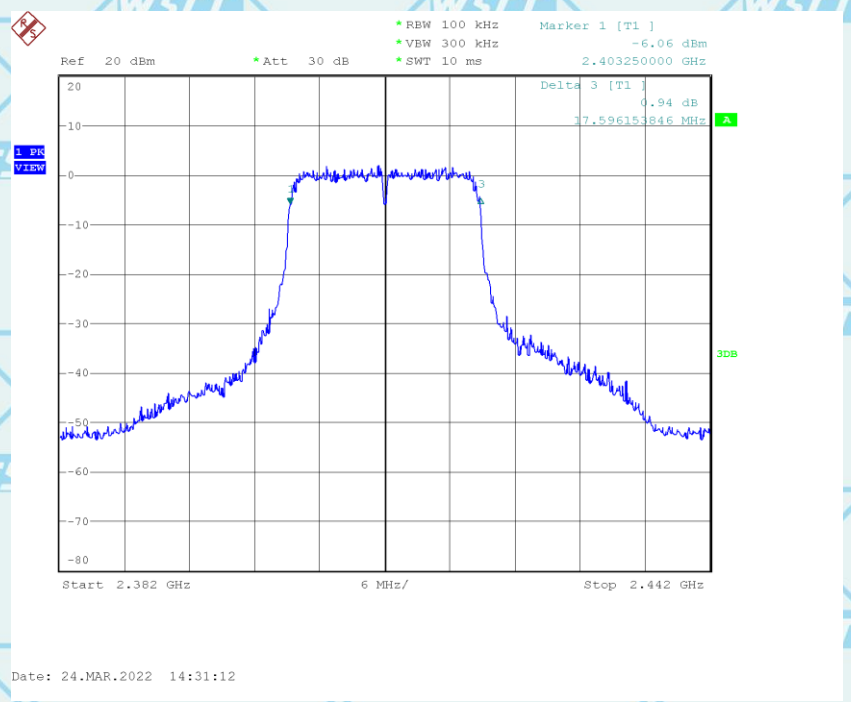
802.11g at 6Mbps of CH6



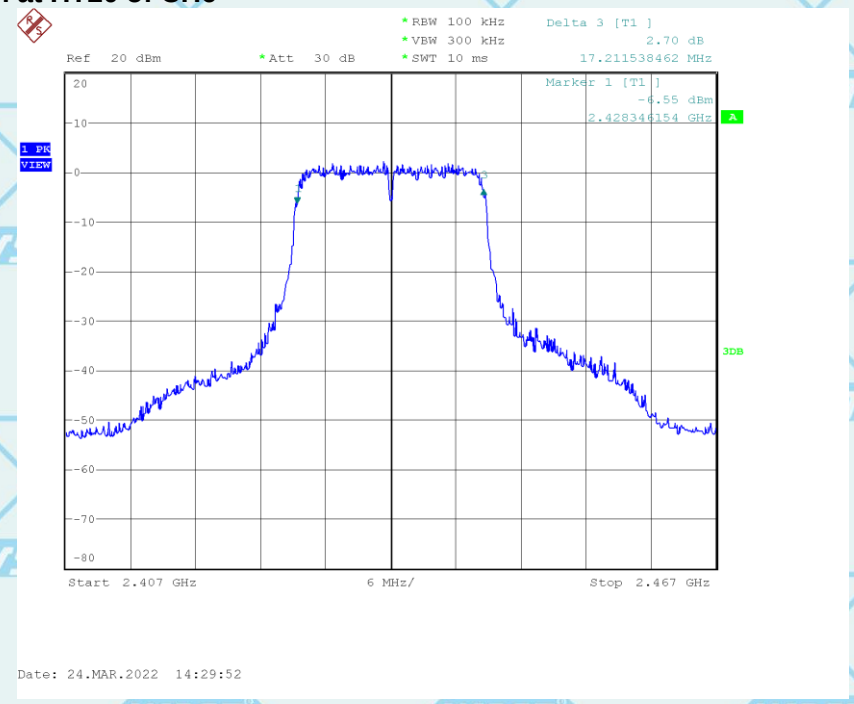
802.11g at 6Mbps of CH11



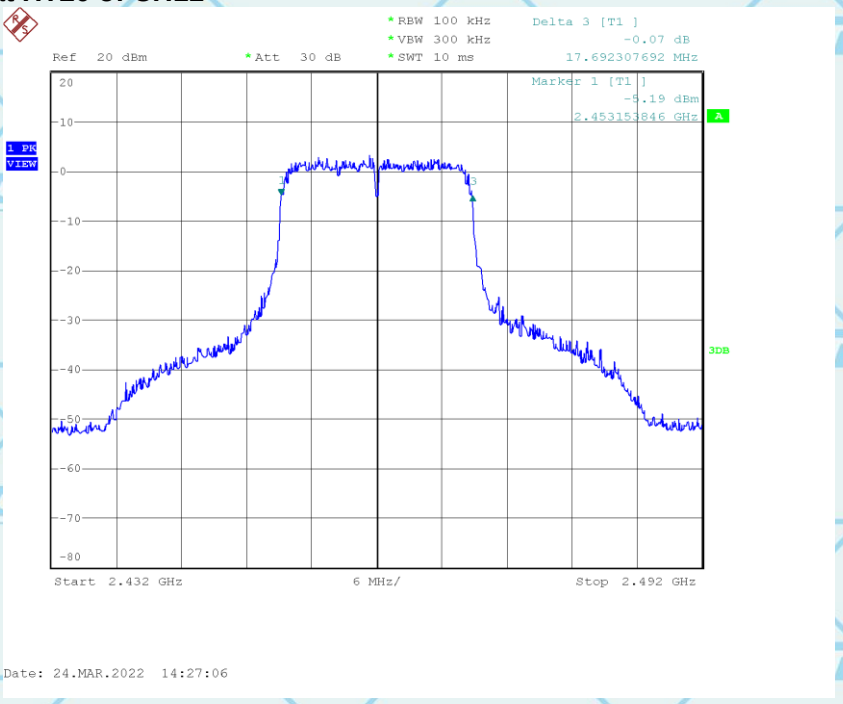
802.11n at HT20 of CH1



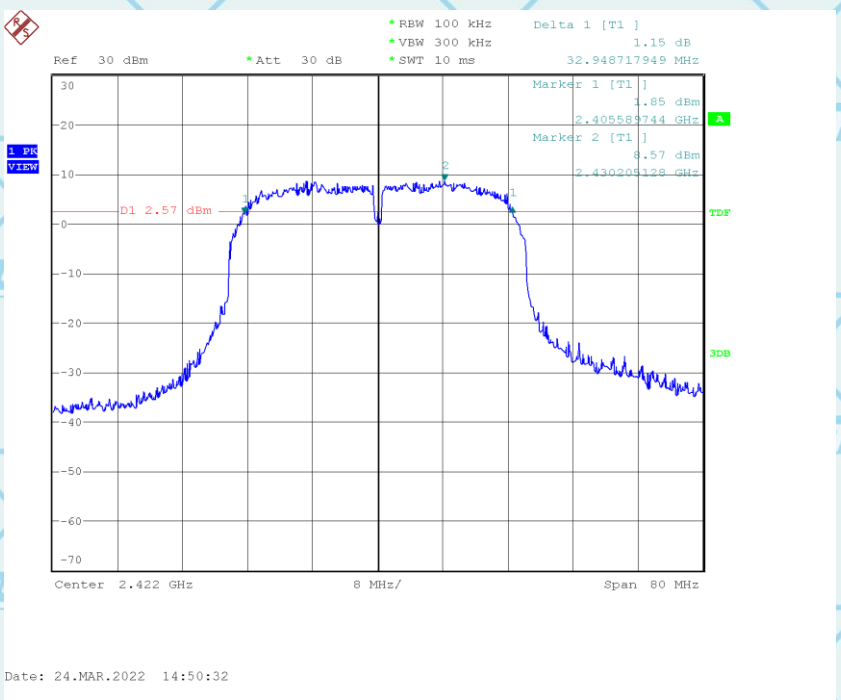
802.11n at HT20 of CH6



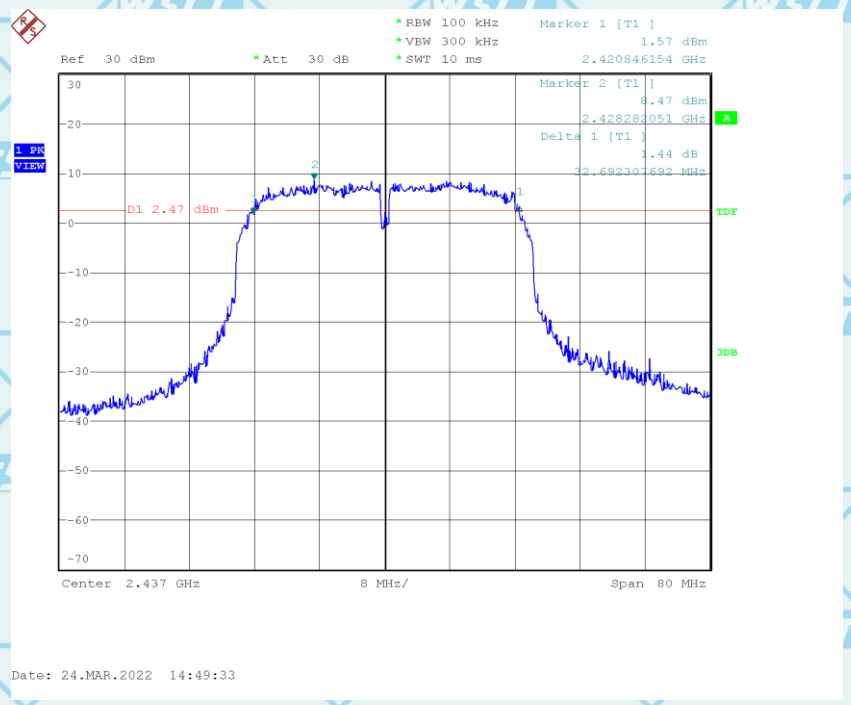
802.11n at HT20 of CH11



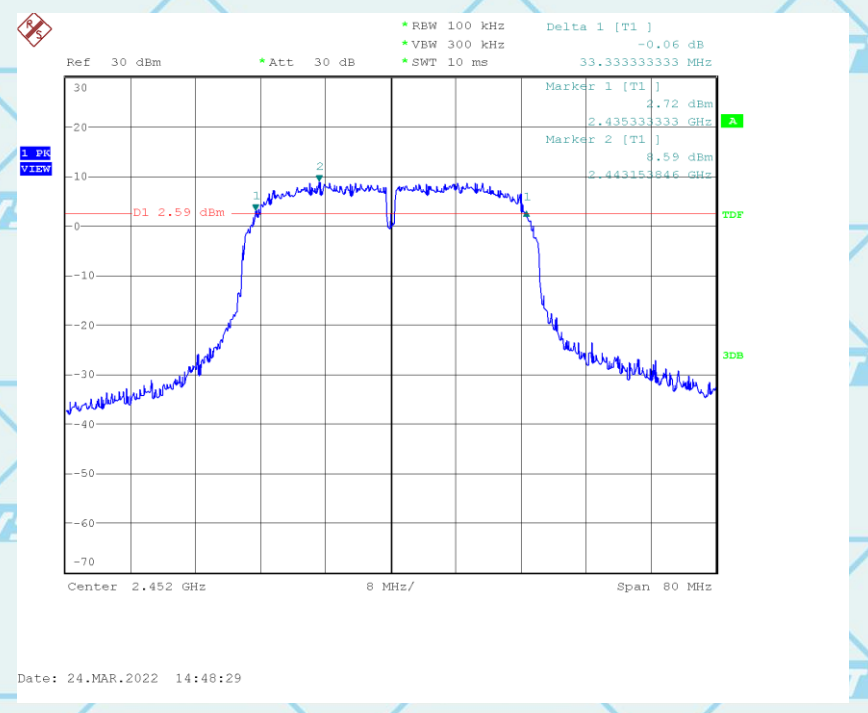
802.11n at HT40 of CH3



802.11n at HT40 of CH6



802.11n at HT40 of CH9



8. MAXIMUM CONDUCTED OUTPUT POWER

Test Requirement: FCC 47 CFR Part 15 Subpart C 15.247(b)
Test Method: KDB 789033 D02 v01r04 Section E.3.a (Method PM)
The Maximum Peak Output Power Measurement is 30dBm.

Test Procedure:
1. Connected the EUT's antenna port to measure device by 10dB attenuator.
2. Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of Tx on burst.

For Conducted RF test setup

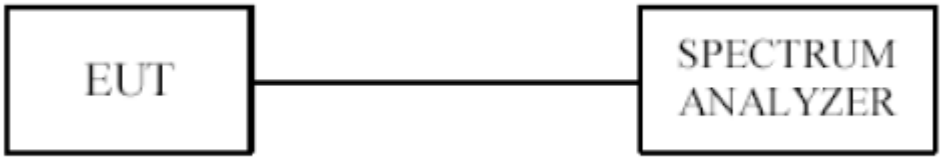
(EUT: LCD monitors)

Test Data:

Mode	Channel/ Frequency (MHz)	Maximum conducted output power (dBm)	Limit(dBm)	Pass / Fail
		Meas Power		
802.11b	1(2412)	**12.16**	30	Pass
	6(2437)	12.08	30	Pass
	11(2462)	12.13	30	Pass
802.11g	1(2412)	11.18	30	Pass
	6(2437)	11.19	30	Pass
	11(2462)	11.23	30	Pass
802.11n(HT20)	1(2412)	11.41	30	Pass
	6(2437)	11.40	30	Pass
	11(2462)	11.33	30	Pass
802.11n (HT40)	3(2422)	10.26	30	Pass
	6(2437)	10.31	30	Pass
	9(2452)	10.29	30	Pass

9. POWER SPECTRAL DENSITY MEASUREMENT

9.1 TEST SETUP



9.2 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum Power Spectral Density Measurement is 8dBm.

9.3 TEST PROCEDURE

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used todemonstrate compliance.
2. Set the RBW = 3 kHz.
3. Set the VBW =10 kHz.
4. Set the span to 1.5 times the DTS channel bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
11. The resulting peak PSD level must be ≤ 8 dBm.

9.4 TEST RESULT

Mode	802.11b	Humidity	56% RH
Temperature	24 deg. C,		

Channel	Channel Frequency (MHz)	Final RF Power Level in (dBm)	Maximum Limit (dBm)	Pass/ Fail
1Mbps				
1	2412	-8.47	8	Pass
6	2437	-7.68	8	Pass
11	2462	-7.20	8	Pass

Mode	802.11g	Humidity	56% RH
Temperature	24 deg. C,		

Channel	Channel Frequency (MHz)	Final RF Power Level in (dBm)	Maximum Limit (dBm)	Pass/ Fail
6Mbps				
1	2412	-13.28	8	Pass
6	2437	-12.89	8	Pass
11	2462	-12.05	8	Pass

Mode	802.11n HT20	Humidity	56% RH
Temperature	24 deg. C,		

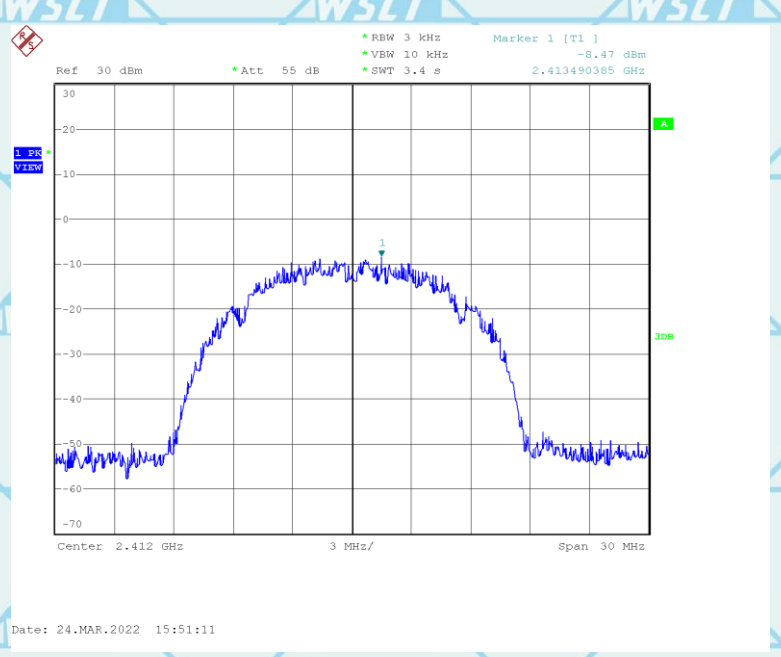
Channel	Channel Frequency (MHz)	Final RF Power Level in (dBm)	Maximum Limit (dBm)	Pass/ Fail
6.5Mbps				
1	2412	-12.28	8	Pass
6	2437	-12.85	8	Pass
11	2462	-11.80	8	Pass

Mode	802.11n HT40	Humidity	56% RH
Temperature	24 deg. C,		

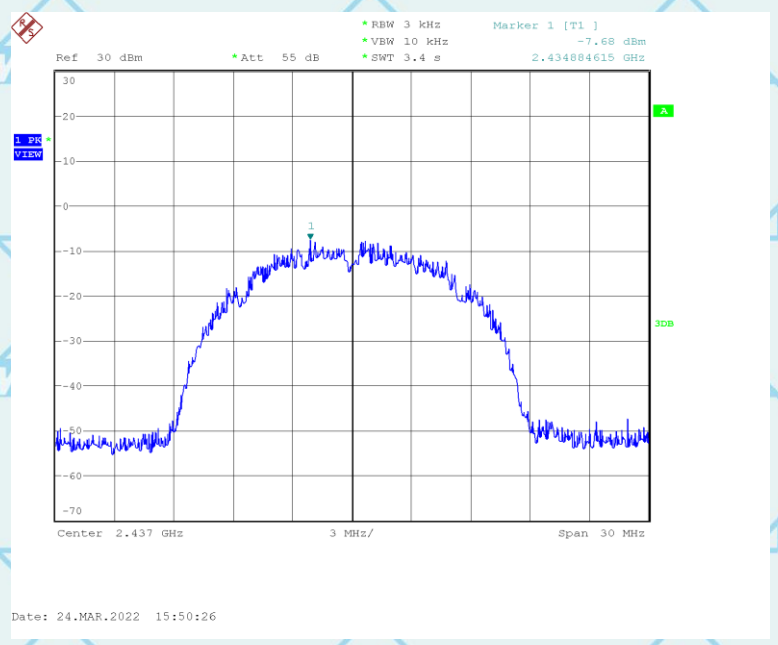
Channel	Channel Frequency (MHz)	Final RF Power Level in (dBm)	Maximum Limit (dBm)	Pass/ Fail
13.5Mbps				
3	2422	-4.98	8	Pass
6	2437	-5.42	8	Pass
9	2452	-5.14	8	Pass

Remark: All of the modes have been investigated, and only worst mode is presented in this report.

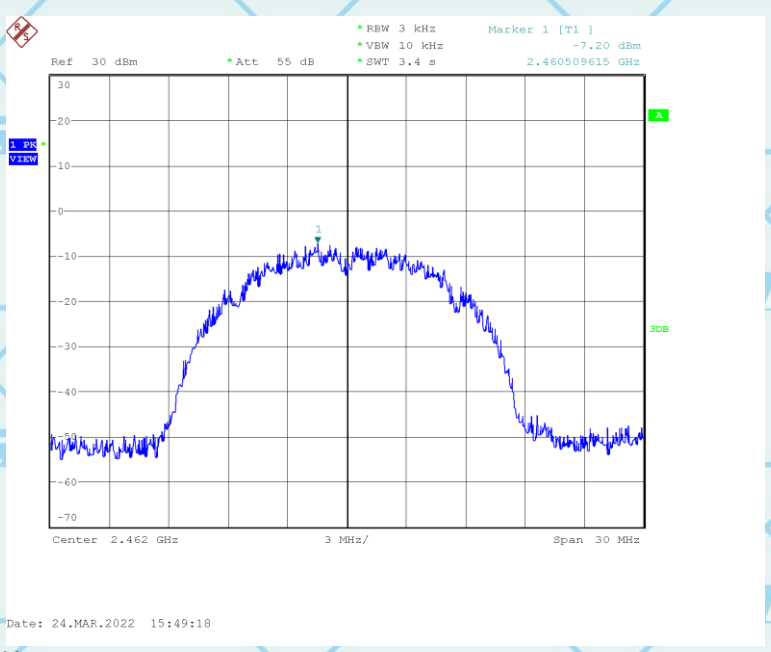
802.11b at 1Mbps of CH1



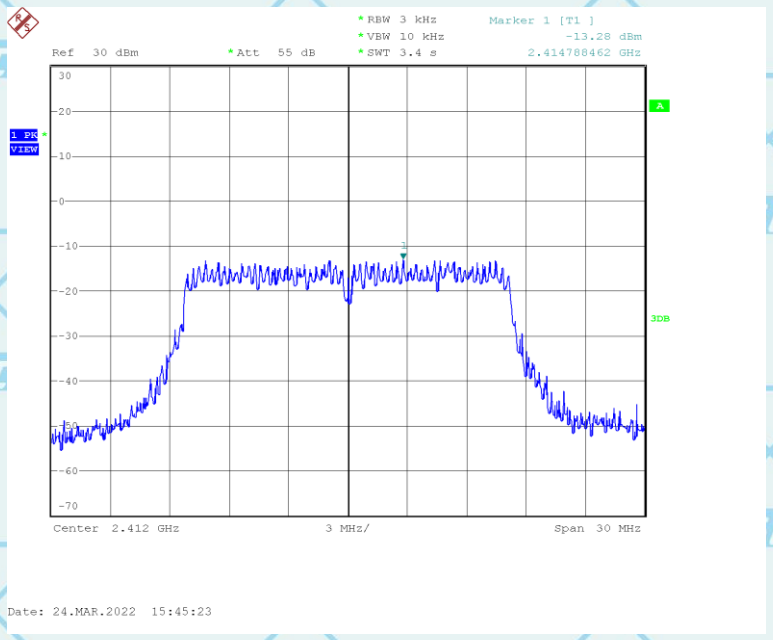
802.11b at 1Mbps at CH6



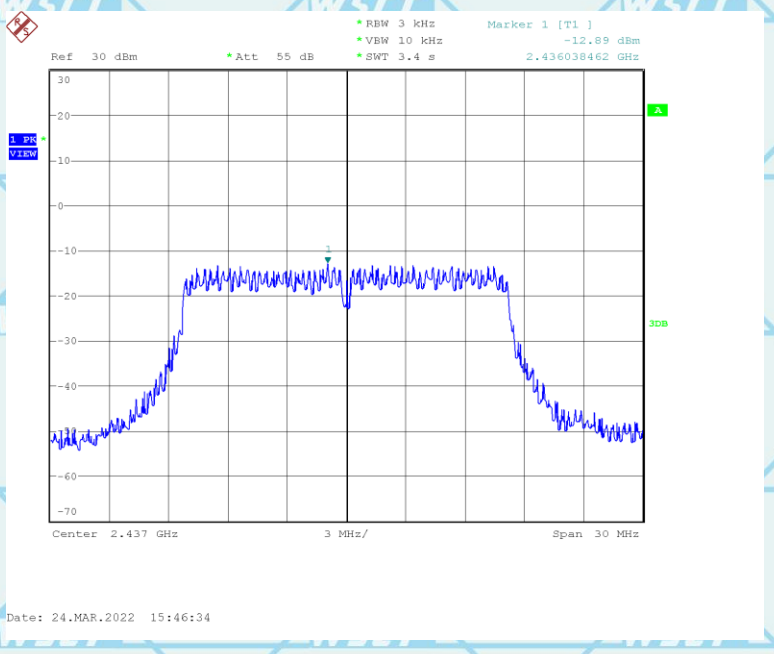
802.11b at 1Mbps of CH11



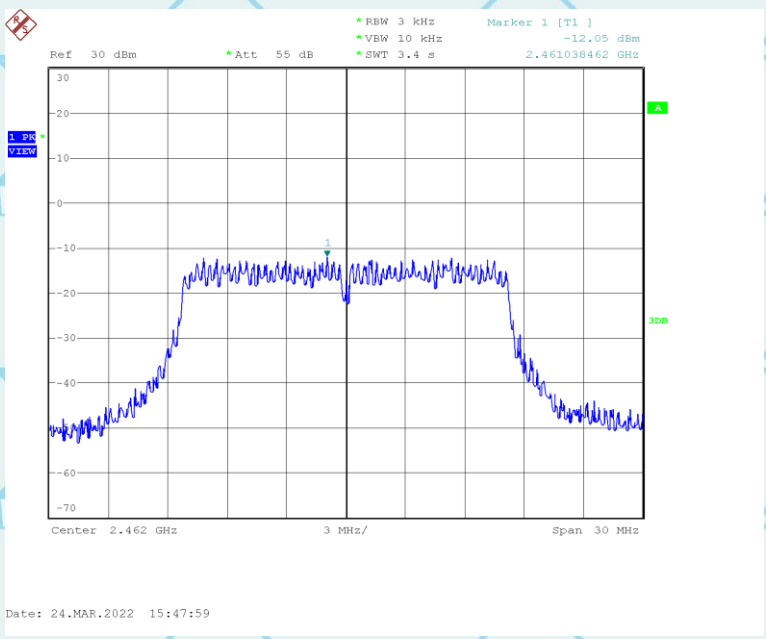
802.11g at 6Mbps of CH1



802.11g at 6Mbps of CH6



802.11g at 6Mbps of CH11



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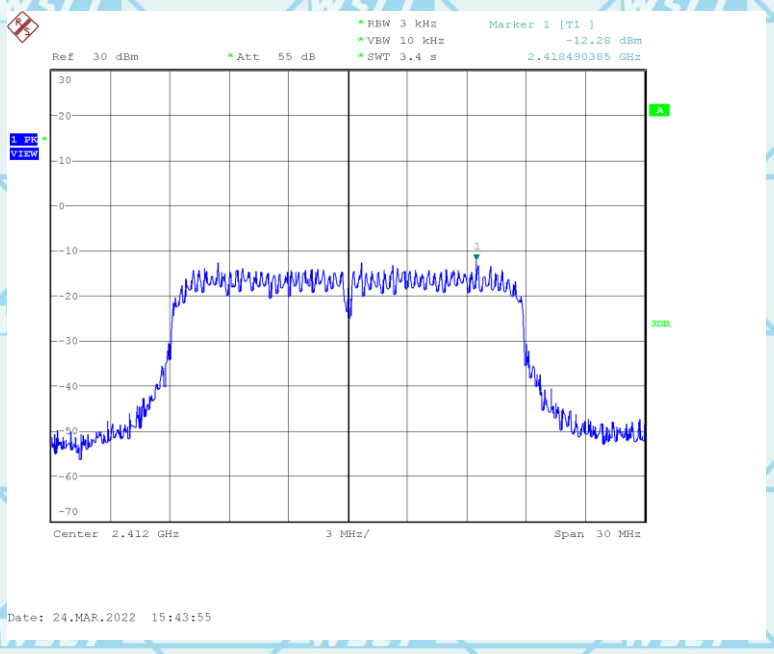
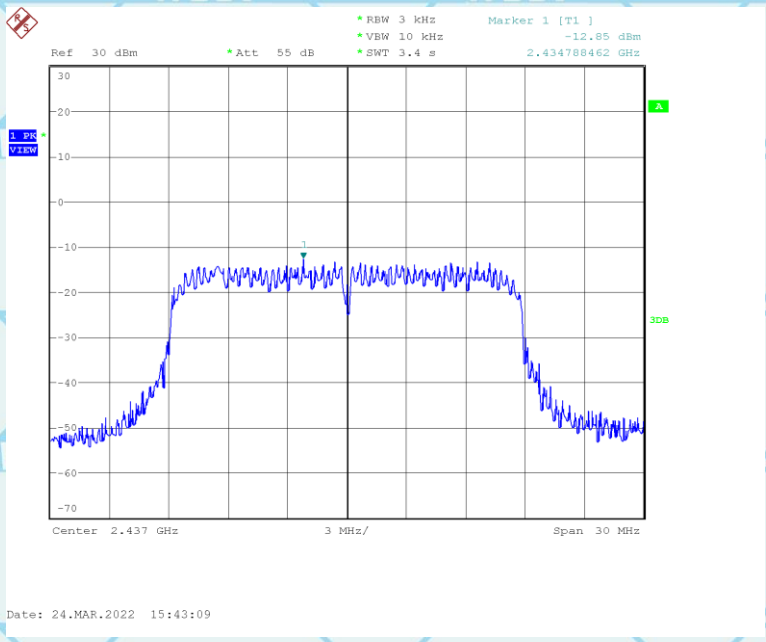
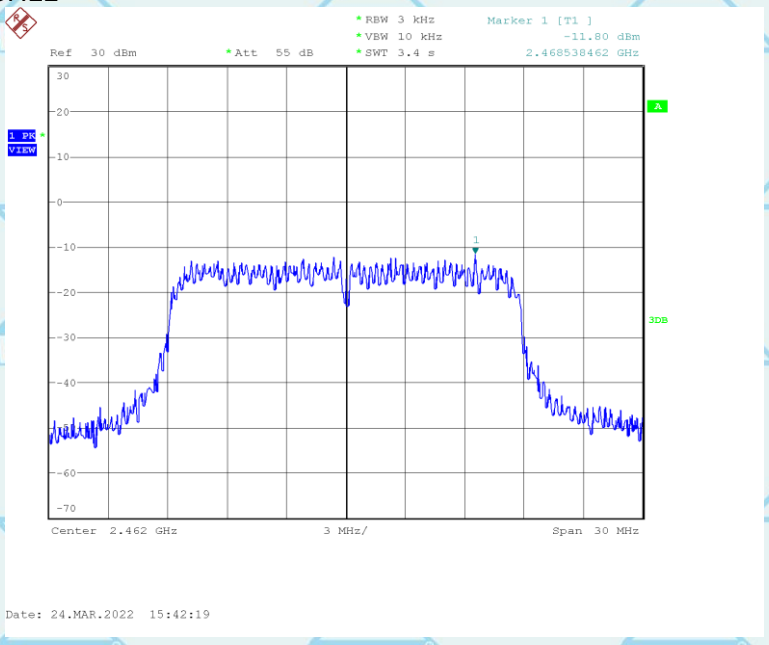
802.11n HT20 at 6.5Mbps of CH1



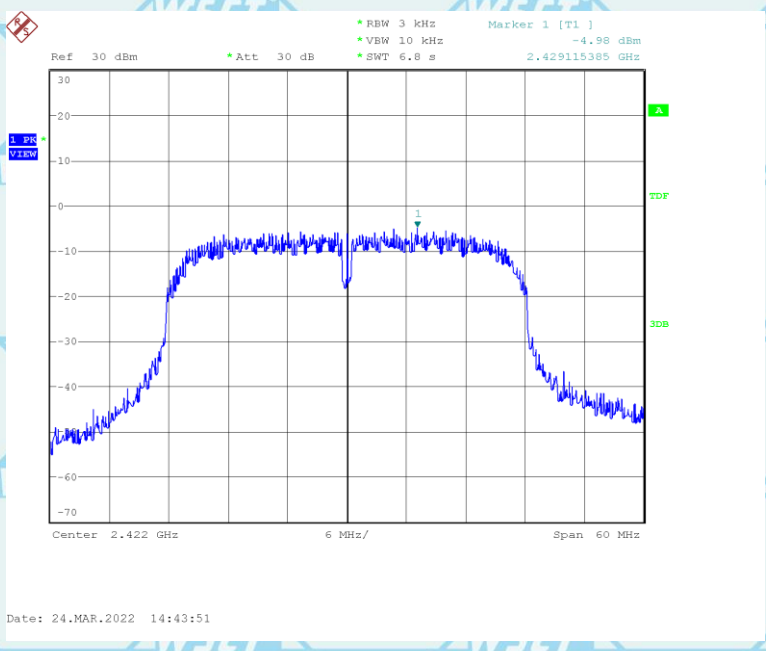
802.11n HT20 at 6.5Mbps of CH6



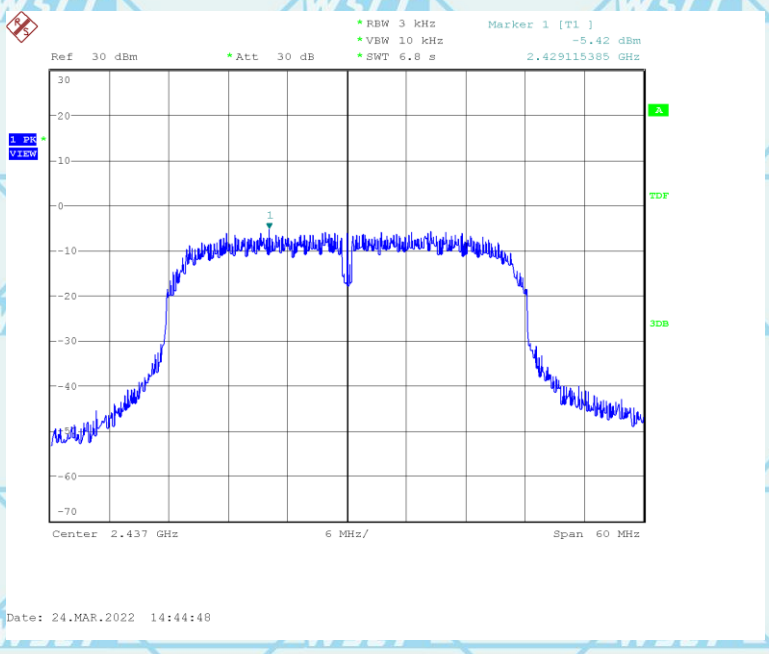
802.11n HT20 at 6.5Mbps of CH11



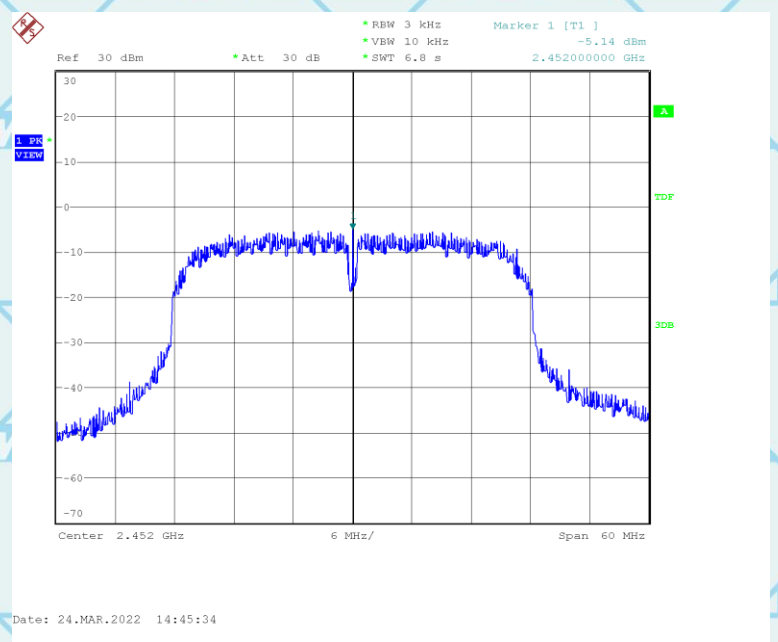
802.11n HT40 at13.5Mbps of CH3



802.11n HT40 at 13.5Mbps of CH6

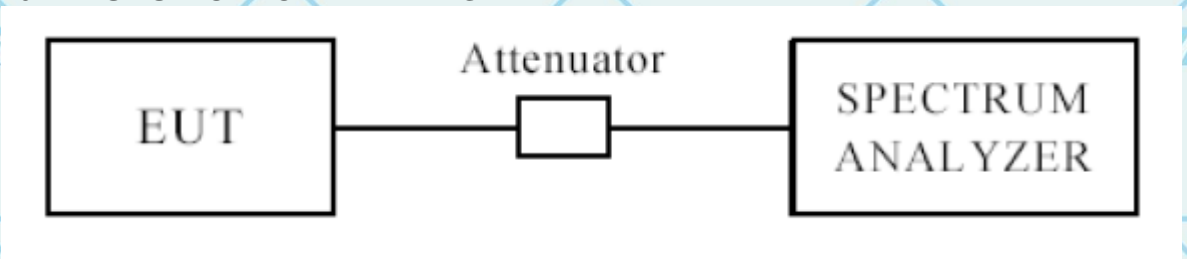


802.11n HT40 at 13.5Mbps of CH9



10. OUT OF BAND MEASUREMENT

10.1 TEST SETUP FOR BAND EDGE



The restricted band requirement based on radiated emission test; please see the clause 6 for the test setup

10.2 LIMITS OF OUT OF BAND EMISSIONS MEASUREMENT

1. Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

10.3 TEST PROCEDURE

For signals in the restricted bands above and below the 2.4-2.483GHz allocated band a measurement was made of radiated emission test.(Peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz,VBW=10Hz and PK detector)
For bandage test, the spectrum set as follows: RBW=100 kHz, VBW=100 kHz. A conducted measurement used

10.4 TEST RESULT

Please see next pages
Note: This is a handhold device. The radiated emissions should be tested under 3-axes position (Lying, Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.

Radiated measurement:

802.11b

Indicated		result (PK/AV)	Antenna Polar (H/V)	Correction Factor			FCC Part 15.247		
Frequency (MHz)	Receiver Reading (dBμV/m)			Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low Channel (2412MHz)									
2390	35.05	AV	V	30.3	4.1	33.1	36.35	54	17.65
2390	33.68	AV	H	30.3	4.1	33.1	34.98	54	19.02
2390	50.84	PK	V	30.3	4.1	33.1	52.14	74	21.86
2390	49.42	PK	H	30.3	4.1	33.1	50.72	74	23.28
High Channel (2462MHz)									
2483.5	30.54	AV	V	31	4.4	32.7	33.24	54	20.76
2483.5	30.11	AV	H	31	4.4	32.7	32.81	54	21.19
2483.5	39.43	PK	V	31	4.4	32.7	42.13	74	31.87
2483.5	41.33	PK	H	31	4.4	32.7	44.03	74	29.97

802.11g

Indicated		result (PK/AV)	Antenna Polar (H/V)	Correction Factor			FCC Part 15.247		
Frequency (MHz)	Receiver Reading (dBμV/m)			Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low Channel (2412MHz)									
2390	37.24	AV	V	30.3	4.1	33.1	38.54	54	15.46
2390	37.97	AV	H	30.3	4.1	33.1	39.27	54	14.73
2390	54.83	PK	V	30.3	4.1	33.1	56.13	74	17.87
2390	53.97	PK	H	30.3	4.1	33.1	55.27	74	18.73
High Channel (2462MHz)									
2483.5	32.86	AV	V	31	4.4	32.7	35.56	54	18.44
2483.5	32.21	AV	H	31	4.4	32.7	34.91	54	19.09
2483.5	45.64	PK	V	31	4.4	32.7	48.34	74	25.66
2483.5	46.42	PK	H	31	4.4	32.7	49.12	74	24.88

Note: The BAND EDGE RESTRICTED BANDS emission is too low at least 20dB to the Fundamental.

802.11n HT20

Indicated		result (PK/AV)	Antenna Polar (H/V)	Correction Factor			FCC Part 15.247		
Frequency (MHz)	Receiver Reading (dBμV/m)			Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low Channel (2412MHz)									
2390	36.79	AV	V	30.3	4.1	33.1	38.09	54	15.91
2390	36.78	AV	H	30.3	4.1	33.1	38.08	54	15.92
2390	53.34	PK	V	30.3	4.1	33.1	54.64	74	19.36
2390	52.67	PK	H	30.3	4.1	33.1	53.97	74	20.03
High Channel (2462MHz)									
2483.5	31.57	AV	V	31	4.4	32.7	34.27	54	19.73
2483.5	32.15	AV	H	31	4.4	32.7	34.85	54	19.15
2483.5	44.49	PK	V	31	4.4	32.7	47.19	74	26.81
2483.5	46.32	PK	H	31	4.4	32.7	49.02	74	24.98

802.11n HT40

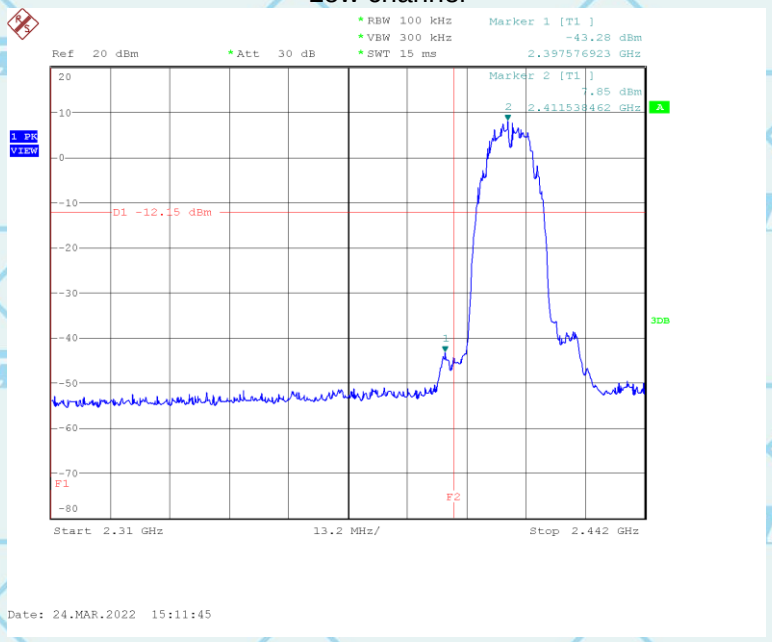
Indicated		result (PK/AV)	Antenna Polar (H/V)	Correction Factor			FCC Part 15.247		
Frequency (MHz)	Receiver Reading (dBμV/m)			Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low Channel (2422MHz)									
2390	33.70	AV	V	30.3	4.1	33.1	35.00	54	19.00
2390	34.43	AV	H	30.3	4.1	33.1	35.73	54	18.27
2390	50.95	PK	V	30.3	4.1	33.1	52.25	74	21.75
2390	51.72	PK	H	30.3	4.1	33.1	53.02	74	20.98
High Channel (2452MHz)									
2483.5	29.59	AV	V	31	4.4	32.7	32.29	54	21.71
2483.5	30.49	AV	H	31	4.4	32.7	33.19	54	20.81
2483.5	41.56	PK	V	31	4.4	32.7	44.26	74	29.74
2483.5	41.77	PK	H	31	4.4	32.7	44.47	74	29.53

Note: The BAND EDGE RESTRICTED BANDS emission is too low at least 20dB to the Fundamental.

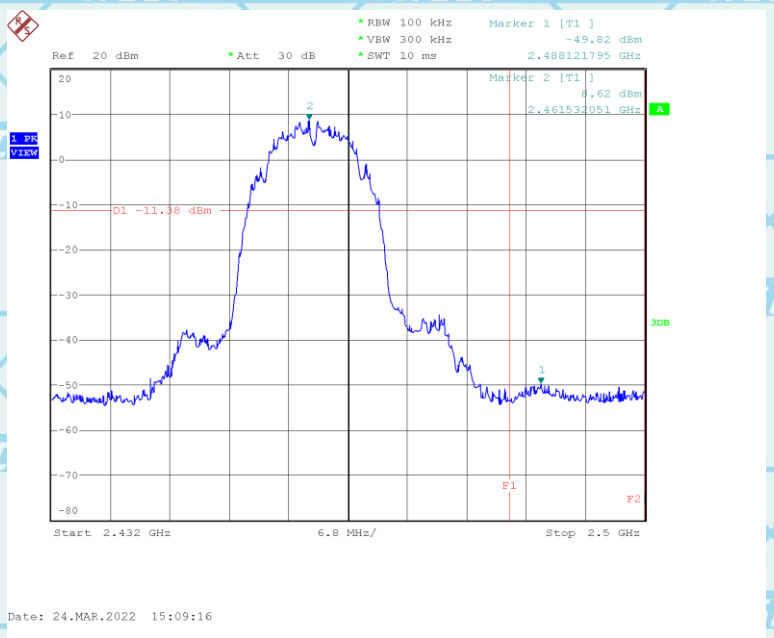
Band Edges Measurement:

802.11b:

Low channel

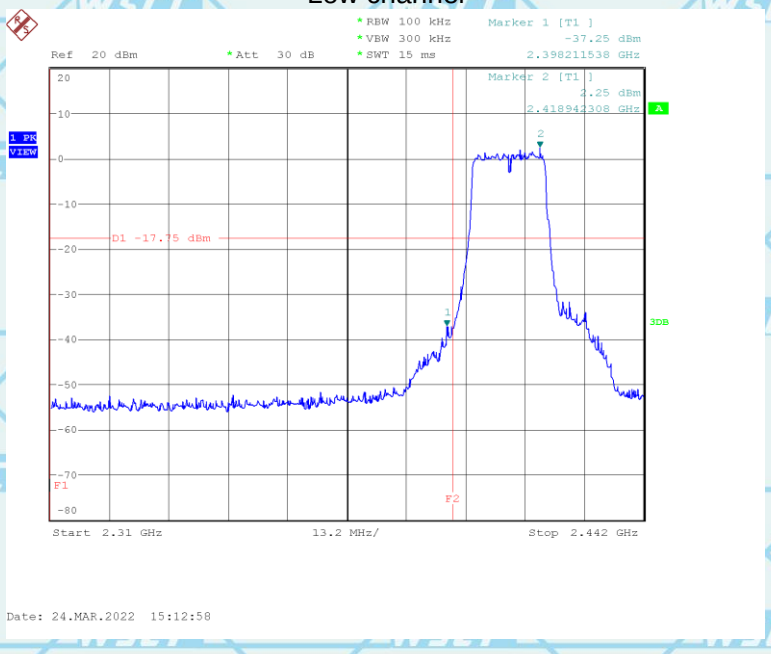


High channel

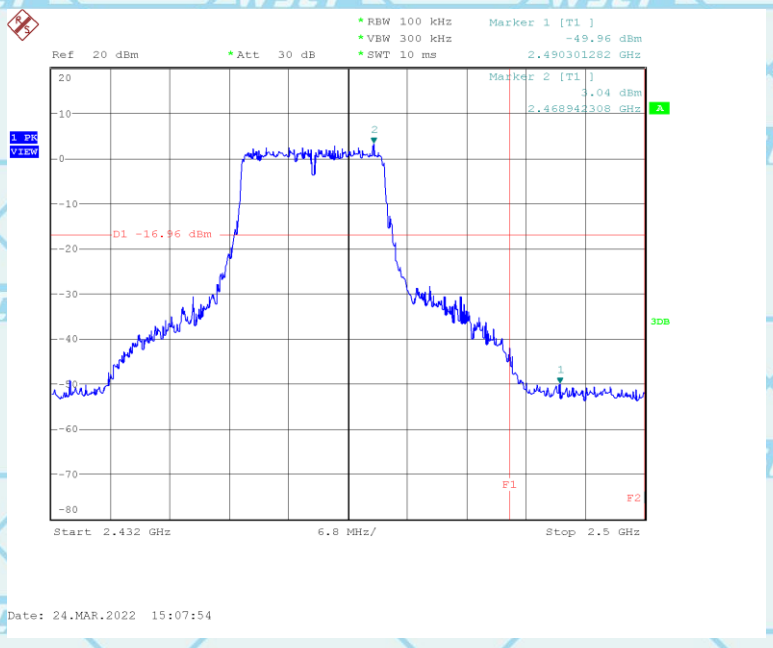


802.11g:

Low channel

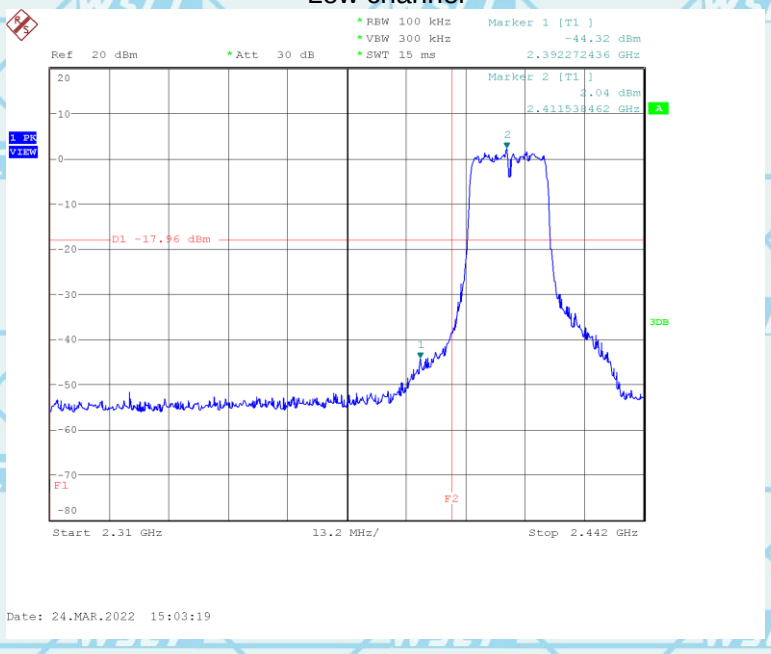


High channel

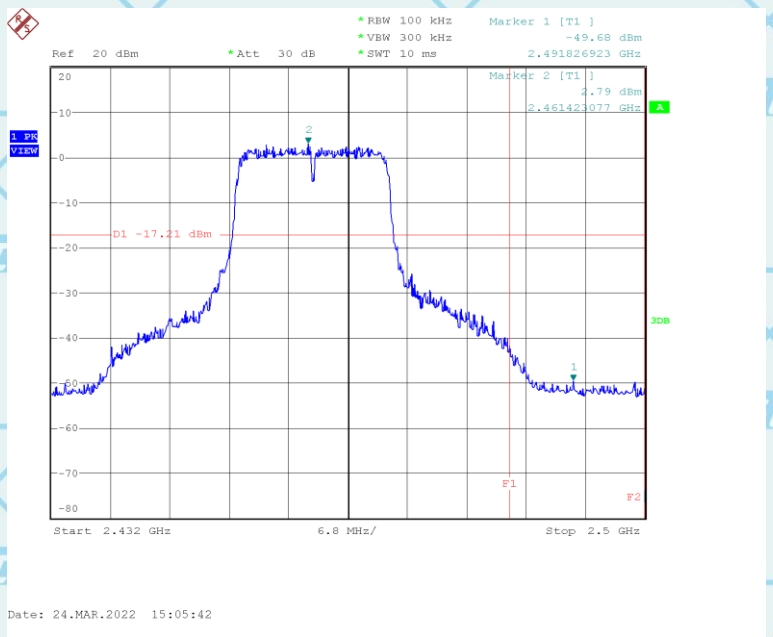


802.11n HT20:

Low channel

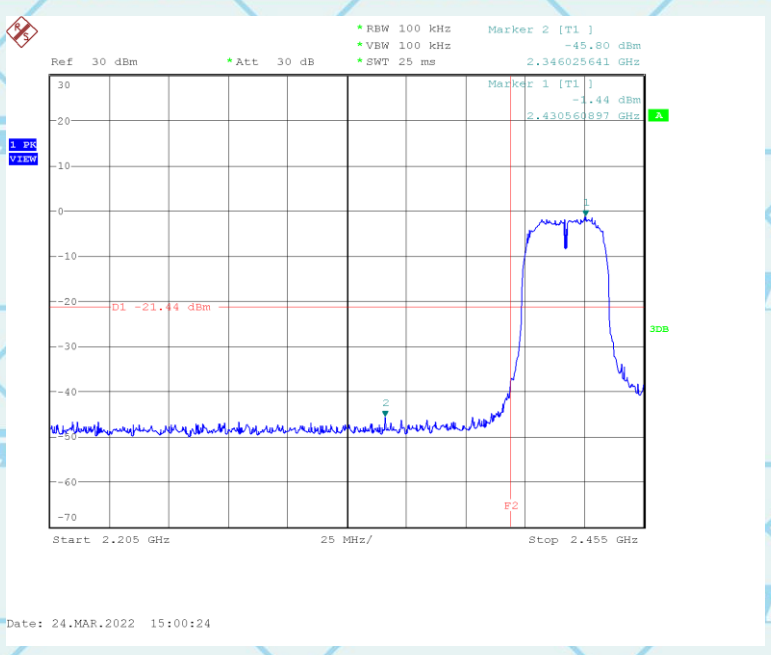


High channel

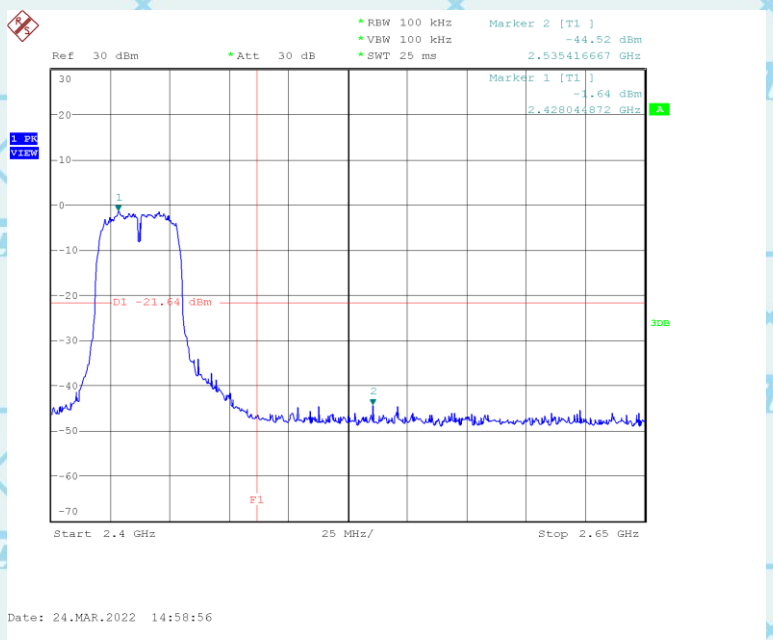


802.11n HT40:

Low channel



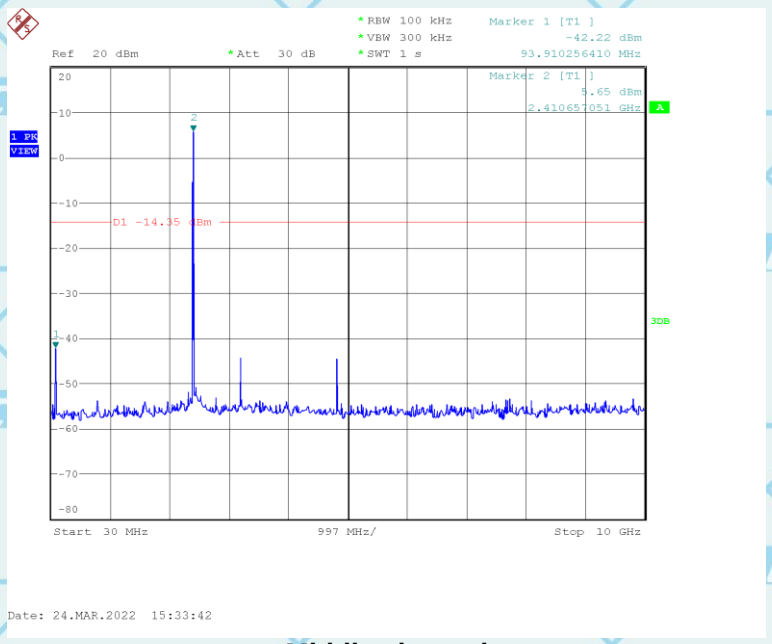
High channel



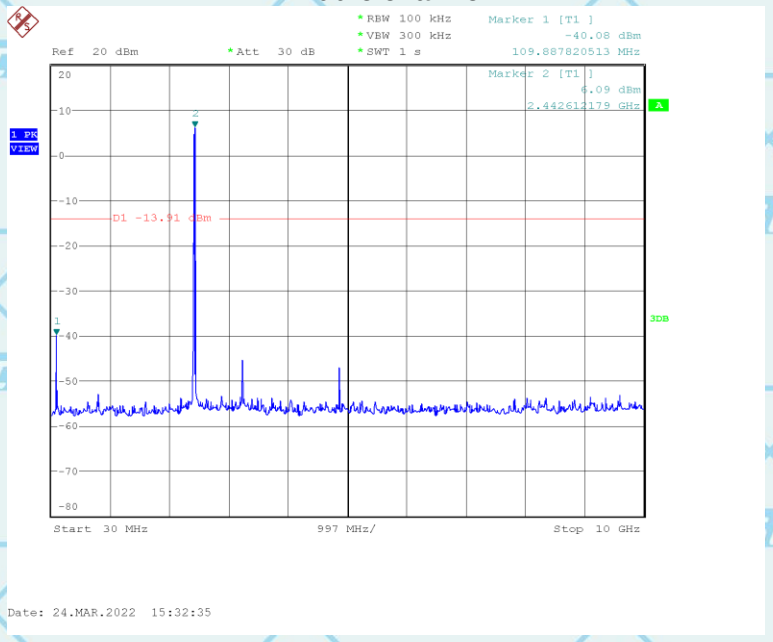
Conducted measurement:

802.11b:

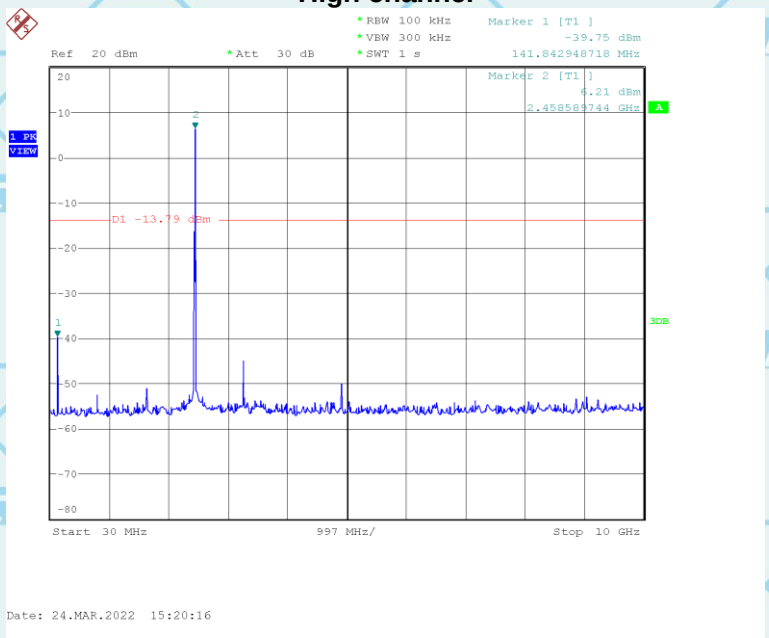
Low channel



Middle channel

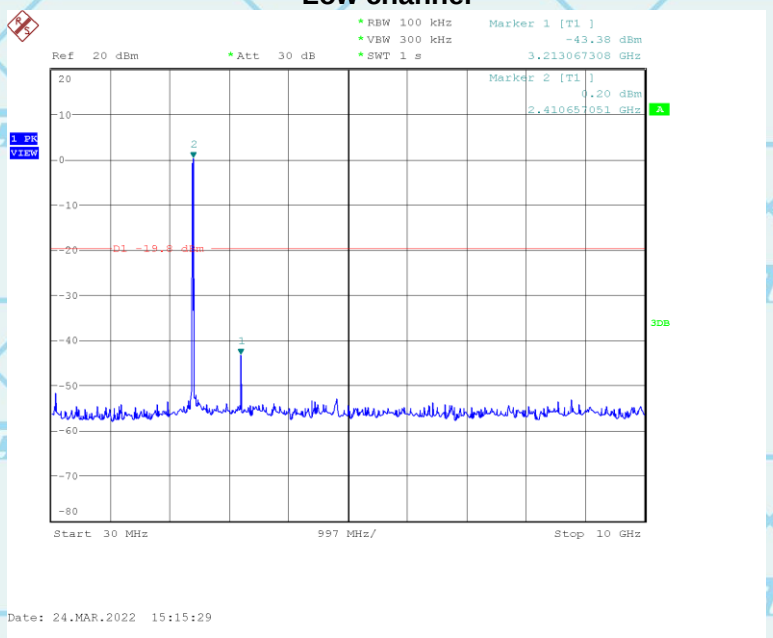


High channel

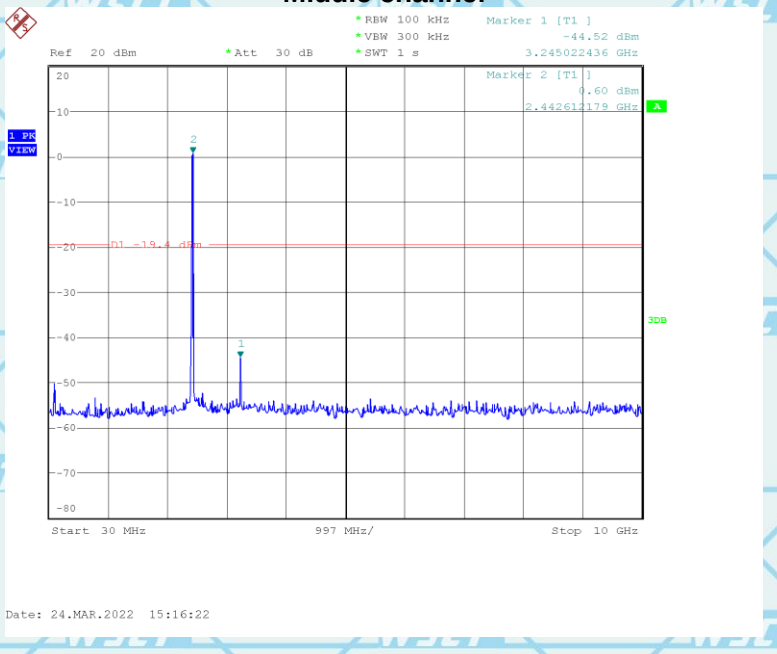


802.11g:

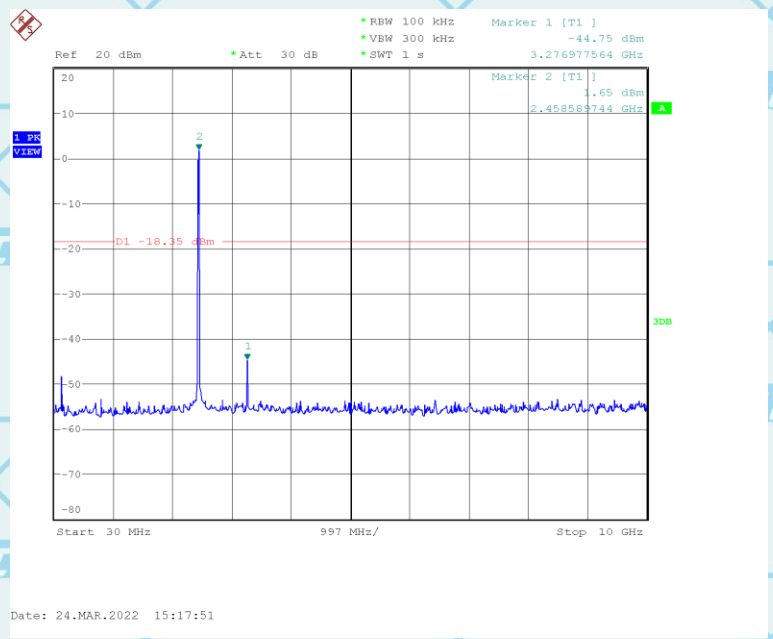
Low channel



Middle channel

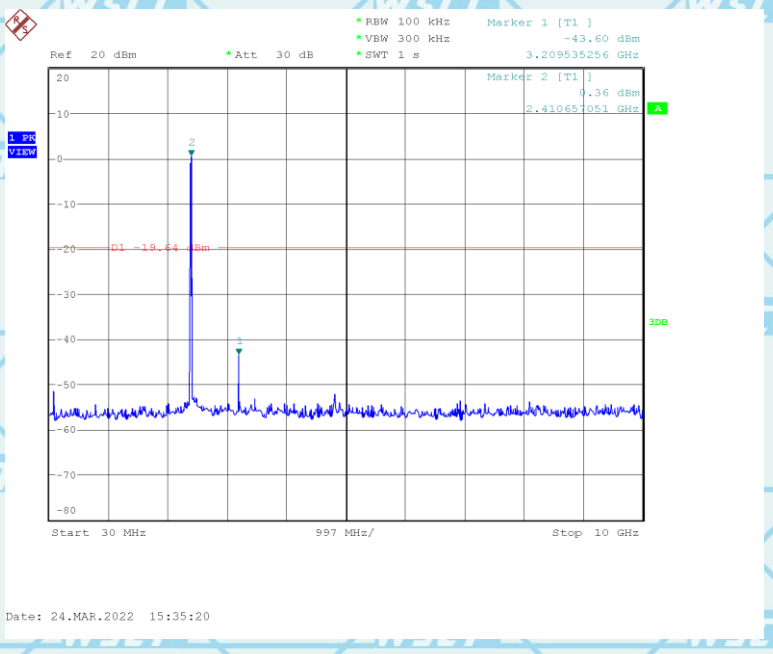


High channel

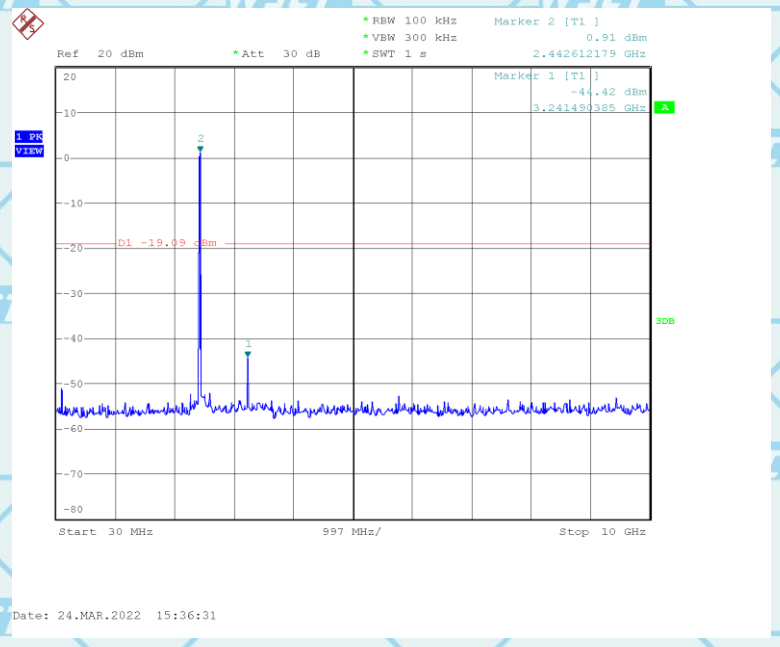


802.11n HT20:

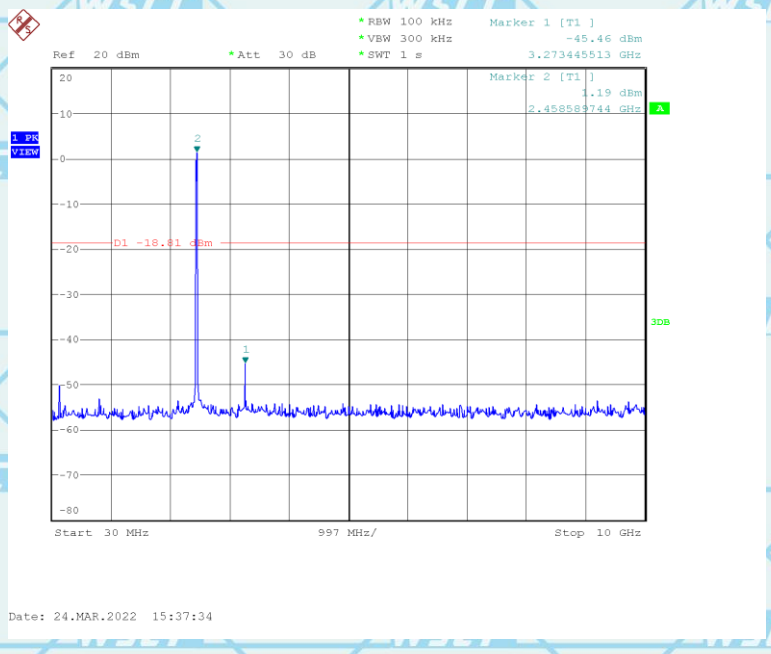
Low channel



Middle channel

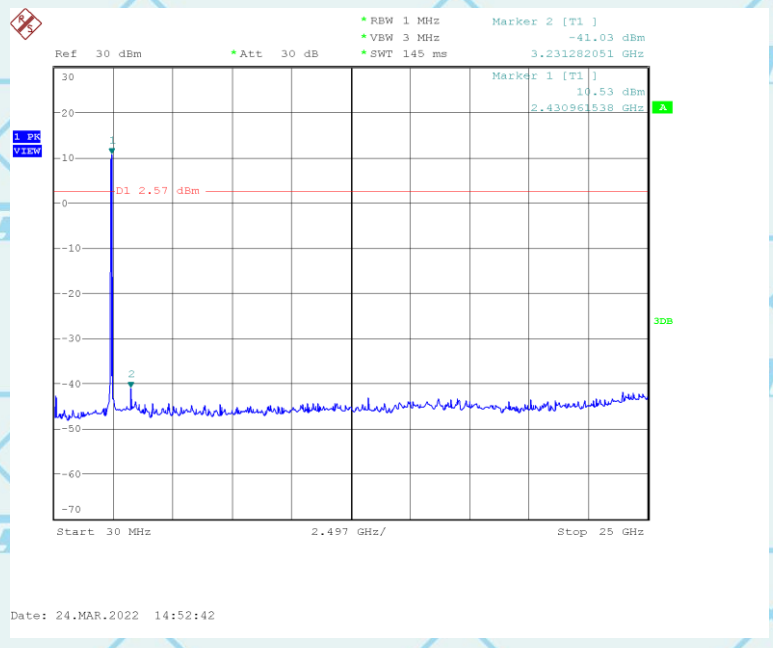


High channel

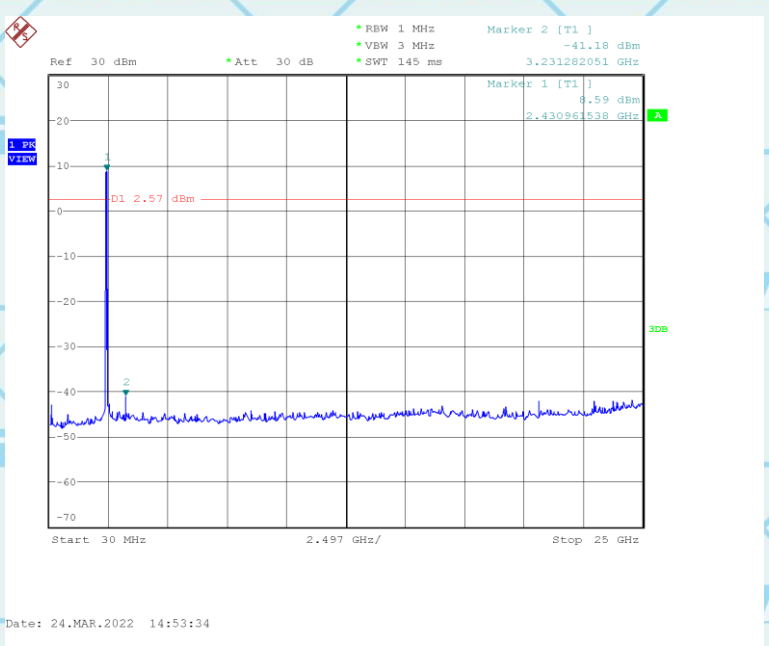


802.11n HT40:

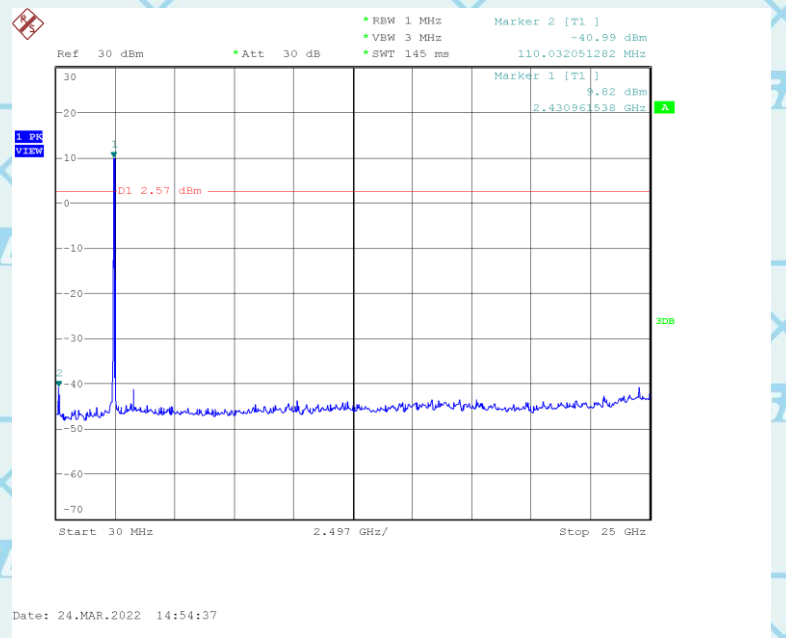
Low channel



Middle channel



High channel



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