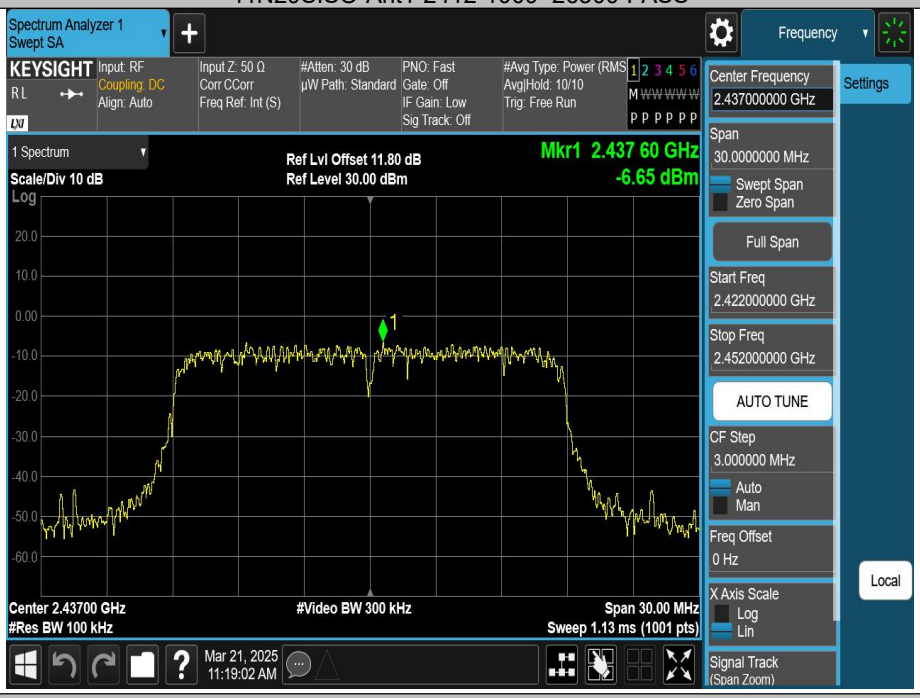
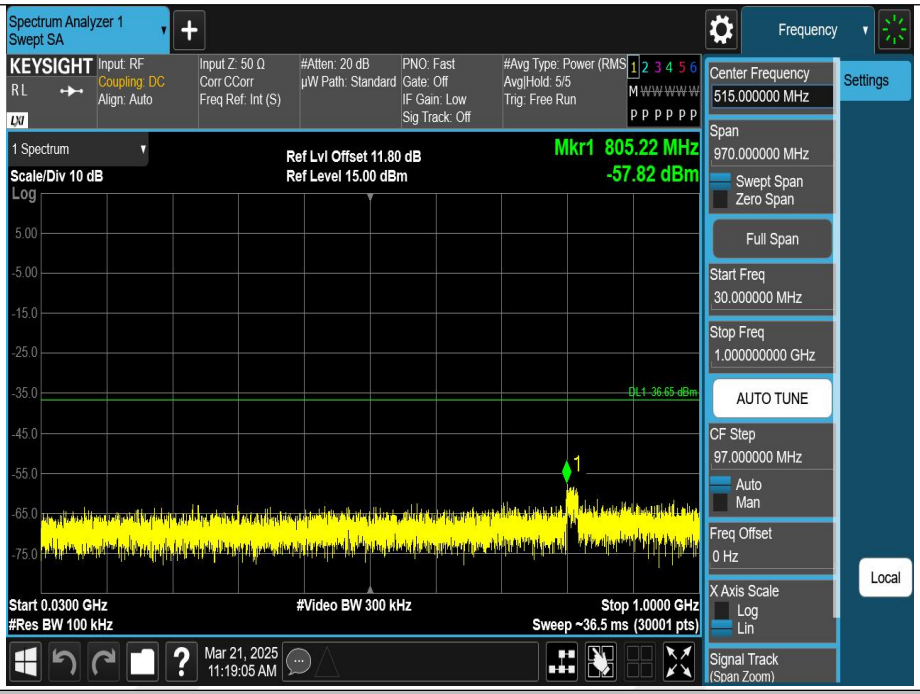
11N20SISO-Ant1-2412-1000~26500-PASS

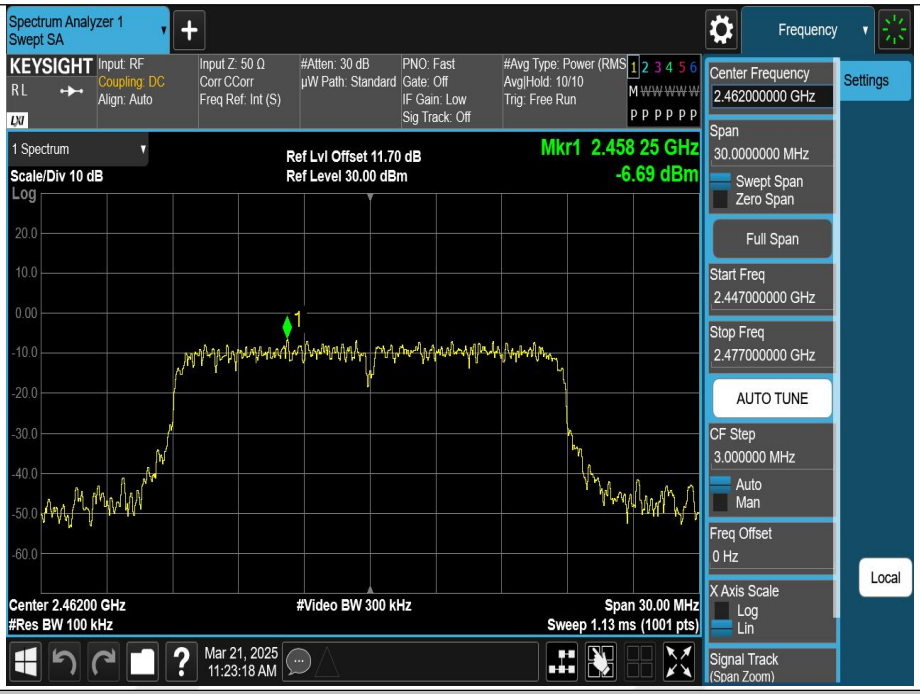


11N20SISO-Ant1-2437-0~Reference-PASS



11N20SISO-Ant1-2437-30~1000-PASS

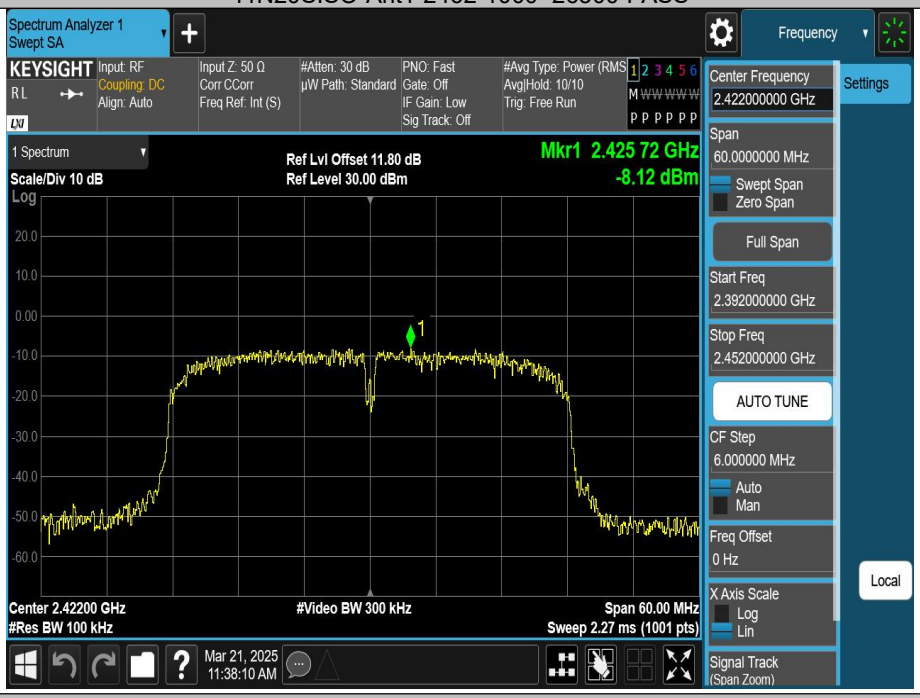
11N20SISO-Ant1-2437-1000~26500-PASS



11N20SISO-Ant1-2462-0~Reference-PASS

11N20SISO-Ant1-2462-30~1000-PASS

11N20SISO-Ant1-2462-1000~26500-PASS



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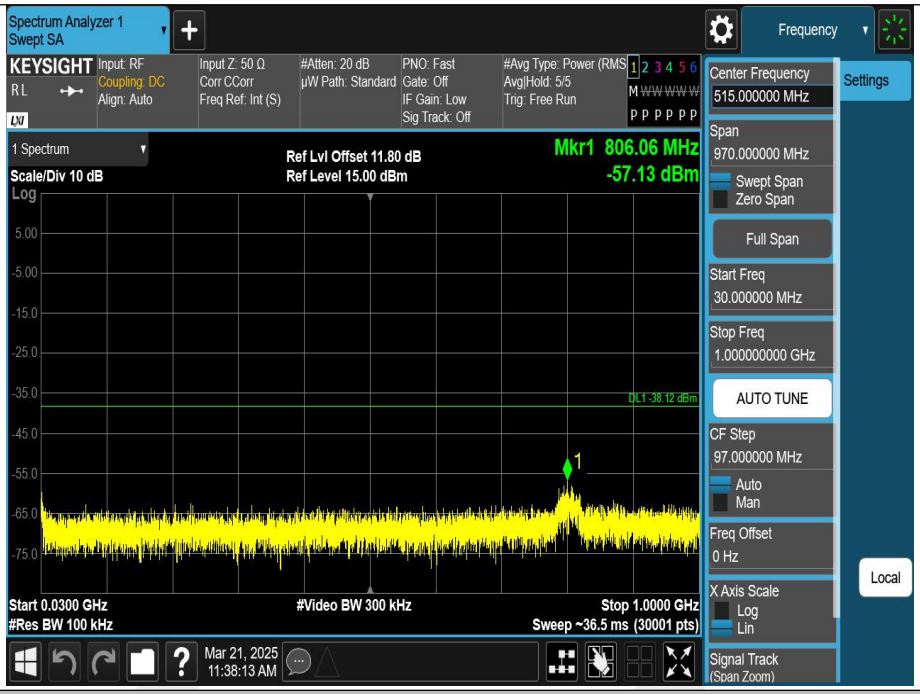
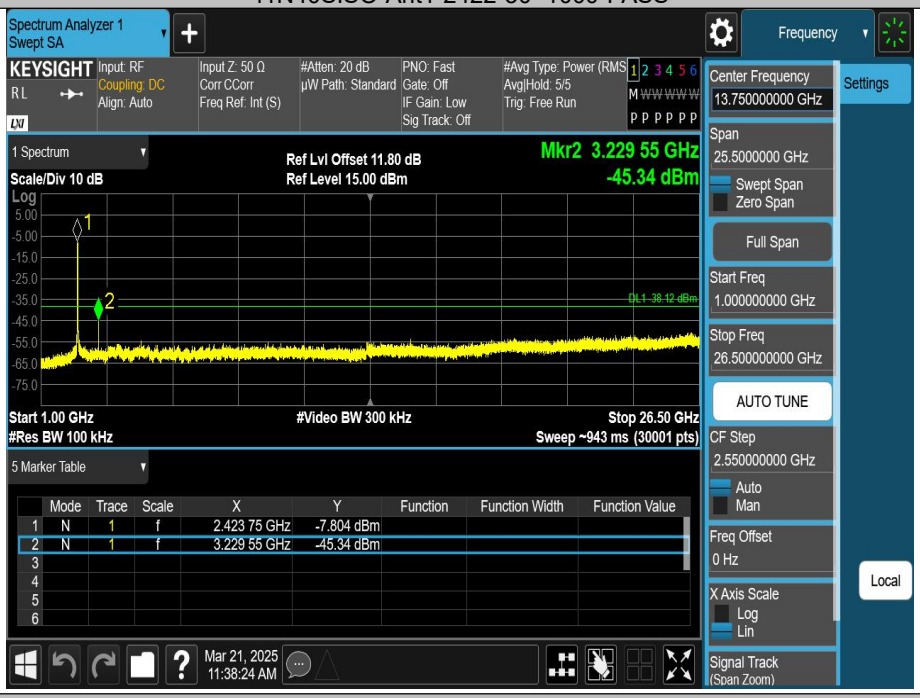
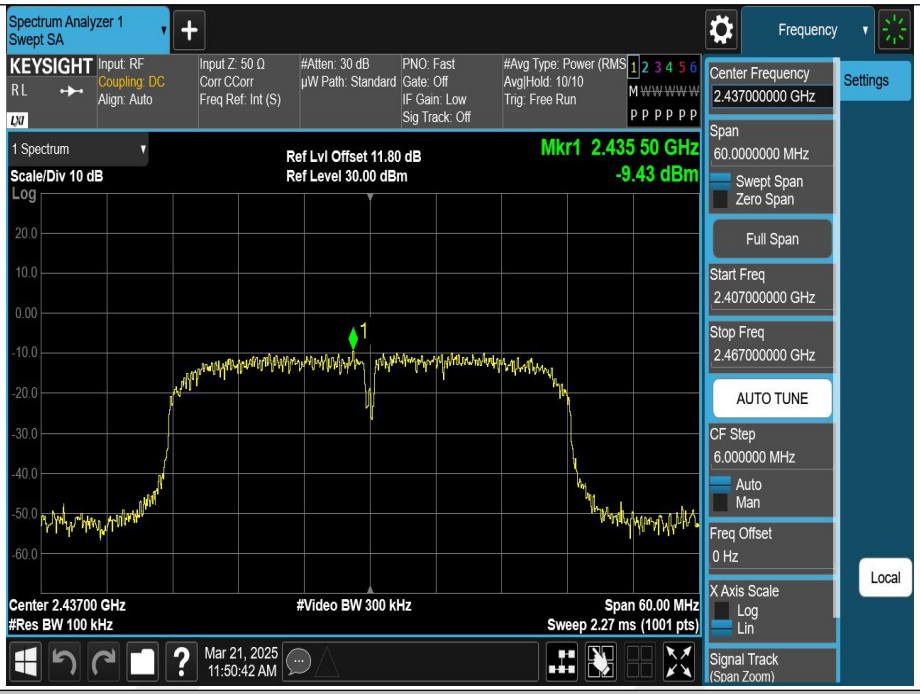


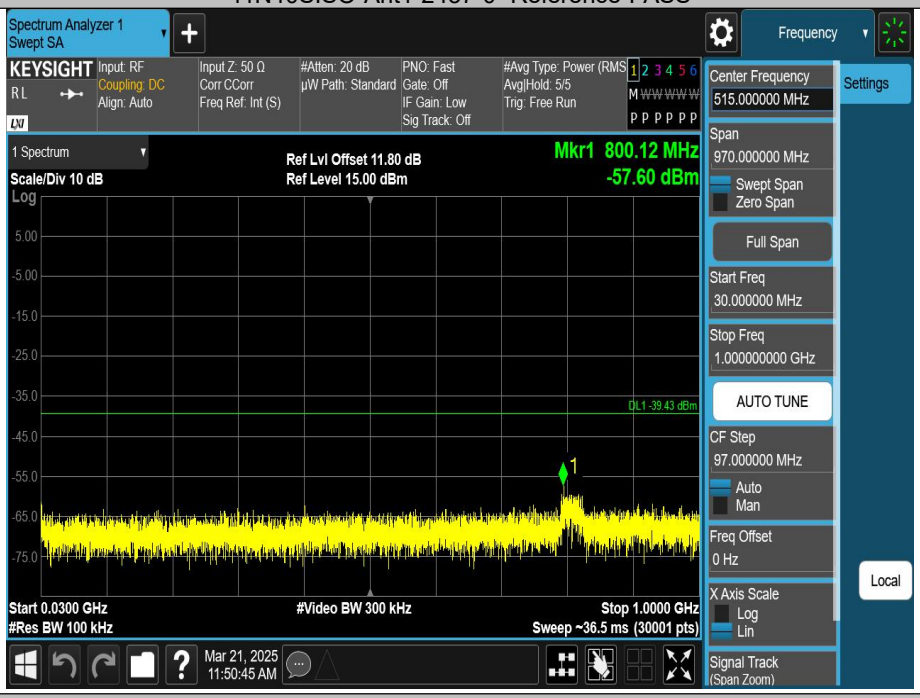
11N40SISO-Ant1-2422-30~1000-PASS



11N40SISO-Ant1-2422-1000~26500-PASS

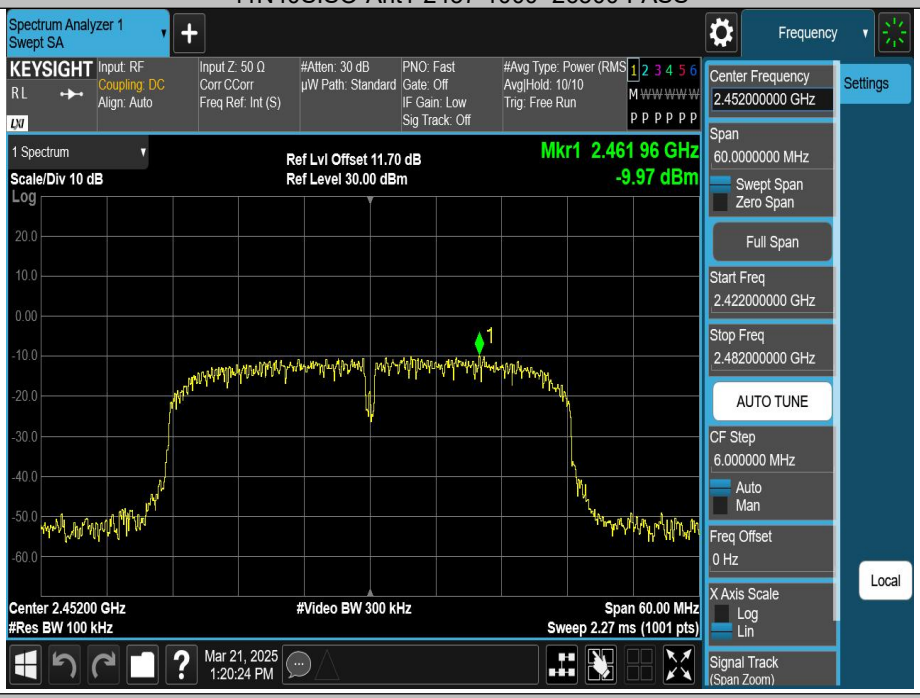


11N40SISO-Ant1-2437-0~Reference-PASS

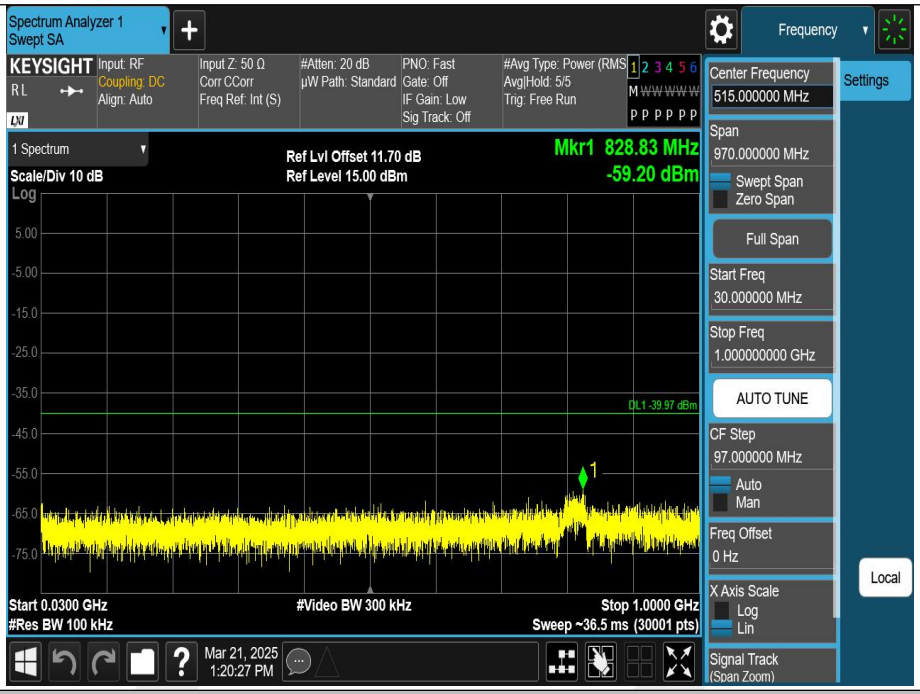


11N40SISO-Ant1-2437-30~1000-PASS

11N40SISO-Ant1-2437-1000~26500-PASS



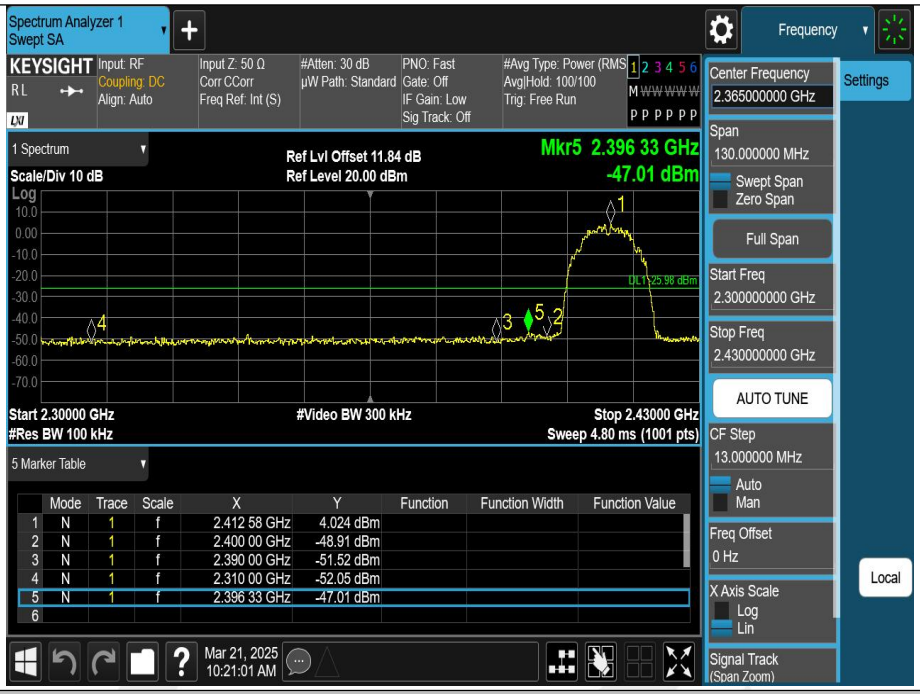
11N40SISO-Ant1-2452-0~Reference-PASS



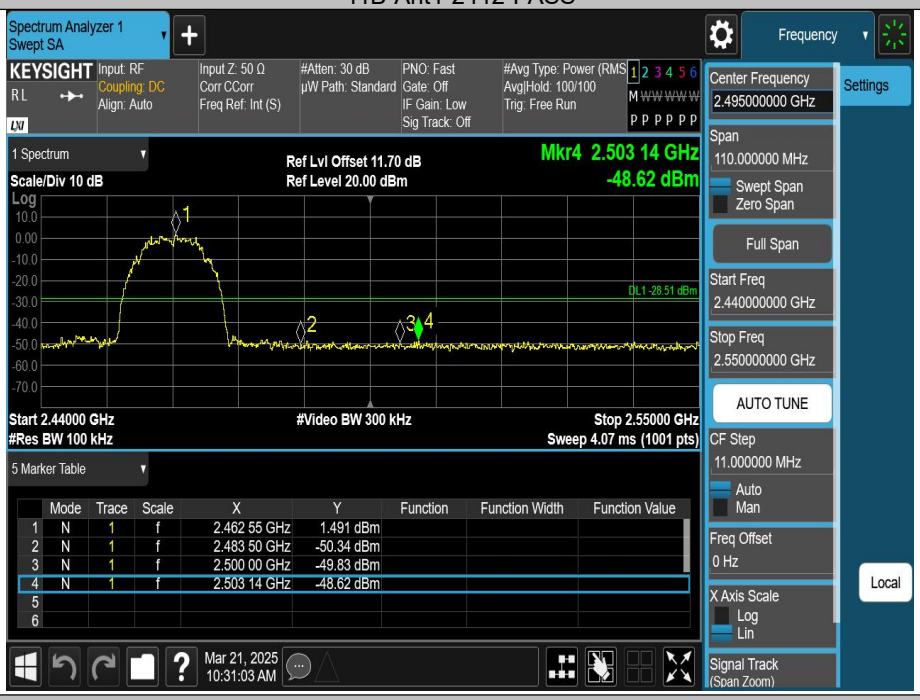
11N40SISO-Ant1-2452-30~1000-PASS

11N40SISO-Ant1-2452-1000~26500-PASS

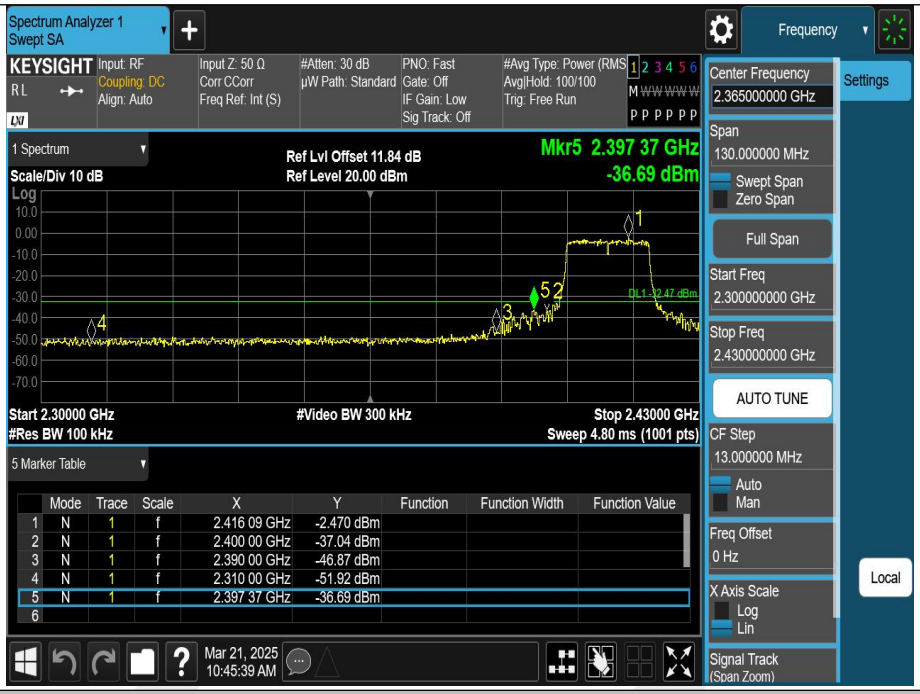
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	4.02	-47.01	≤-25.98	PASS
11B	Ant1	High	2462	1.49	-48.62	≤-28.51	PASS
11G	Ant1	Low	2412	-2.47	-36.69	≤-32.47	PASS
11G	Ant1	High	2462	-5.49	-45.7	≤-35.49	PASS
11N20SISO	Ant1	Low	2412	-3.07	-39.81	≤-33.07	PASS
11N20SISO	Ant1	High	2462	-5.73	-46.88	≤-35.73	PASS
11N40SISO	Ant1	Low	2422	-7.15	-46.25	≤-37.15	PASS
11N40SISO	Ant1	High	2452	-9.48	-47.79	≤-39.48	PASS



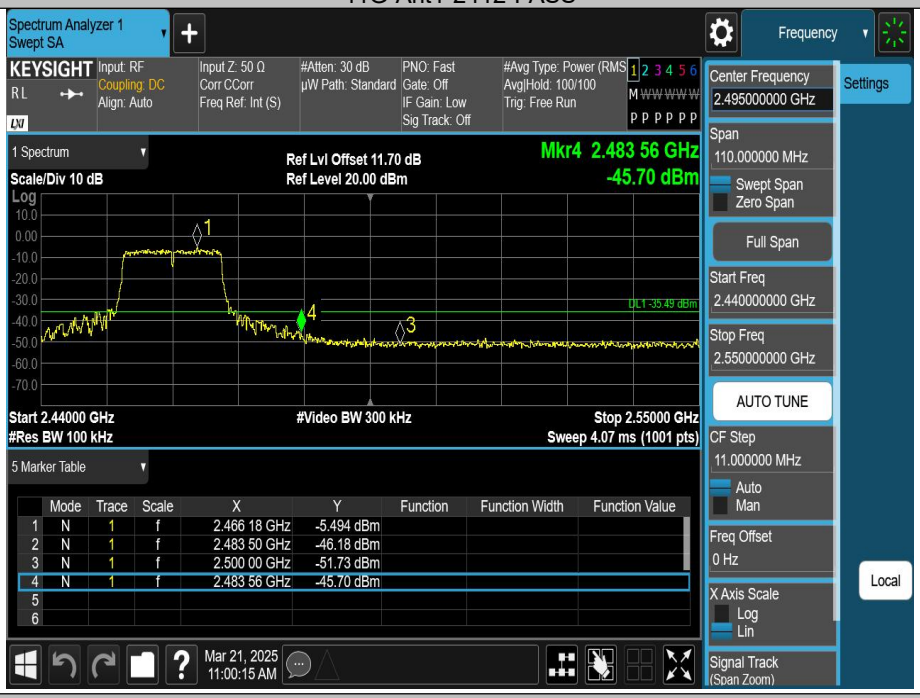
11B-Ant1-2412-PASS



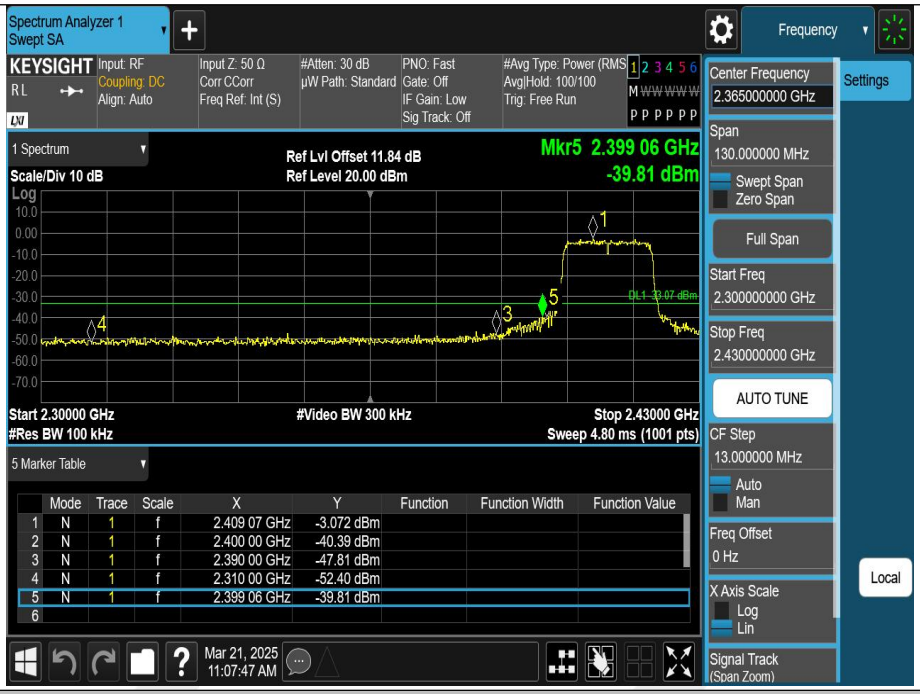
11B-Ant1-2462-PASS



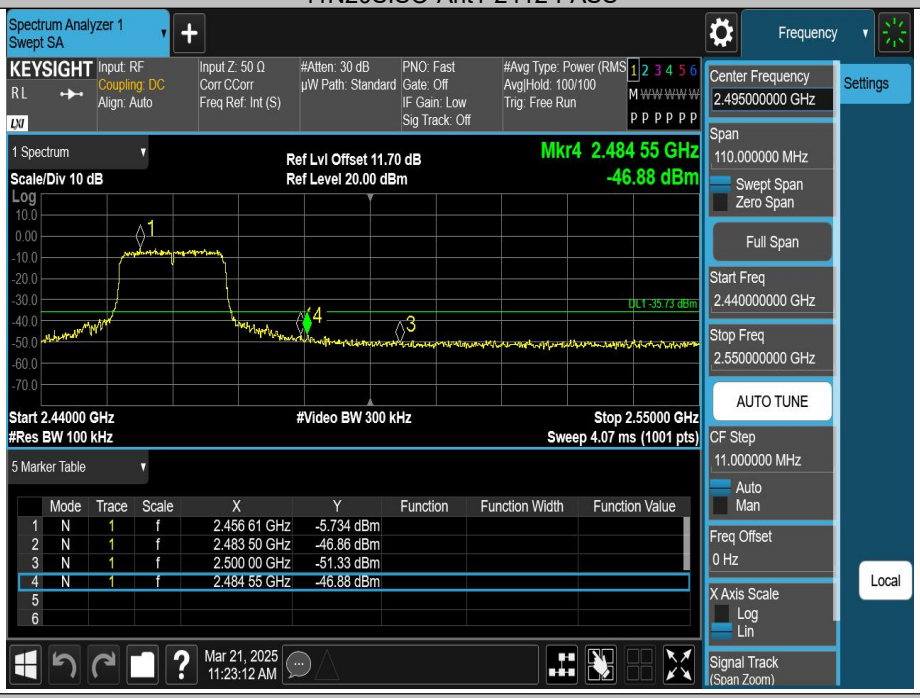
11G-Ant1-2412-PASS



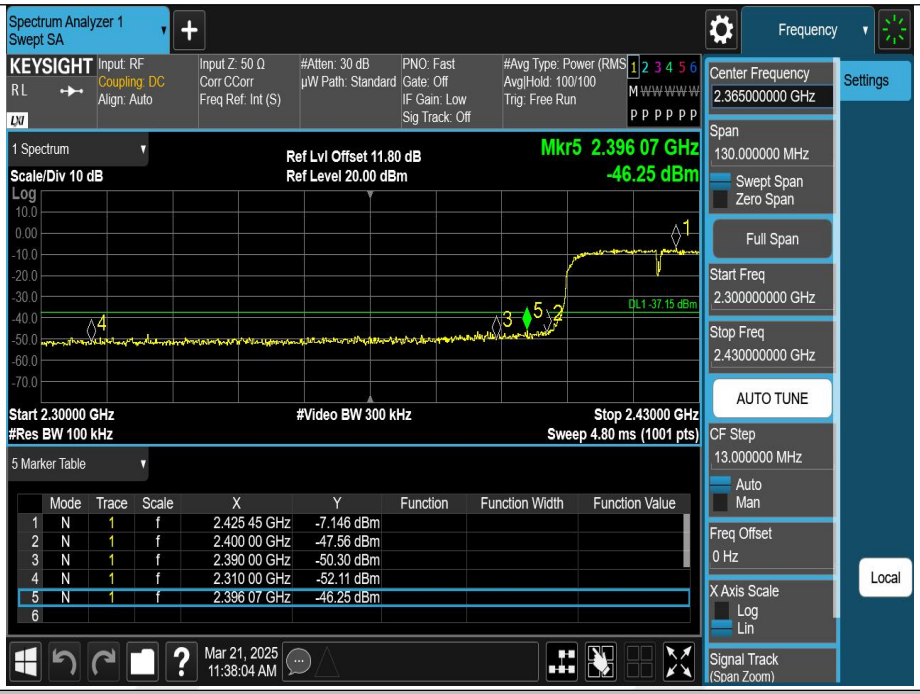
11G-Ant1-2462-PASS



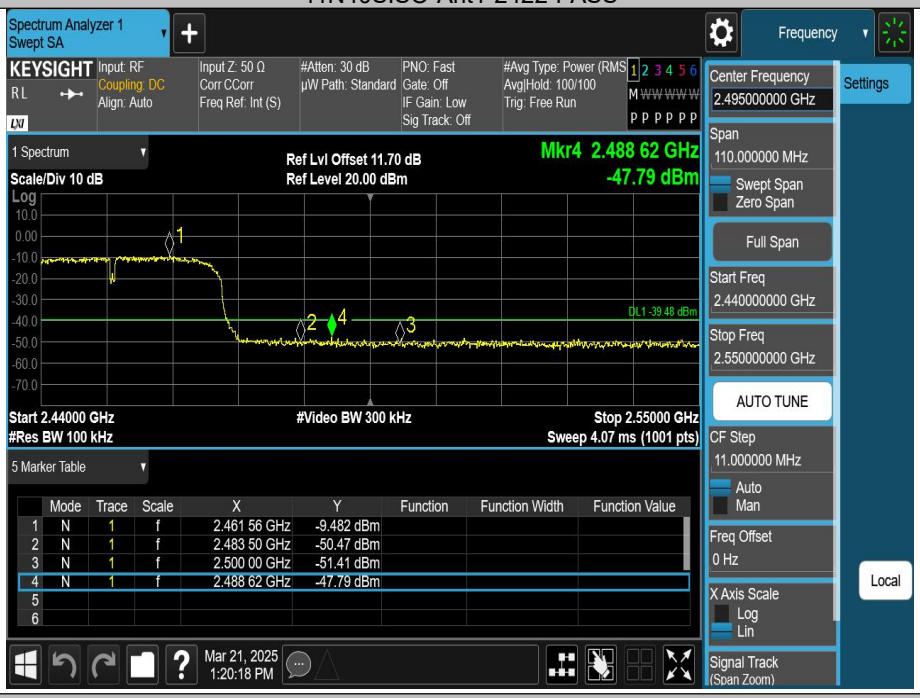
11N20SISO-Ant1-2412-PASS



11N20SISO-Ant1-2462-PASS



11N40SISO-Ant1-2422-PASS



11N40SISO-Ant1-2452-PASS

8.6 RADIATED SPURIOUS EMISSION

8.6.1 Applicable Standard

According to FCC Part 15.247(d), 15.205, 15.209 and KDB 558074 D01 15.247 Meas Guidance v05r02
According to IC RSS-Gen and RSS-247

8.6.2 Conformance Limit

According to FCC Part 15.247(d): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
According to FCC Part15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

According to FCC Part15.205 the level of any transmitter spurious emission in Restricted bands shall not exceed the level of the emission specified in the following table

Restricted Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009-0.490	2400/F(KHz)	20 log (uV/m)	300
0.490-1.705	24000/F(KHz)	20 log (uV/m)	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

8.6.3 Test Configuration

Test according to clause 6.2 radio frequency test setup

8.6.4 Test Procedure

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:
For Above 1GHz:
The EUT was placed on a turn table which is 1.5m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured
RBW = 1 MHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

For Below 1GHz:
The EUT was placed on a turn table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured
RBW = 100 kHz for
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
For Below 30MHz:
The EUT was placed on a turn table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured
RBW = 9kHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
For Below 150KHz:
The EUT was placed on a turn table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured
RBW = 200Hz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Follow the guidelines in ANSI C63.10 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit. Submit this data.
Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from 20log(dwell time/100 ms), in an effort to demonstrate compliance with the limit. Submit this data.
Repeat above procedures until all frequency measured was complete.

8.6.5 Test Results

Temperature:	26° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

■ Spurious Emission below 30MHz(9KHz to 30MHz)

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
--	--	--	--	--	--	--	--

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor

■ Spurious Emission Above 1GHz(1GHz to 25GHz)

All the antenna(Antenna 1) and modes(802.11b/g/n) have been tested and the worst(Antenna 1 , 802.11b) result recorded was report as below:

Test mode: 802.11b Frequency: Channel 1: 2412MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
8106.00	V	58.68	45.43	74.00	54.00	-15.32	-8.57
11302.00	V	59.24	46.19	74.00	54.00	-14.76	-7.81
15382.00	V	58.84	46.12	74.00	54.00	-15.16	-7.88
7698.00	H	59.40	46.70	74.00	54.00	-14.60	-7.30
10350.00	H	59.57	46.79	74.00	54.00	-14.43	-7.21
13580.00	H	59.86	47.28	74.00	54.00	-14.14	-6.72

Test mode: 802.11b Frequency: Channel 6: 2437MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
10520.00	V	59.45	46.20	74.00	54.00	-14.55	-7.80
12322.00	V	59.93	46.88	74.00	54.00	-14.07	-7.12
13988.00	V	59.69	46.51	74.00	54.00	-14.31	-7.49
7324.00	H	59.12	46.29	74.00	54.00	-14.88	-7.71
10724.00	H	59.55	47.01	74.00	54.00	-14.45	-6.99
15382.00	H	58.55	45.63	74.00	54.00	-15.45	-8.37

Test mode: 802.11b Frequency: Channel 11: 2462MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
8888.00	V	59.66	46.68	74.00	54.00	-14.34	-7.32
10928.00	V	59.88	46.49	74.00	54.00	-14.12	-7.51
15212.00	V	60.30	47.15	74.00	54.00	-13.70	-6.85
7800.00	H	59.04	45.66	74.00	54.00	-14.96	-8.34
9432.00	H	58.97	46.35	74.00	54.00	-15.03	-7.65
11132.00	H	59.09	46.34	74.00	54.00	-14.91	-7.66

Note:
(1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
(2) Emission Level= Reading Level+Correct Factor.
(3) Correct Factor= Ant_F + Cab_L - Preamp
(4) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

■ Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz

All the antenna(Antenna 1) and modes(802.11b/g/n) have been tested and the worst(Antenna 1 , 802.11b) result recorded was report as below:

Test mode:	802.11b	Frequency:	Channel 1: 2412MHz

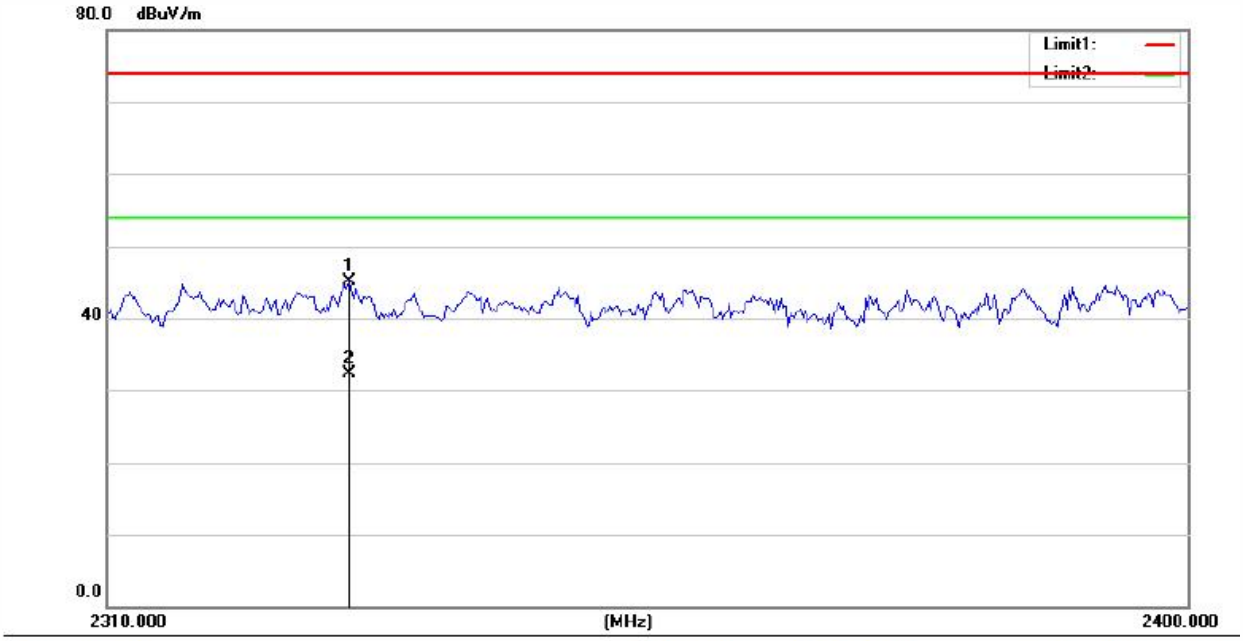
Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
2329.980	H	45.09	74.00	32.21	54.00
2340.960	V	44.26	74.00	31.73	54.00

Test mode:	802.11b	Frequency:	Channel 11: 2462MHz

Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
2484.226	H	46.68	74.00	34.15	54.00
2491.222	V	45.83	74.00	32.91	54.00

Note: (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
(2) Emission Level= Reading Level+Correct Factor.
(3) Correct Factor= Ant_F + Cab_L - Preamp
(4) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Test Model	Spurious Emission in Restricted Band 2310-2390MHz			
	802.11b	Channel 1: 2412MHz	VBW=3MHz	Polarity: H

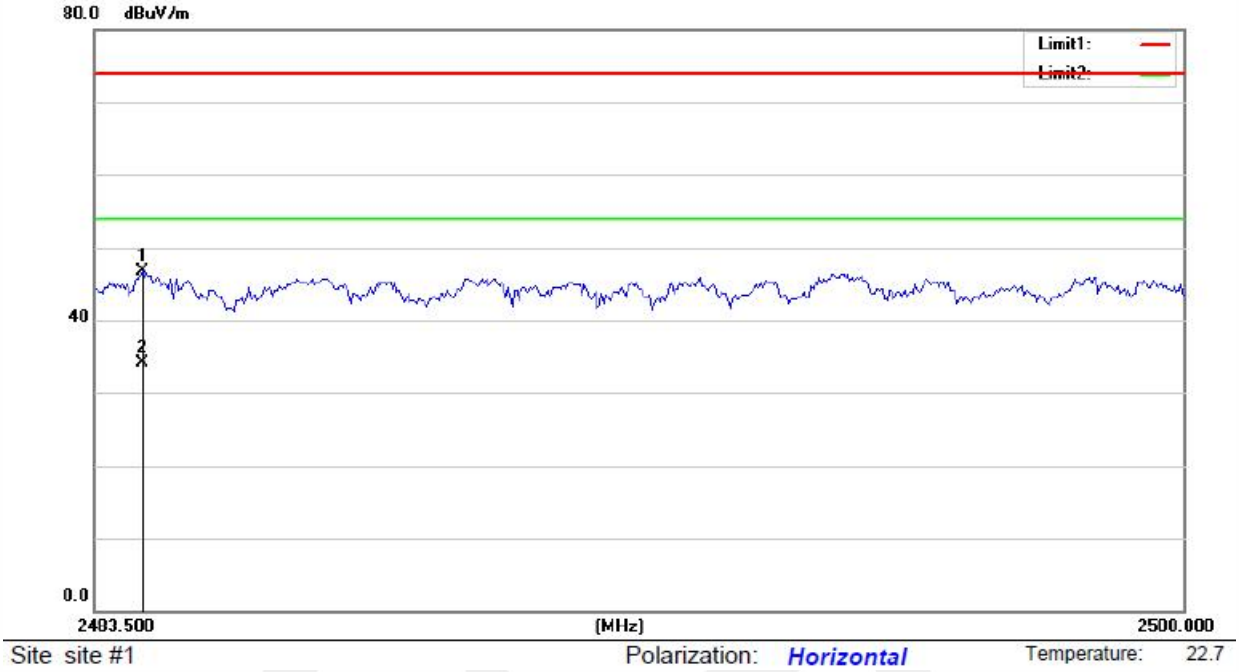


Site site #1 Polarization: *Horizontal* Temperature: 22.7

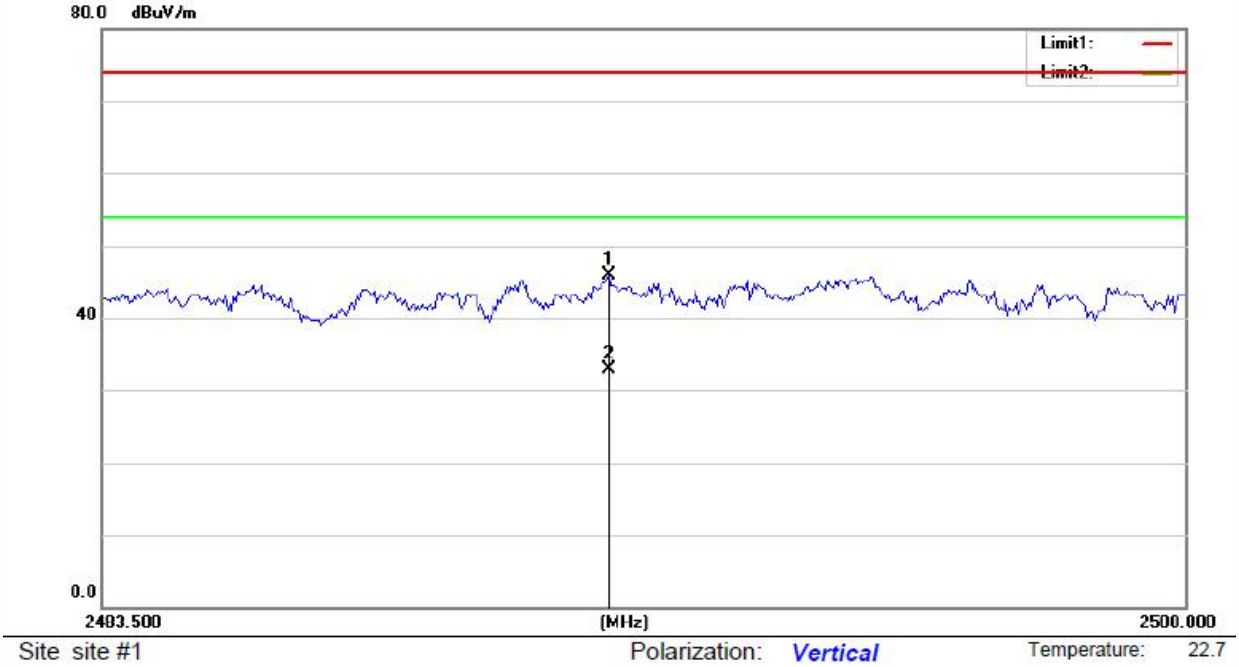
Test Model	Spurious Emission in Restricted Band 2310-2390MHz			
	802.11b	Channel 1: 2412MHz	VBW=3MHz	Polarity: V

Site site #1 Polarization: *Vertical* Temperature: 22.7

Test Model	Spurious Emission in Restricted Band 2483.5-2500MHz			
	802.11b	Channel 11: 2462MHz	VBW=3MHz	Polarity: H

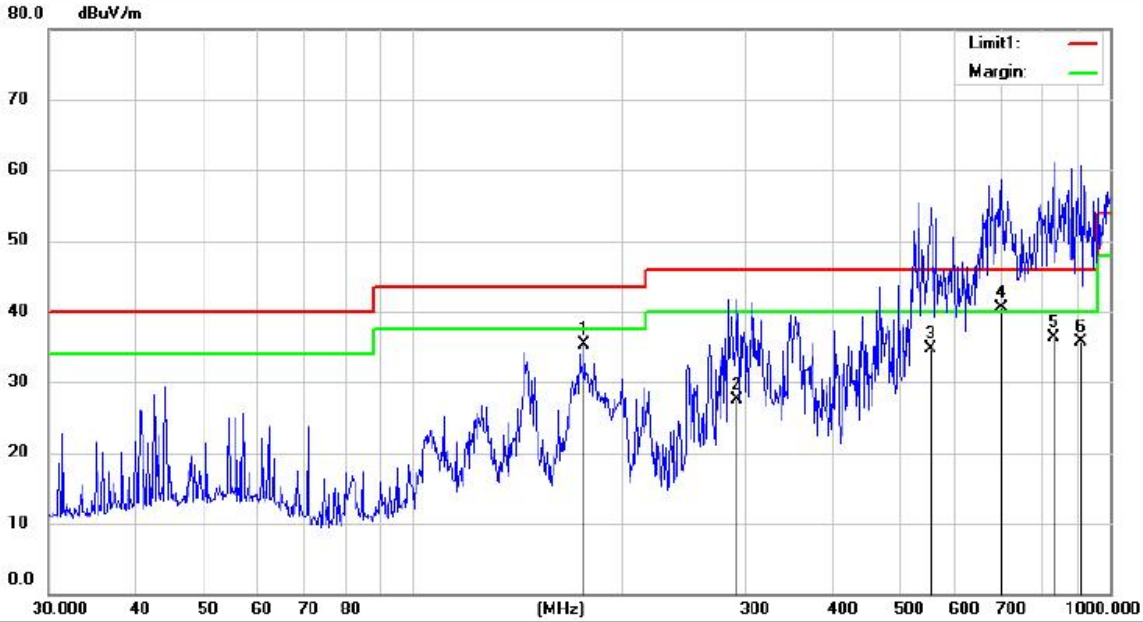


Test Model	Spurious Emission in Restricted Band2483.5-2500MHz			
	802.11b	Channel 11: 2462MHz	VBW=3MHz	Polarity: V



■ Spurious Emission below 1GHz (30MHz to 1GHz)

All the antenna(Antenna 1) and modes(802.11b/g/n) have been tested and the worst(Antenna 1, 802.11b) result recorded was report as below:



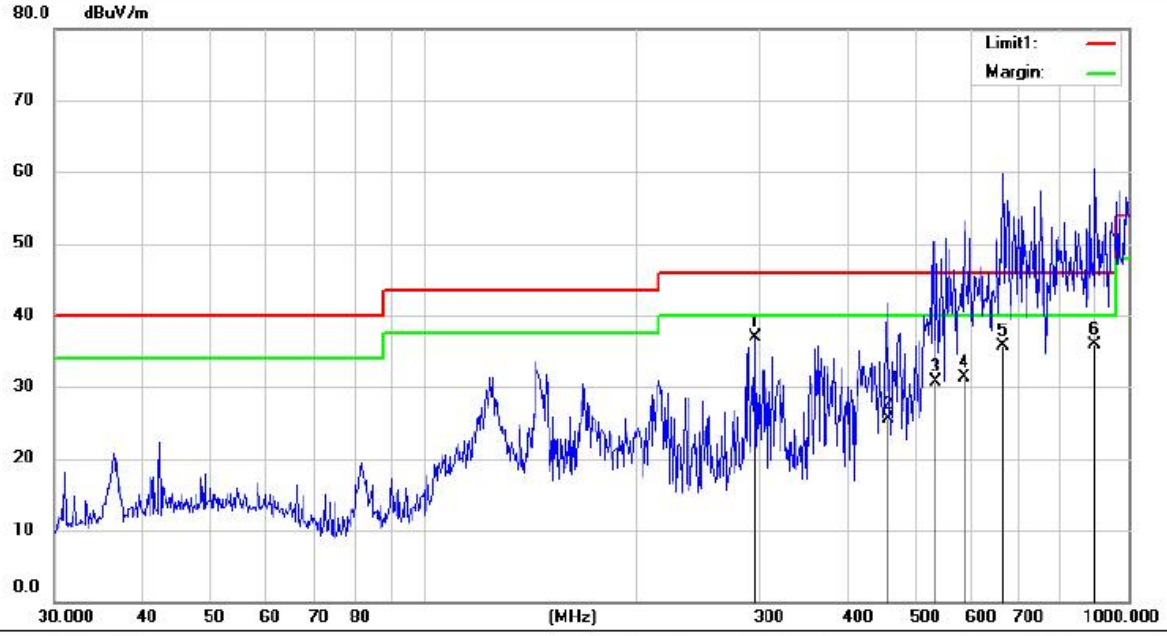
Site Chamber #1 Polarization: *Horizontal* Temperature: 22.7 C

No.	Mk.	Freq.	Reading Level	Ant. Factor	Pre Amp Gain	Cable loss	Measure-ment	Limit	Over		HI	Degree	
		MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	Detector	cm	deg.	Comment
1		176.2684	52.77	9.51	28.63	1.63	35.28	43.50	-8.22	QP			
2		291.0360	41.06	12.8	28.31	2.05	27.60	46.00	-18.40	QP			
3		552.8832	44.34	16.9	29.46	3.02	34.80	46.00	-11.20	QP			
4	*	699.3045	47.11	19.83	29.22	2.78	40.50	46.00	-5.50	QP			
5		830.4001	41.79	20.16	29.01	3.46	36.40	46.00	-9.60	QP			
6		909.6666	39.19	21.63	28.9	3.78	35.70	46.00	-10.30	QP			

*:Maximum data x:Over limit !:over margin Operator: Ccyf

Remark:

1. Measurement (dB μ V/m) = Antenna Factor(dB) -Amp Factor(dB) +Cable Loss(dB) + Reading(dB μ V/m)
2. Over (dB) = Measurement (dB μ V/m) - Limit (dB μ V/m)



Site Chamber #1 Polarization: *Vertical* Temperature: 22.7 C

No.	Mk.	Freq.	Reading Level	Ant. Factor	Pre Amp Gain	Cable loss	Measure-ment	Limit	Over		HI	Degree	
		MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	Detector	cm	deg.	Comment
1	*	296.1836	49.75	13.27	28.29	2.08	36.81	46.00	-9.19	QP			
2		455.9058	36.26	15.94	29.27	2.67	25.60	46.00	-20.40	QP			
3		533.8321	39.86	17.37	29.49	2.96	30.70	46.00	-15.30	QP			
4		584.7894	39.23	18.41	29.41	3.07	31.30	46.00	-14.70	QP			
5		663.4730	42.71	19.24	29.28	3.03	35.70	46.00	-10.30	QP			
6		896.9965	39.60	21.58	28.92	3.74	36.00	46.00	-10.00	QP			

*:Maximum data x:Over limit !:over margin Operator: Ccyf

Remark:

1. Measurement (dB μ V/m) = Antenna Factor(dB) -Amp Factor(dB) +Cable Loss(dB) + Reading(dB μ V/m)
2. Over (dB) = Measurement (dB μ V/m) - Limit (dB μ V/m)

8.7 CONDUCTED EMISSION TEST

8.7.1 Applicable Standard

According to FCC Part 15.207(a)
According to IC RSS-Gen 8.8

8.7.2 Conformance Limit

Conducted Emission Limit		
Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

8.7.3 Test Configuration

Test according to clause 6.3 conducted emission test setup

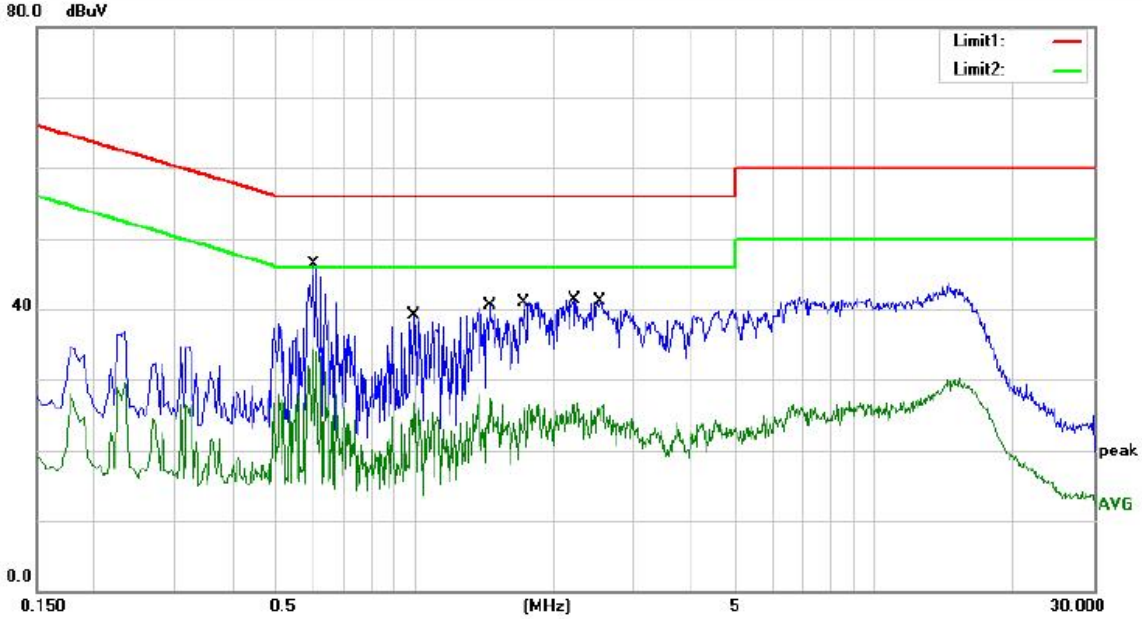
8.7.4 Test Procedure

The EUT was placed on a table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Repeat above procedures until all frequency measured were complete.

8.7.5 Test Results

Pass

The AC120V &240V voltage have been tested, and the worst result recorded was report as below:



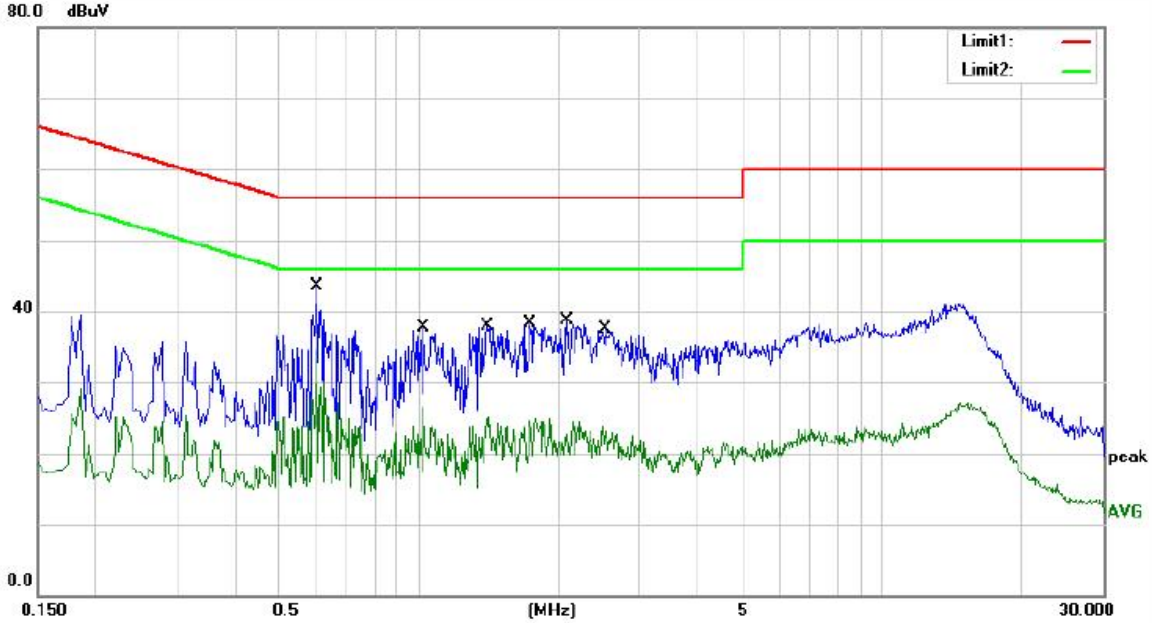
Site site #1 Phase: *L1* Temperature: 23.3

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.6020	29.28	17.06	46.34	56.00	-9.66	QP	
2		0.6020	17.34	17.06	34.40	46.00	-11.60	AVG	
3		0.9900	22.03	17.03	39.06	56.00	-16.94	QP	
4		0.9900	9.67	17.03	26.70	46.00	-19.30	AVG	
5		1.4500	23.49	17.07	40.56	56.00	-15.44	QP	
6		1.4500	10.77	17.07	27.84	46.00	-18.16	AVG	
7		1.7300	23.87	17.09	40.96	56.00	-15.04	QP	
8		1.7300	9.32	17.09	26.41	46.00	-19.59	AVG	
9		2.2140	24.25	17.09	41.34	56.00	-14.66	QP	
10		2.2140	9.53	17.09	26.62	46.00	-19.38	AVG	
11		2.5380	23.94	17.06	41.00	56.00	-15.00	QP	
12		2.5380	9.51	17.06	26.57	46.00	-19.43	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: Jian

Remark:

1. Measurement (dB μ V) = AMN Factor (dB) + Cable Loss (dB) + Reading (dB μ V)
2. Over (dB) = Measurement (dB μ V) - Limit (dB μ V)



Site site #1 Phase: N Temperature: 23.3

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.6020	26.48	17.06	43.54	56.00	-12.46	QP	
2	*	0.6020	17.36	17.06	34.42	46.00	-11.58	AVG	
3		1.0260	20.74	17.03	37.77	56.00	-18.23	QP	
4		1.0260	9.39	17.03	26.42	46.00	-19.58	AVG	
5		1.4060	20.75	17.06	37.81	56.00	-18.19	QP	
6		1.4060	6.85	17.06	23.91	46.00	-22.09	AVG	
7		1.7380	21.21	17.09	38.30	56.00	-17.70	QP	
8		2.0860	21.64	17.10	38.74	56.00	-17.26	QP	
9		2.0860	7.82	17.10	24.92	46.00	-21.08	AVG	
10		2.0860	7.48	17.10	24.58	46.00	-21.42	AVG	
11		2.5340	20.42	17.06	37.48	56.00	-18.52	QP	
12		2.5340	6.81	17.06	23.87	46.00	-22.13	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: Jian

Remark:

1. Measurement (dB μ V) = AMN Factor (dB) + Cable Loss (dB) + Reading (dB μ V)
2. Over (dB) = Measurement (dB μ V) - Limit (dB μ V)

8.8 ANTENNA APPLICATION

8.8.1 Antenna Requirement

Standard	Requirement
FCC CRF Part 15.203	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. 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.
FCC 47 CFR Part 15.247 (b)	If transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.
RSS-Gen Section 6.8	The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.
RSS-247 Section 5.4	If the transmitter employs an antenna system that emits multiple directional beams, but does not emit multiple directional beams simultaneously, the total output power conducted to the array or arrays that comprise the device (i.e. the sum of the power supplied to all antennas, antenna elements, staves, etc., and summed across all carriers or frequency channels) shall not exceed the applicable output power limit. However, the total conducted output power shall be reduced by 1 dB below the specified limits for each 3 dB that the directional gain of the antenna/antenna array exceeds 6 dBi. The directional antenna gain shall be computed as the sum of 10 log (number of array elements or staves) plus the directional gain of the element or stave having the highest gain.

8.8.2 Result

PASS.

Note:
- ☑ Antenna use a permanently attached antenna which is not replaceable.
- ☐ Not using a standard antenna jack or electrical connector for antenna replacement
- ☐ The antenna has to be professionally installed (please provide method of installation)

Please refer to the attached document Internal Photos to show the antenna connector.

*** End of Report ***

声 明

Statement

1. **本报告无授权批准人签字及“检验检测专用章”无效；**

   This report will be void without authorized signature or special seal for testing report.

2. **未经许可本报告不得部分复制；**

   This report shall not be copied partly without authorization.

3. **本报告的检测结果仅对送测样品有效，委托方对样品的代表性和资料的真实性负责；**

   The test results or observations are applicable only to tested sample. Client shall be responsible for representativeness of the sample and authenticity of the material.

4. **本检测报告中检测项目标注有特殊符号则该项目不在资质认定范围内，仅作为客户委托、科研、教学或内部质量控制等目的使用；**

   The observations or tests with special mark fall outside the scope of accreditation, and are only used for purpose of commission, research, training, internal quality control etc.

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6. **对本检验报告若有异议，请于收到报告之日起 20 日内提出；**

   Objections shall be raised within 20 days from the date receiving the report.