

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 $\geq$ 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 $\geq$ 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 $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Follow the guidelines in ANSI C63.10-2013 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 specified in Section 15.35(b). 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 specified in Section 15.209. 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 $20\log(\text{dwell time}/100 \text{ ms})$, in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Repeat above procedures until all frequency measured was complete.

9.7.5 Test Results

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

Temperature:	22° C
Relative Humidity:	45%
ATM Pressure:	1011 mbar

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		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 = $40\log(\text{Specific distance}/\text{test distance})$ (dB);

Limit line = Specific limits(dBuV) + distance extrapolation factor

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

All the antenna(Antenna 1) and modes(GFSK, $\pi/4$ -DQPSK, 8DPSK) mode have been tested, and the worst(Antenna 1, 8DPSK) result recorded was report as below:

Test mode: 8DPSK Frequency: Channel 0: 2402MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
8866.06	V	59.04	46.20	74.00	54.00	-14.96	-7.80
11533.48	V	59.65	46.74	74.00	54.00	-14.35	-7.26
16268.10	V	59.25	45.53	74.00	54.00	-14.75	-8.47
8465.38	H	57.86	45.08	74.00	54.00	-16.14	-8.92
9809.92	H	58.53	45.61	74.00	54.00	-15.47	-8.39
15759.04	H	57.70	44.84	74.00	54.00	-16.30	-9.16

Test mode: 8DPSK Frequency: Channel 39: 2441MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
8969.16	V	59.26	46.09	74.00	54.00	-14.74	-7.91
13677.96	V	58.79	45.96	74.00	54.00	-15.21	-8.04
16504.90	V	59.30	46.54	74.00	54.00	-14.70	-7.46
8465.38	H	58.18	45.23	74.00	54.00	-15.82	-8.77
11500.19	H	59.43	46.32	74.00	54.00	-14.57	-7.68
15221.80	H	59.21	46.34	74.00	54.00	-14.79	-7.66

Test mode: 8DPSK Frequency: Channel 78: 2480MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
9530.43	V	59.09	49.76	74.00	54.00	-14.91	-4.24
15046.85	V	58.29	45.50	74.00	54.00	-15.71	-8.50
16600.60	V	57.65	44.27	74.00	54.00	-16.35	-9.73
9366.58	H	58.51	44.93	74.00	54.00	-15.49	-9.07
10484.23	H	58.88	45.42	74.00	54.00	-15.12	-8.58
16552.70	H	58.82	45.86	74.00	54.00	-15.18	-8.14

- 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(GFSK, $\pi/4$ -DQPSK, 8DPSK, Hopping) mode have been tested, and the worst(Antenna 1, 8DPSK, Hopping) result recorded was report as below:

Test mode: 8DPSK Frequency: Channel 0: 2402MHz

Frequency (MHz)	Polarity H/V	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
2383.99	H	43.63	74.00	31.37	54.00
2370.47	V	43.76	74.00	31.24	54.00

Test mode: 8DPSK Frequency: Channel 78: 2480MHz

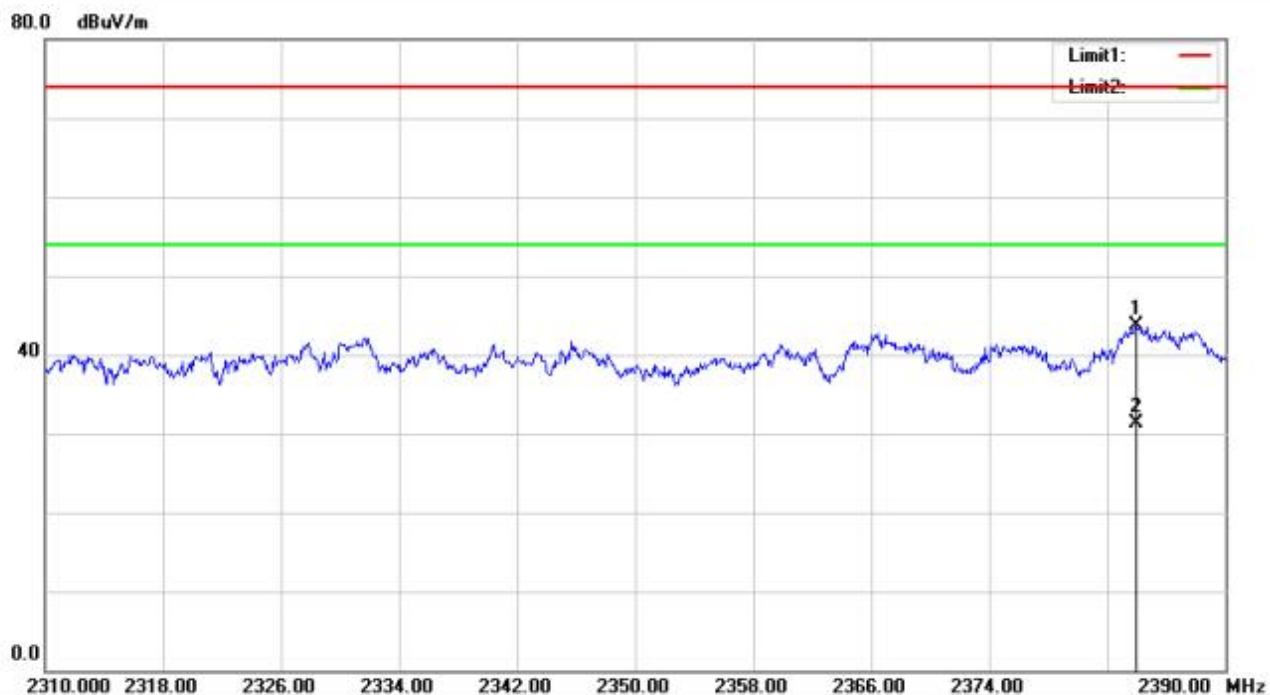
Frequency (MHz)	Polarity H/V	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
2484.51	H	43.97	74.00	31.47	54.00
2485.97	V	44.19	74.00	30.92	54.00

Test mode: 8DPSK Frequency: Hopping

Frequency (MHz)	Polarity H/V	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
2386.00	H	44.99	74.00	32.30	54.00
2400.00	H	45.16	74.00	32.27	54.00
2483.50	H	44.03	74.00	31.49	54.00
2387.71	V	44.37	74.00	30.77	54.00
2400.00	V	46.38	74.00	32.86	54.00
2483.50	V	44.57	74.00	31.60	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 Channel 0: 2402MHz	8DPSK	H
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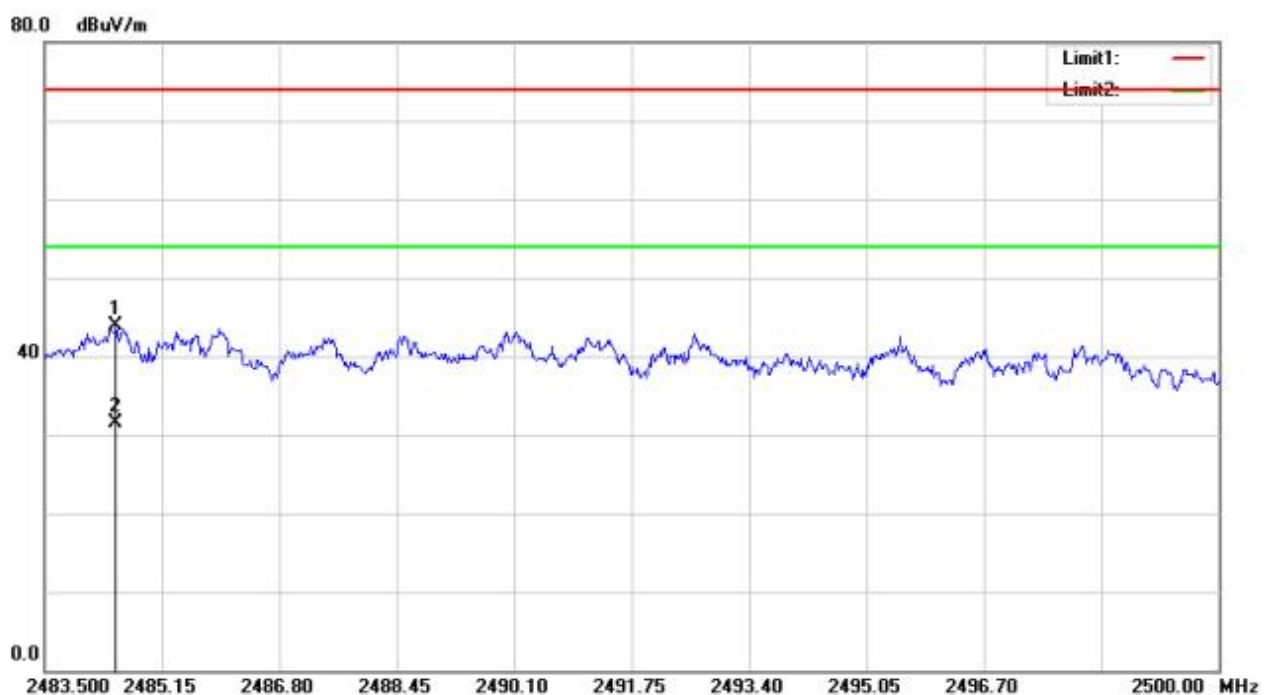
Site site #1 Polarization: **Horizontal** Temperature: 23.4

Test Model	Spurious Emission in Restricted Band 2310-2390MHz Channel 0: 2402MHz	8DPSK	V
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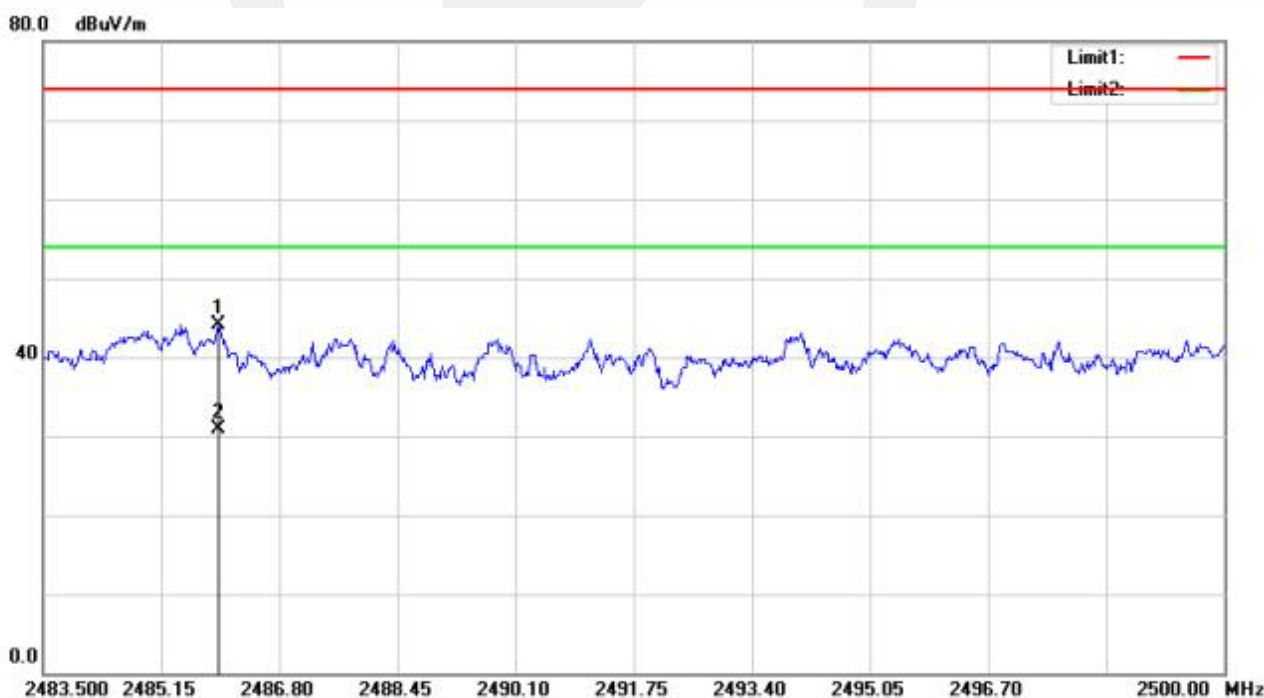


Site site #1 Polarization: **Vertical** Temperature: 23.4

Test Model	Spurious Emission in Restricted Band 2483.5-2500MHz Channel 78: 2480MHz	8DPSK	H
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Site site #1	Polarization: Horizontal	Temperature: 22.8
Test Model	Spurious Emission in Restricted Band 2483.5-2500MHz Channel 78: 2480MHz	8DPSK V



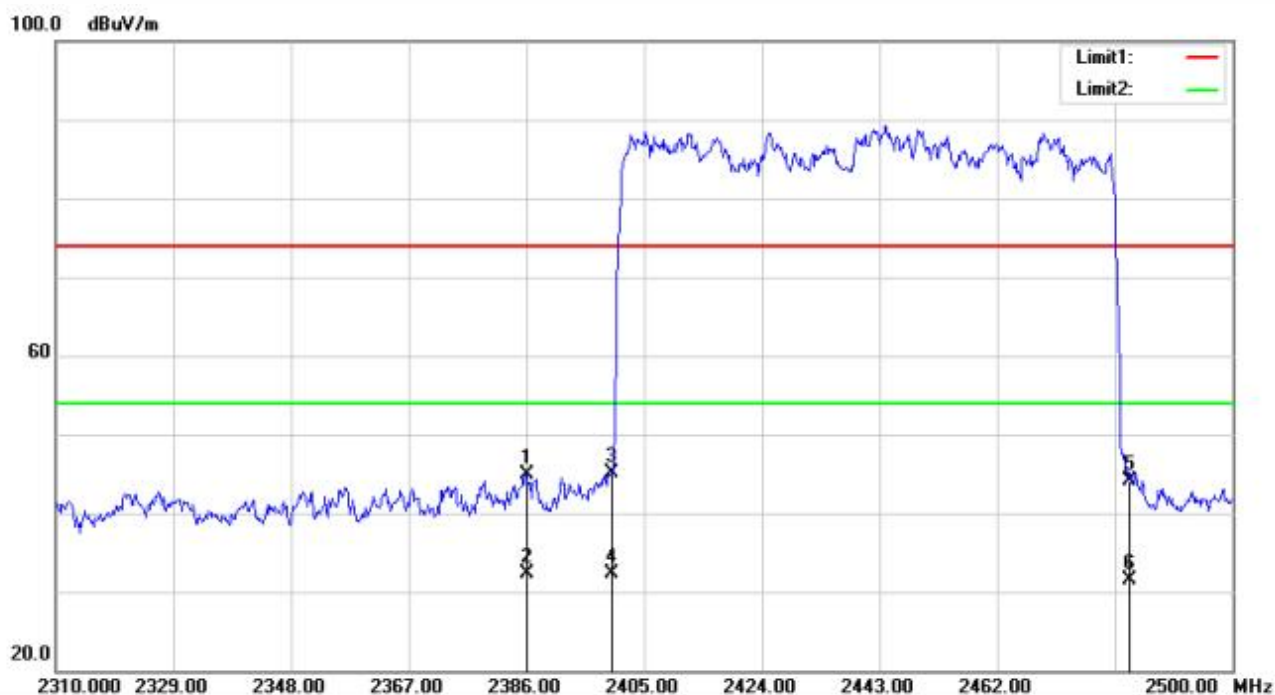
Site site #1	Polarization: Vertical	Temperature: 22.8
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Test Model

Spurious Emission in Restricted Band 2310-2390MHz and 2400-2483.5MHz
Hopping

8DPSK

H

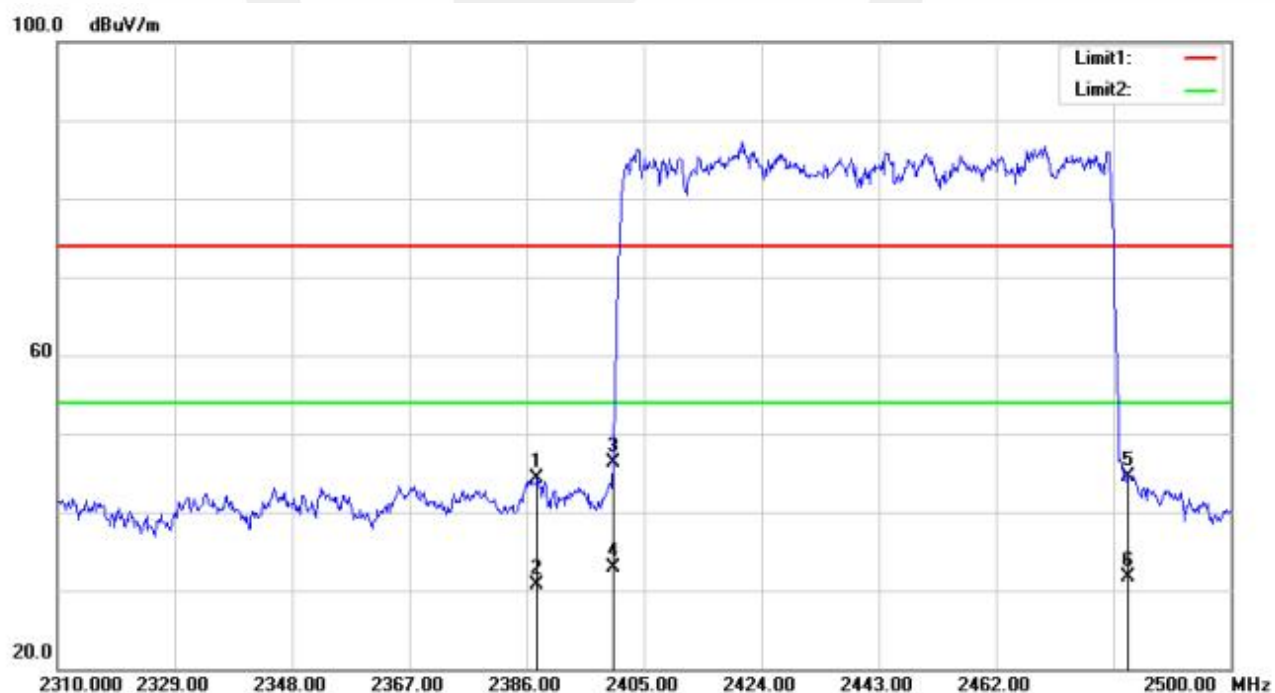


Test Model

Spurious Emission in Restricted Band 2310-2390MHz and 2400-2483.5MHz
Hopping

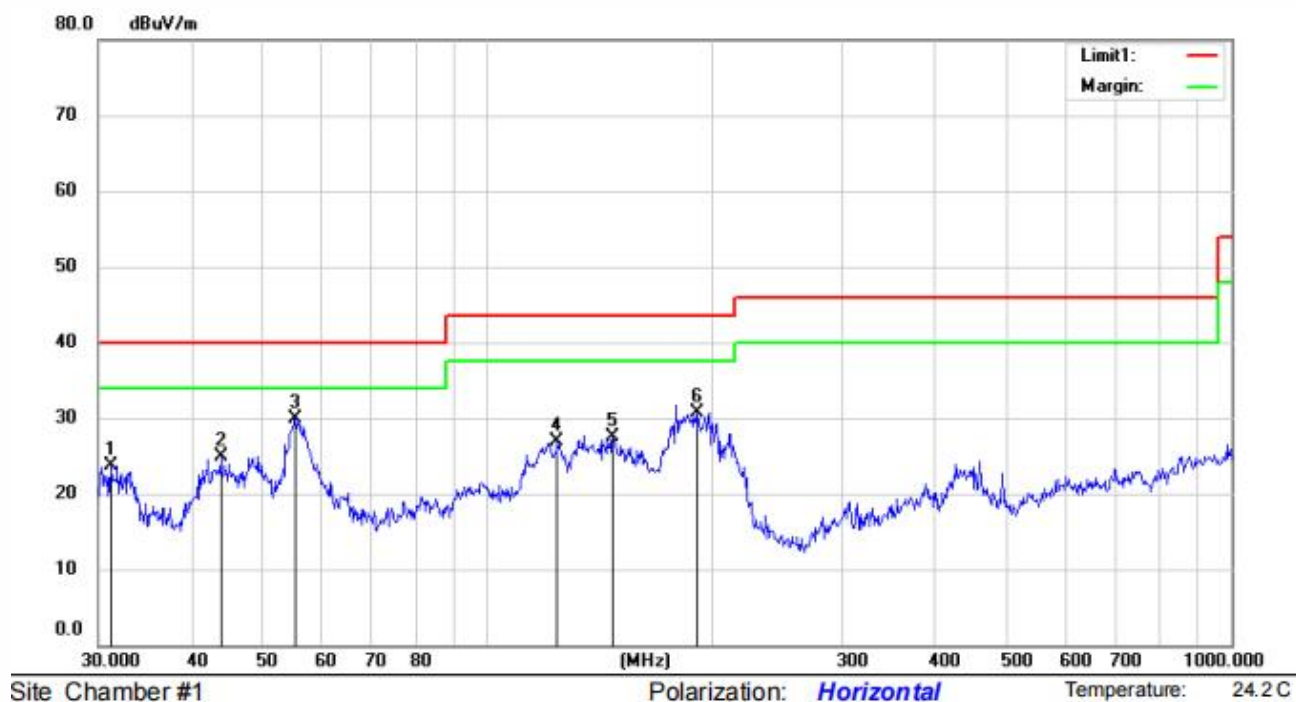
8DPSK

V



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

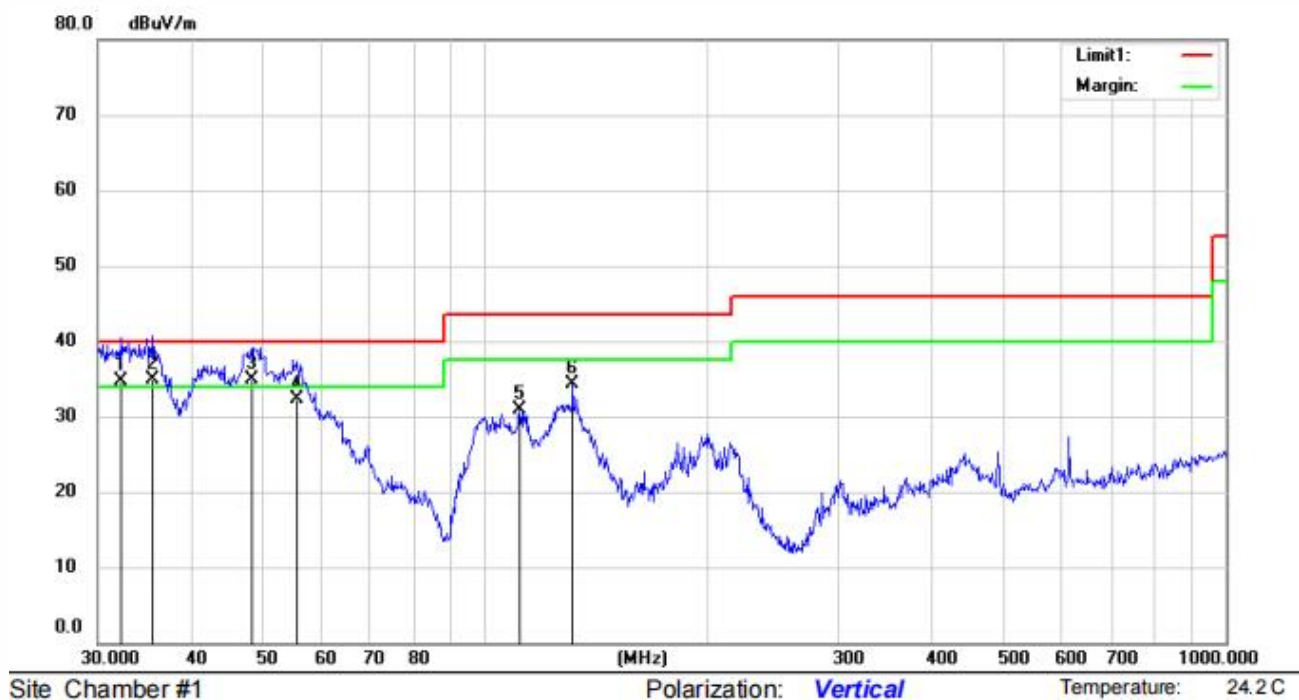
All the antenna(Antenna 1) and modes(GFSK, $\pi/4$ -DQPSK, 8DPSK) mode have been tested, and the worst(Antenna 1, 8DPSK) result recorded was report as below:



No.	Mk.	Freq. MHz	Reading Level dBuV	Ant. Factor dB/m	Pre Amp Gain dB	Cable loss dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	HI	Degree	Comment
1		31.1797	41.08	10.8	29.12	0.9	23.66	40.00	-16.34	QP		
2		43.8120	39.74	13.2	29.02	0.95	24.87	40.00	-15.13	QP		
3	*	55.2207	44.72	13.27	29	0.92	29.91	40.00	-10.09	QP		
4		124.1330	44.37	9.85	28.78	1.38	26.82	43.50	-16.68	QP		
5		147.4036	46.16	8.64	28.71	1.51	27.60	43.50	-15.90	QP		
6		191.7450	47.73	9.82	28.59	1.7	30.66	43.50	-12.84	QP		

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

Operator: Ccyf



No.	Mk.	Freq. MHz	Reading Level dBuV	Ant. Factor dB/m	Pre Amp Gain dB	Cable loss dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	HI	Degree	Comment
1	!	32.2925	52.21	10.8	29.11	0.9	34.80	40.00	-5.20	QP		
2	*	35.6240	51.64	11.52	29.08	0.92	35.00	40.00	-5.00	QP		
3	!	48.3318	50.31	12.7	28.98	0.97	35.00	40.00	-5.00	QP		
4		55.8047	47.46	12.92	29	0.92	32.30	40.00	-7.70	QP		
5		111.3468	46.51	11.87	28.82	1.31	30.87	43.50	-12.63	QP		
6		131.2965	52.70	8.85	28.76	1.42	34.21	43.50	-9.29	QP		

!:Maximum data x:Over limit !:over margin

Operator: Ccyf

Remark:

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

9.8 CONDUCTED EMISSION TEST

9.8.1 Applicable Standard

According to FCC Part 15.207

According to IC RSS-Gen 8.8

9.8.2 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.		

9.8.3 Test Configuration

Test according to clause 7.3 conducted emission test setup

9.8.4 Test Procedure

The EUT was placed on a table which is 0.8m above ground plane.

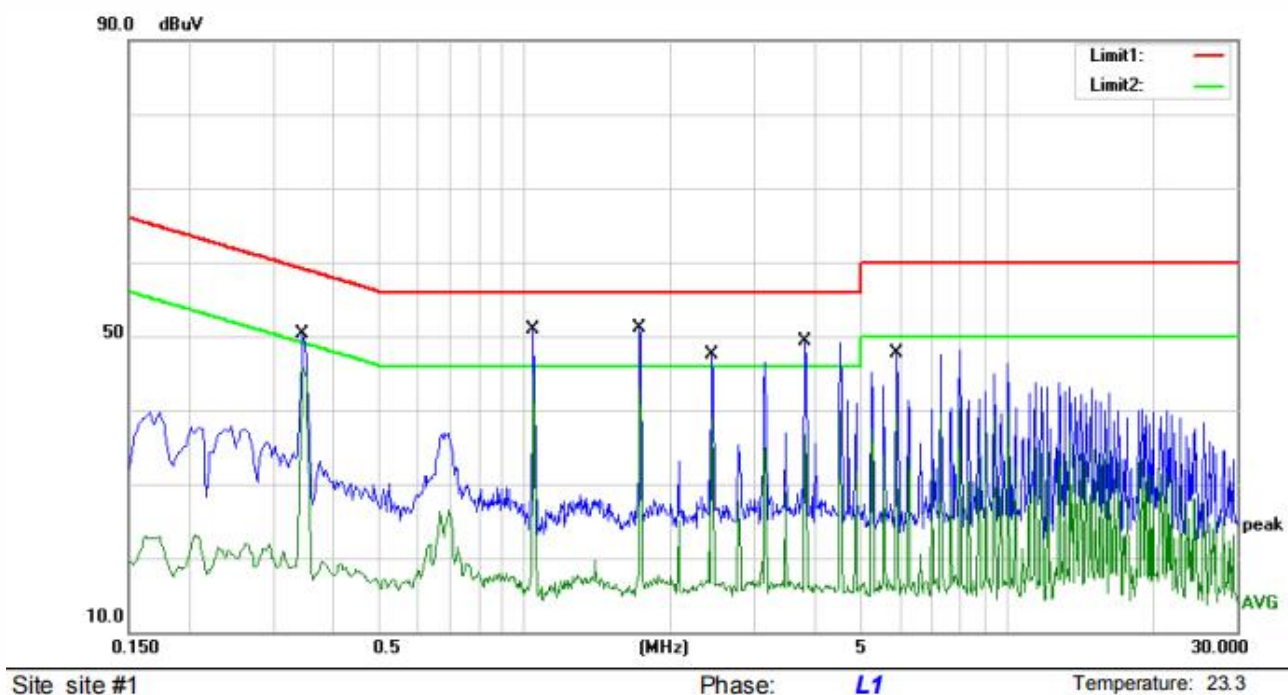
Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Repeat above procedures until all frequency measured were complete.

9.8.5 Test Results

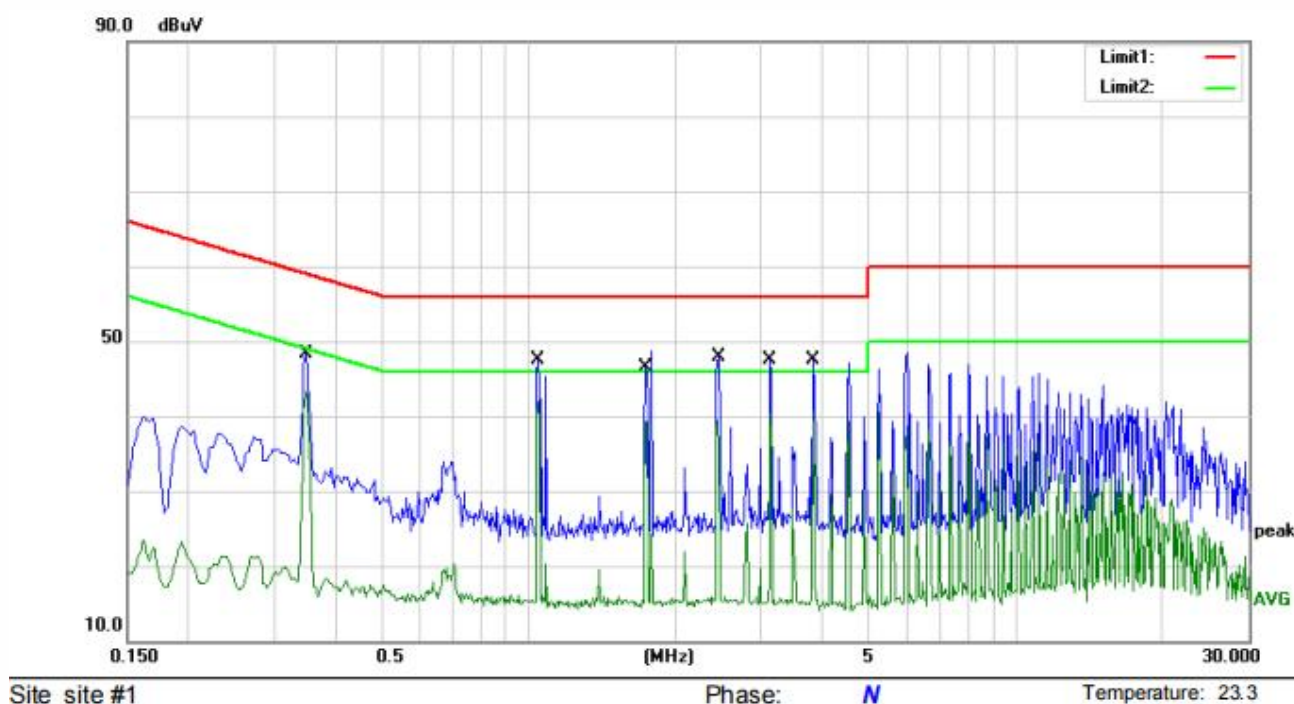
Pass

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



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.3460	33.13	17.07	50.20	59.06	-8.86	QP	
2		0.3460	28.66	17.07	45.73	49.06	-3.33	AVG	
3		1.0420	33.92	17.03	50.95	56.00	-5.05	QP	
4	*	1.0420	27.93	17.03	44.96	46.00	-1.04	AVG	
5		1.7340	33.96	17.09	51.05	56.00	-4.95	QP	
6		1.7340	25.76	17.09	42.85	46.00	-3.15	AVG	
7		2.4460	30.49	17.07	47.56	56.00	-8.44	QP	
8		2.4460	21.74	17.07	38.81	46.00	-7.19	AVG	
9		3.8180	32.33	16.99	49.32	56.00	-6.68	QP	
10		3.8180	19.72	16.99	36.71	46.00	-9.29	AVG	
11		5.9020	30.76	17.00	47.76	60.00	-12.24	QP	
12		5.9020	22.23	17.00	39.23	50.00	-10.77	AVG	

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



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.3500	31.25	17.07	48.32	58.96	-10.64	QP	
2		0.3500	26.29	17.07	43.36	48.96	-5.60	AVG	
3		1.0460	30.48	17.03	47.51	56.00	-8.49	QP	
4	*	1.0460	24.85	17.03	41.88	46.00	-4.12	AVG	
5		1.7420	31.63	17.09	48.72	56.00	-7.28	QP	
6		1.7420	22.31	17.09	39.40	46.00	-6.60	AVG	
7		2.4380	30.78	17.07	47.85	56.00	-8.15	QP	
8		2.4380	22.48	17.07	39.55	46.00	-6.45	AVG	
9		3.1380	30.44	17.02	47.46	56.00	-8.54	QP	
10		3.1380	23.33	17.02	40.35	46.00	-5.65	AVG	
11		3.8340	30.52	16.99	47.51	56.00	-8.49	QP	
12		3.8340	23.78	16.99	40.77	46.00	-5.23	AVG	

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

Remark:

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

9.9 ANTENNA APPLICATION

9.9.1 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 staff having the highest gain.

9.9.2 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 ***

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