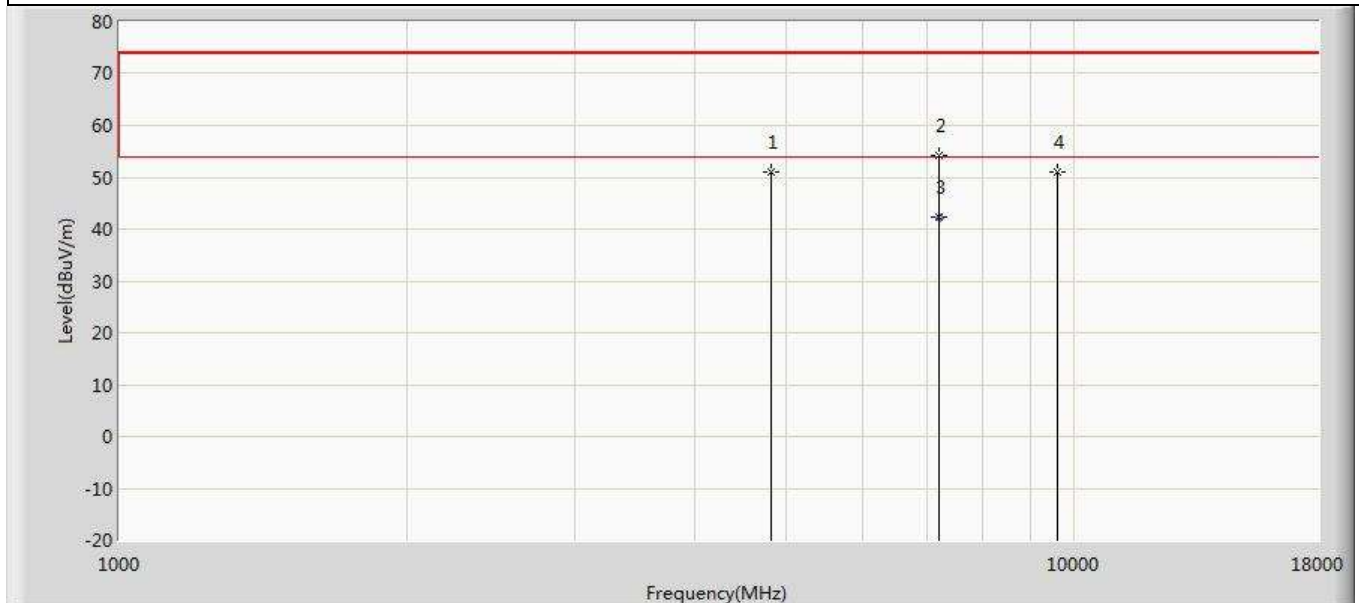
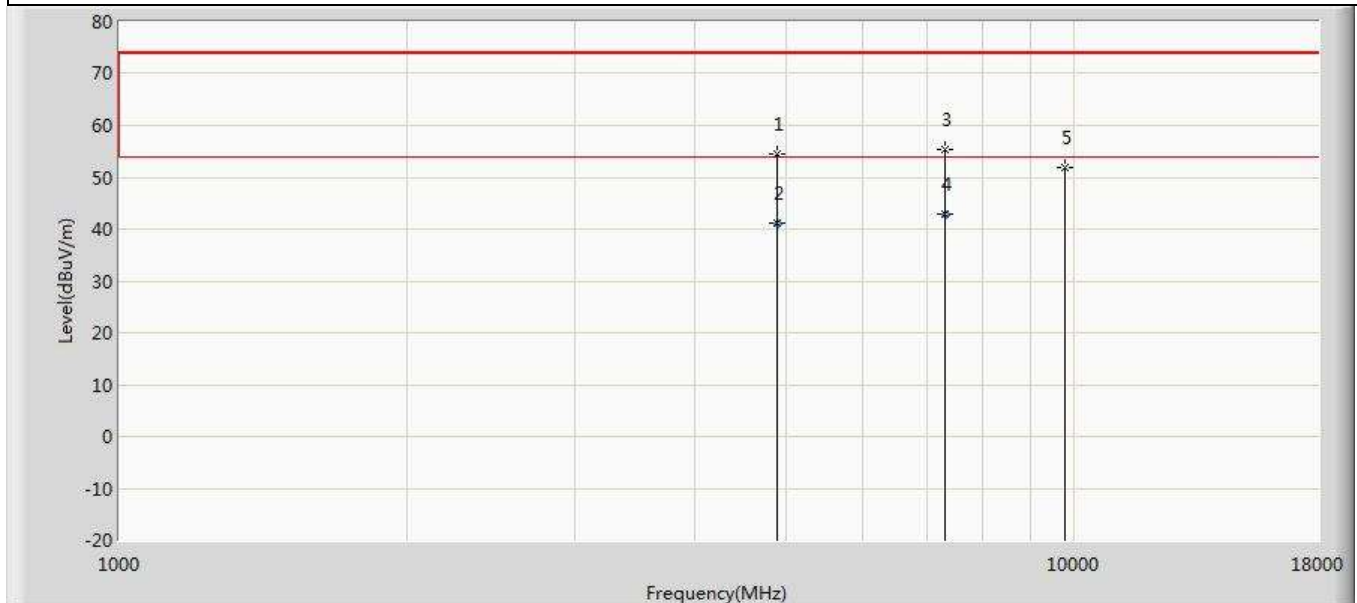


Profile: 23B0020R	Page No.: 20
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/12/01 - 02:42
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LoRa Module	Power: DC 3.3V
Note: Mode 5:Transmit at 2403MHz by LoRa with 812kHz LoRa	



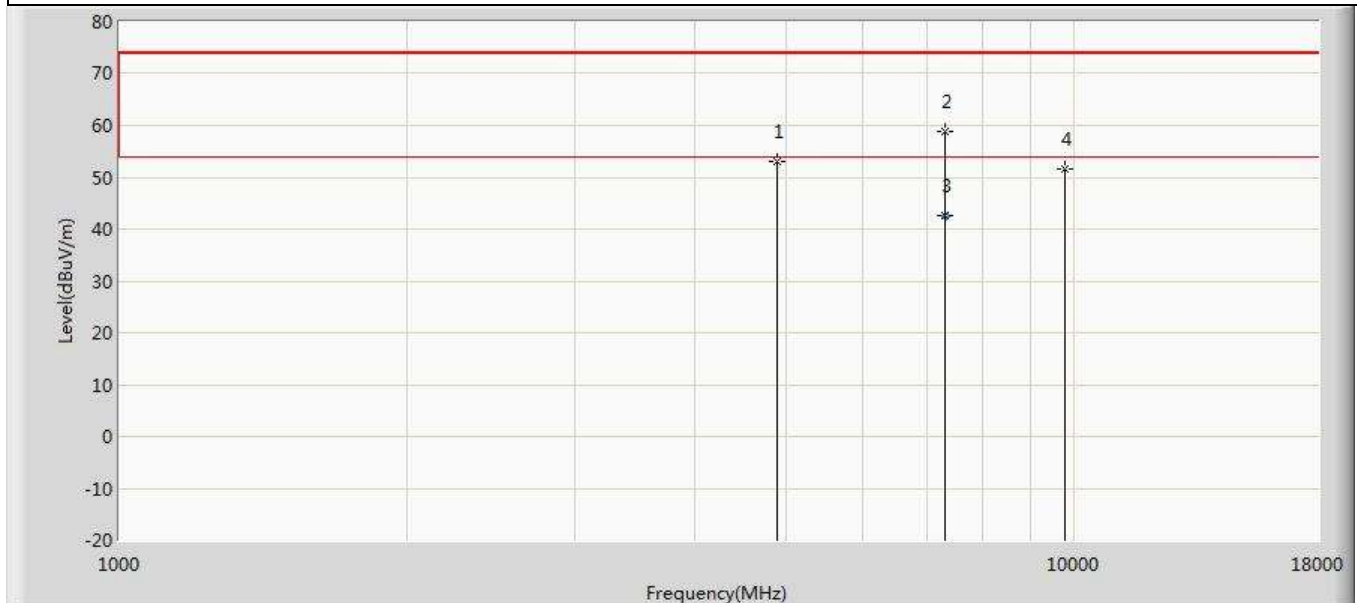
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4808.000	50.996	62.862	-23.004	74.000	-11.866	PK
2		7205.000	54.079	60.229	-19.921	74.000	-6.150	PK
3	*	7209.000	42.458	48.671	-11.542	54.000	-6.213	AV
4		9612.000	51.025	54.450	-22.975	74.000	-3.425	PK

Profile: 23B0020R	Page No.: 21
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/12/01 - 02:42
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LoRa Module	Power: DC 3.3V
Note: Mode 5:Transmit at 2442MHz by LoRa with 812kHz LoRa	



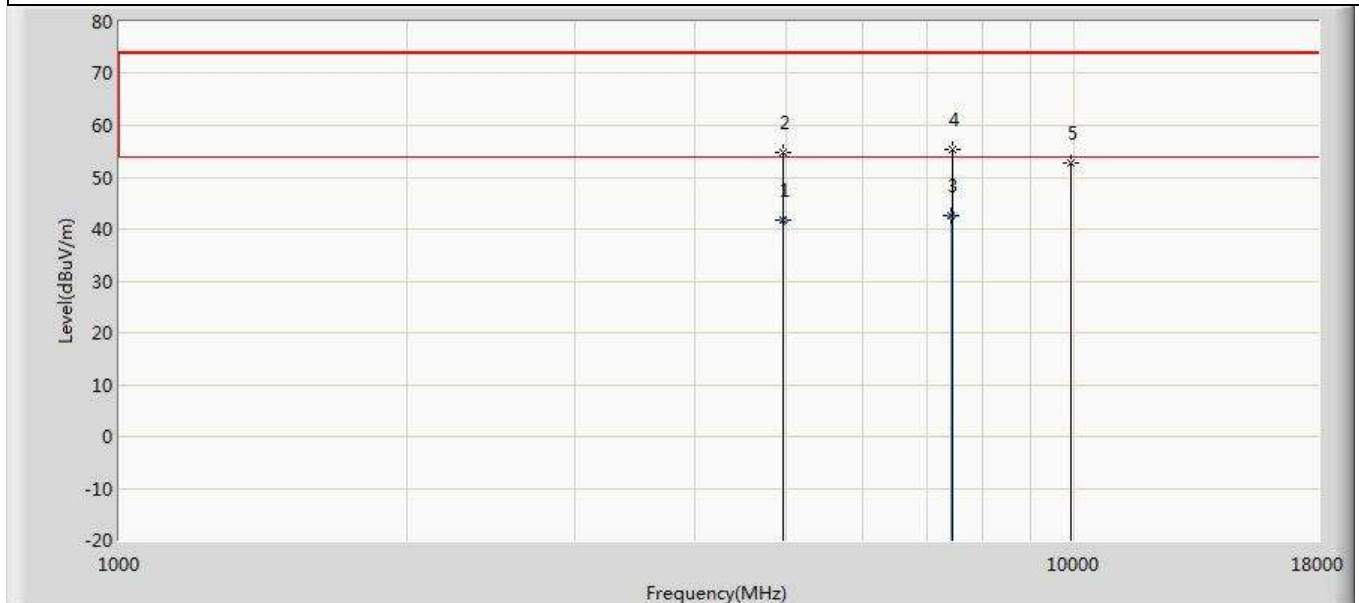
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4876.000	54.427	64.854	-19.573	74.000	-10.427	PK
2		4884.000	41.229	52.010	-12.771	54.000	-10.780	AV
3		7324.000	55.337	62.172	-18.663	74.000	-6.835	PK
4	*	7326.000	42.936	49.720	-11.064	54.000	-6.785	AV
5		9768.000	51.769	54.716	-22.231	74.000	-2.946	PK

Profile: 23B0020R	Page No.: 22
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/12/01 - 02:42
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LoRa Module	Power: DC 3.3V
Note: Mode 5:Transmit at 2442MHz by LoRa with 812kHz LoRa	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4876.000	52.946	63.373	-21.054	74.000	-10.427	PK
2		7324.000	58.734	65.569	-15.266	74.000	-6.835	PK
3	*	7326.000	42.536	49.320	-11.464	54.000	-6.785	AV
4		9768.000	51.544	54.491	-22.456	74.000	-2.946	PK

Profile: 23B0020R	Page No.: 23
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/12/01 - 02:43
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LoRa Module	Power: DC 3.3V
Note: Mode 5:Transmit at 2479MHz by LoRa with 812kHz LoRa	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4958.000	41.734	52.510	-12.266	54.000	-10.776	AV
2		4961.000	54.684	65.355	-19.316	74.000	-10.671	PK
3	*	7437.000	42.730	49.530	-11.270	54.000	-6.799	AV
4		7443.000	55.265	62.022	-18.735	74.000	-6.757	PK
5		9916.000	52.759	54.499	-21.241	74.000	-1.740	PK

Profile: 23B0020R	Page No.: 24
Engineer: Pengcheng Yang	
Site: AC5	Time: 2023/12/01 - 02:43
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LoRa Module	Power: DC 3.3V
Note: Mode 5:Transmit at 2479MHz by LoRa with 812kHz LoRa	

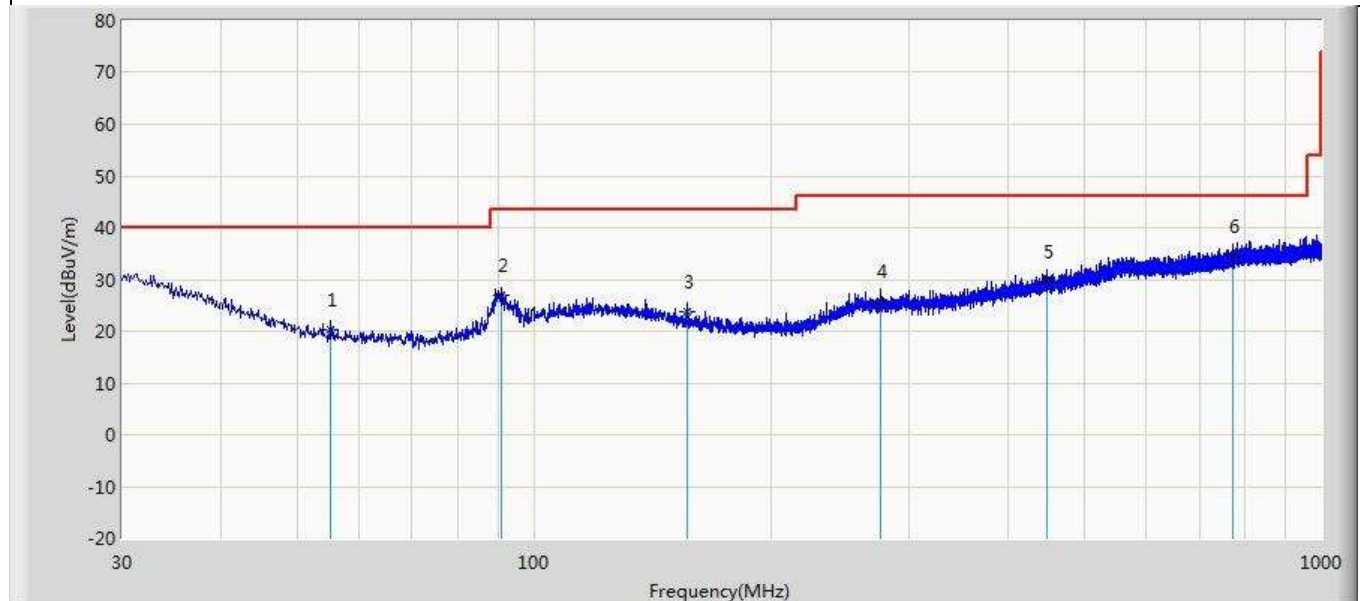


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4958.000	40.964	51.740	-13.036	54.000	-10.776	AV
2		4961.000	54.284	64.955	-19.716	74.000	-10.671	PK
3	*	7437.000	43.320	50.120	-10.680	54.000	-6.799	AV
4		7443.000	56.058	62.815	-17.942	74.000	-6.757	PK
5		9916.000	52.574	54.314	-21.426	74.000	-1.740	PK

Remark	1. " * ", means this data is the worst emission level. 2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp). 3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed. 4. The test frequency range, 18GHz~25GHz test result on peak is lower than average limit, all is the noise base, therefore no data appear in the report.
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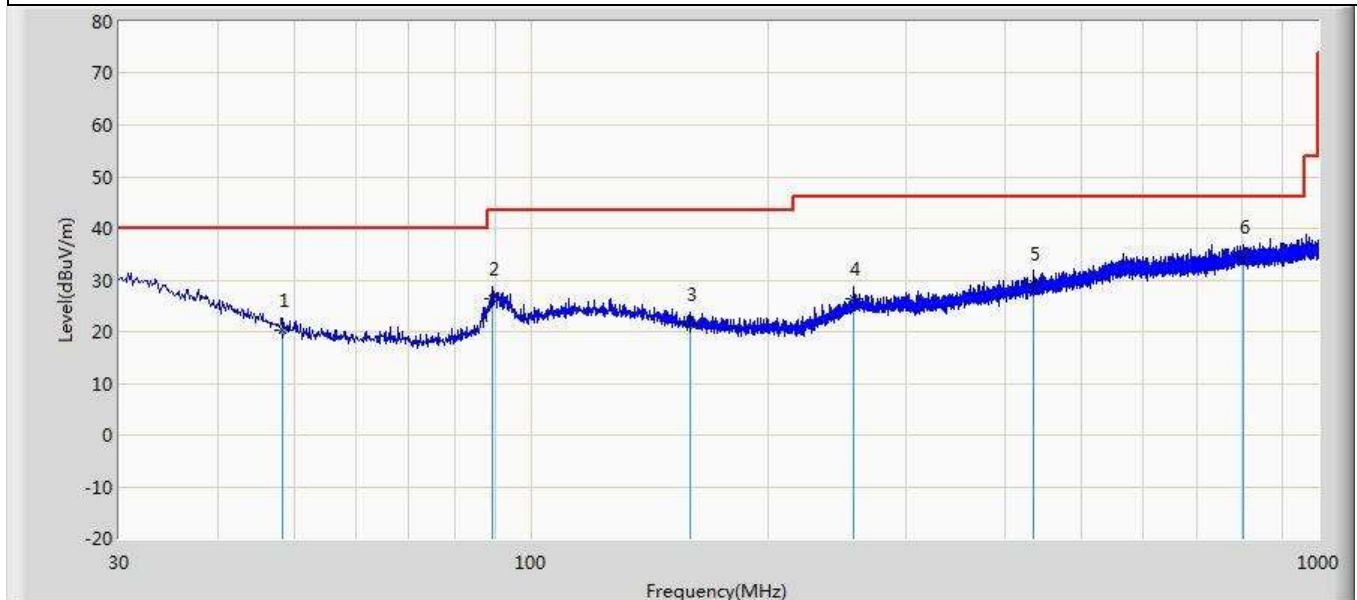
The worst case of Radiated Emission below 1GHz:

Profile: 23B0020R	Page No.: 60
Engineer: Pengchengyang	
Site: AC2	Time: 2023/12/12 - 17:36
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Horizontal
EUT: LoRa Module	Power: DC 3.3V
Note: Mode 2: Transmit at 914.2MHz by LoRa 500kHz bandwidth	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		55.220	20.400	6.774	-19.600	40.000	13.626	QP
2		90.868	26.944	10.858	-16.556	43.500	16.087	QP
3		156.464	23.734	6.600	-19.766	43.500	17.134	QP
4		275.289	25.689	5.355	-20.311	46.000	20.334	QP
5		448.919	29.579	4.965	-16.421	46.000	24.614	QP
6	*	770.474	34.476	5.623	-11.524	46.000	28.853	QP

Profile: 23B0020R	Page No.: 61
Engineer: Pengchengyang	
Site: AC2	Time: 2023/12/12 - 17:37
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Vertical
EUT: LoRa Module	Power: DC 3.3V
Note: Mode 2: Transmit at 914.2MHz by LoRa 500kHz bandwidth	

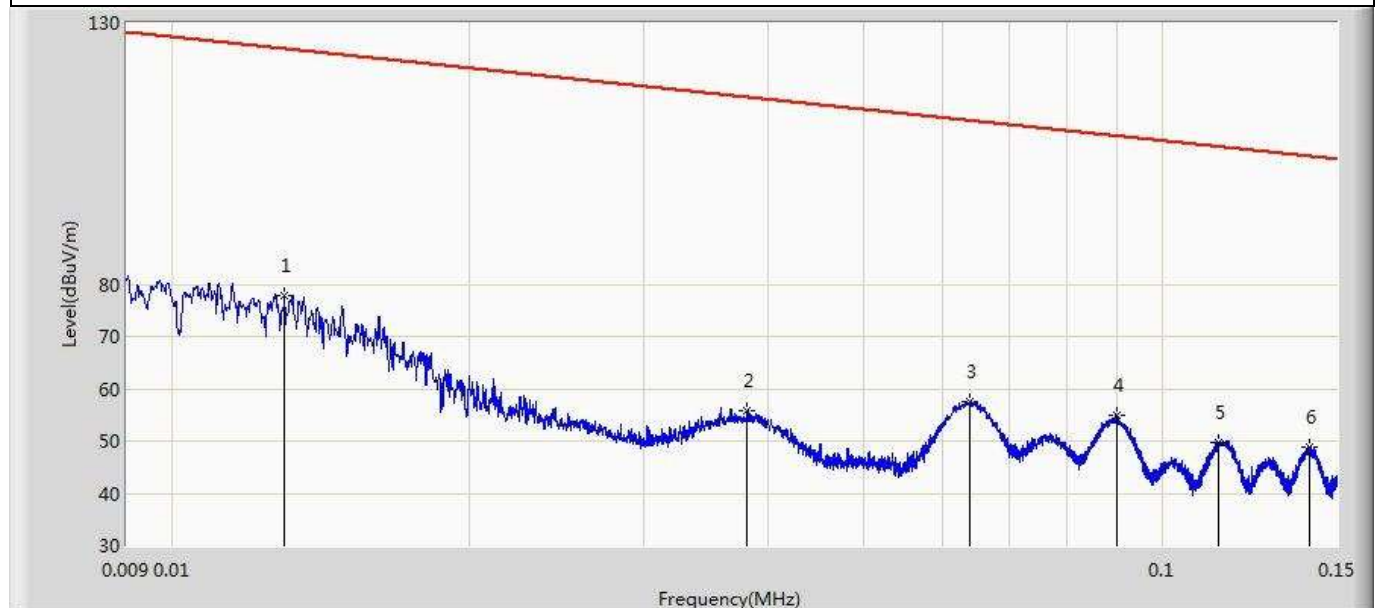


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		48.430	20.263	4.765	-19.737	40.000	15.498	QP
2		89.412	26.460	10.709	-17.040	43.500	15.750	QP
3		159.253	21.396	4.383	-22.104	43.500	17.013	QP
4		257.465	26.448	5.835	-19.552	46.000	20.613	QP
5		435.703	29.179	4.828	-16.821	46.000	24.351	QP
6	*	803.818	34.469	5.058	-11.531	46.000	29.411	QP

Remark	1. " * ", means this data is the worst emission level. 2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp). 3. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary. 4. We tested all the modes and showed the worst mode in the report.
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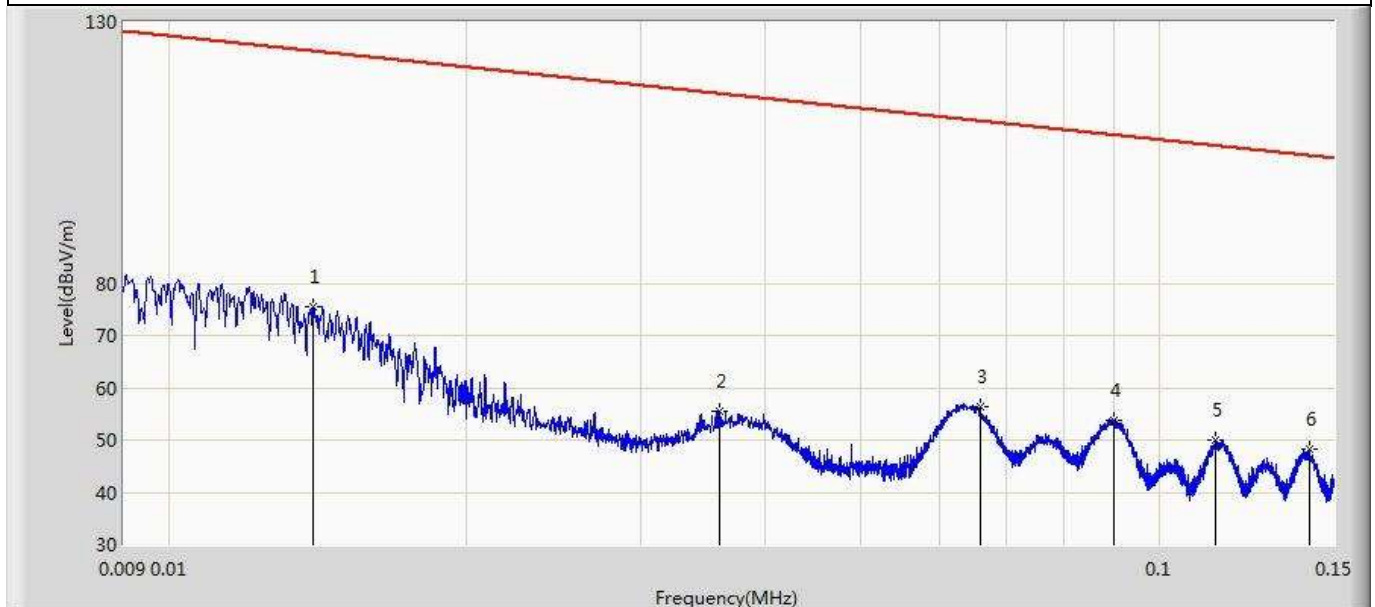
The worst case of Radiated Emission below 1GHz:

Profile: 23B0020R	Page No.: 1
Engineer: Pengchengyang	
Site: AC2	Time: 2023/12/10 - 11:08
Limit: 15.209	Margin: 0
Probe: RF(0.009-30MHz)	Polarity: Horizontal
EUT: LoRa Module	Power: DC 3.3V
Note: Mode 2: Transmit at 914.2MHz by LoRa 500kHz bandwidth	



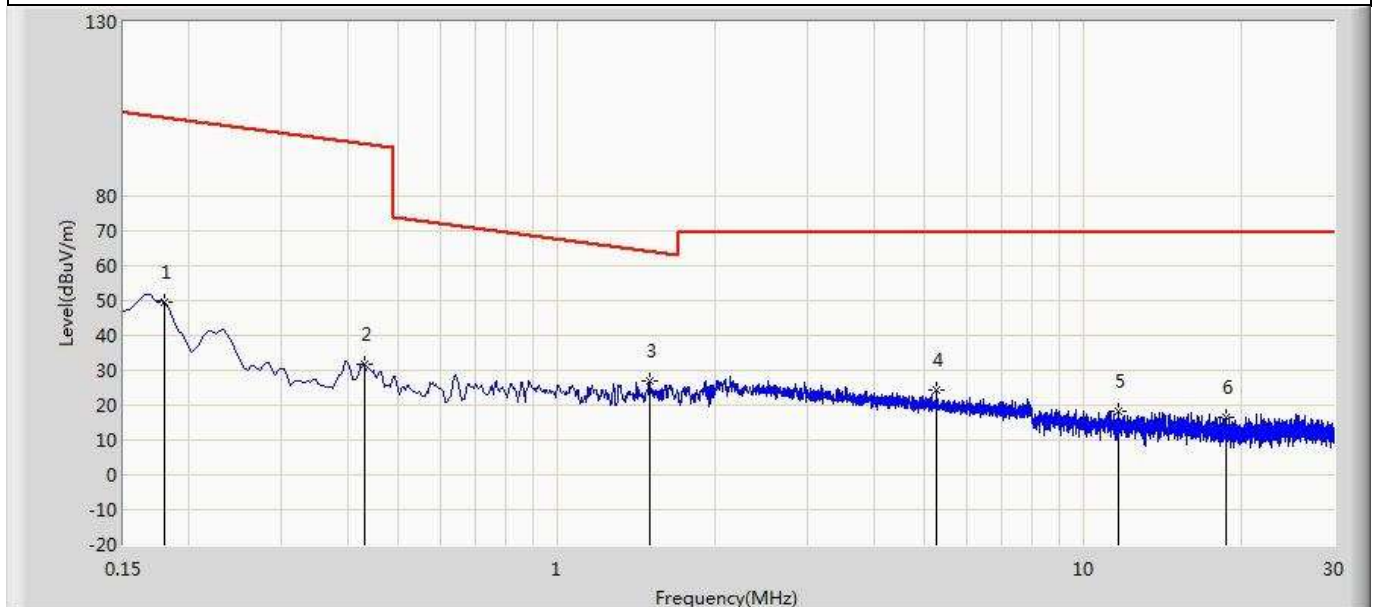
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	0.013	77.803	56.647	-47.405	125.208	21.155	PK
2		0.038	55.667	33.736	-60.229	115.896	21.931	PK
3		0.064	57.590	35.655	-53.781	111.371	21.935	PK
4		0.090	54.801	32.896	-53.610	108.411	21.905	PK
5		0.114	49.731	27.854	-56.628	106.359	21.877	PK
6		0.141	48.793	26.942	-55.721	104.514	21.851	PK

Profile: 23B0020R	Page No.: 3
Engineer: Pengchengyang	
Site: AC2	Time: 2023/12/10 - 11:13
Limit: 15.209	Margin: 0
Probe: RF(0.009-30MHz)	Polarity: Vertical
EUT: LoRa Module	Power: DC 3.3V
Note: Mode 2: Transmit at 914.2MHz by LoRa 500kHz bandwidth	



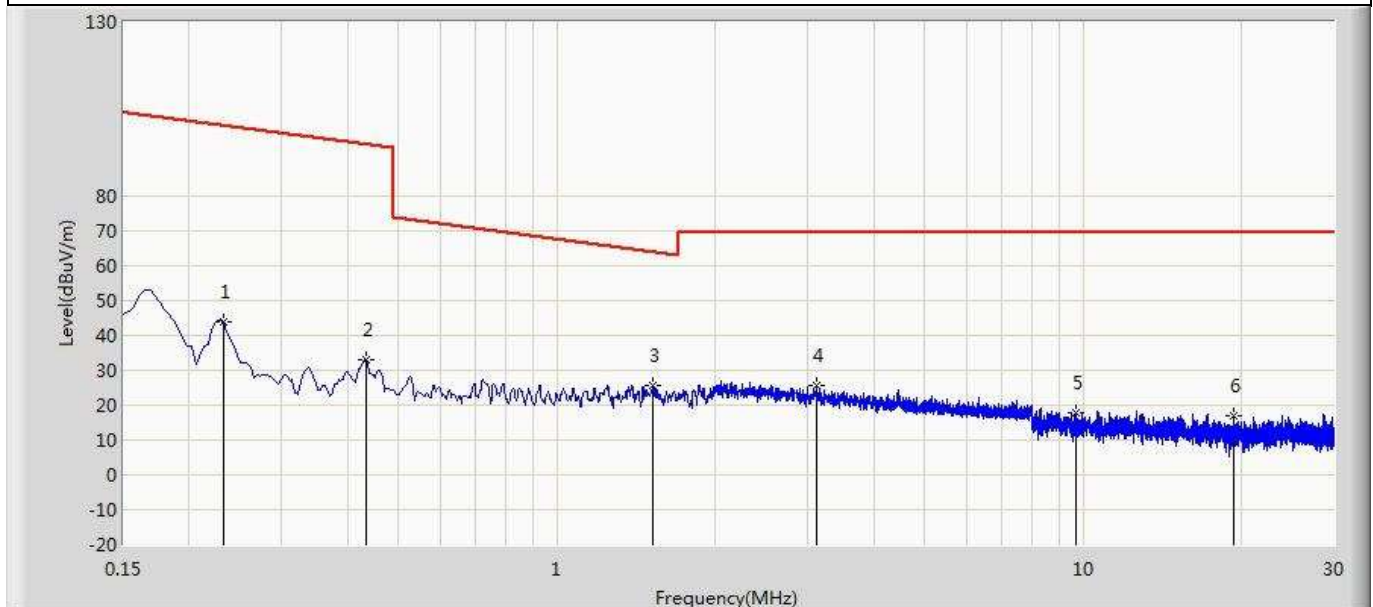
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	0.014	75.627	54.940	-48.938	124.564	20.687	PK
2		0.036	55.610	34.241	-60.755	116.365	21.369	PK
3		0.066	56.348	34.915	-54.756	111.103	21.433	PK
4		0.090	53.837	32.432	-54.574	108.411	21.405	PK
5		0.114	49.933	28.556	-56.426	106.359	21.377	PK
6		0.142	48.248	26.898	-56.204	104.452	21.350	PK

Profile: 23B0020R	Page No.: 2
Engineer: Pengchengyang	
Site: AC2	Time: 2023/12/10 - 11:11
Limit: 15.209	Margin: 0
Probe: RF(0.009-30MHz)	Polarity: Horizontal
EUT: LoRa Module	Power: DC 3.3V
Note: Mode 2: Transmit at 914.2MHz by LoRa 500kHz bandwidth	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		0.180	49.557	27.751	-52.837	102.394	21.806	PK
2		0.430	31.683	10.123	-63.151	94.834	21.560	PK
3	*	1.501	27.167	6.725	-36.837	64.004	20.442	PK
4		5.273	24.385	3.805	-45.015	69.400	20.581	PK
5		11.702	18.141	-2.666	-51.259	69.400	20.807	PK
6		18.706	16.648	-3.890	-52.752	69.400	20.538	PK

Profile: 23B0020R	Page No.: 4
Engineer: Pengchengyang	
Site: AC2	Time: 2023/12/10 - 11:18
Limit: 15.209	Margin: 0
Probe: RF(0.009-30MHz)	Polarity: Vertical
EUT: LoRa Module	Power: DC 3.3V
Note: Mode 2: Transmit at 914.2MHz by LoRa 500kHz bandwidth	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		0.232	44.042	22.780	-56.149	100.191	21.262	PK
2		0.434	33.241	12.185	-61.512	94.754	21.056	PK
3	*	1.523	25.586	5.621	-38.291	63.878	19.965	PK
4		3.128	25.742	5.419	-43.658	69.400	20.323	PK
5		9.695	17.993	-2.089	-51.407	69.400	20.082	PK
6		19.314	16.792	-3.131	-52.608	69.400	19.923	PK

Remark	1. " * ", means this data is the worst emission level. 2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp). 3. We tested all the modes and showed the worst mode in the report.
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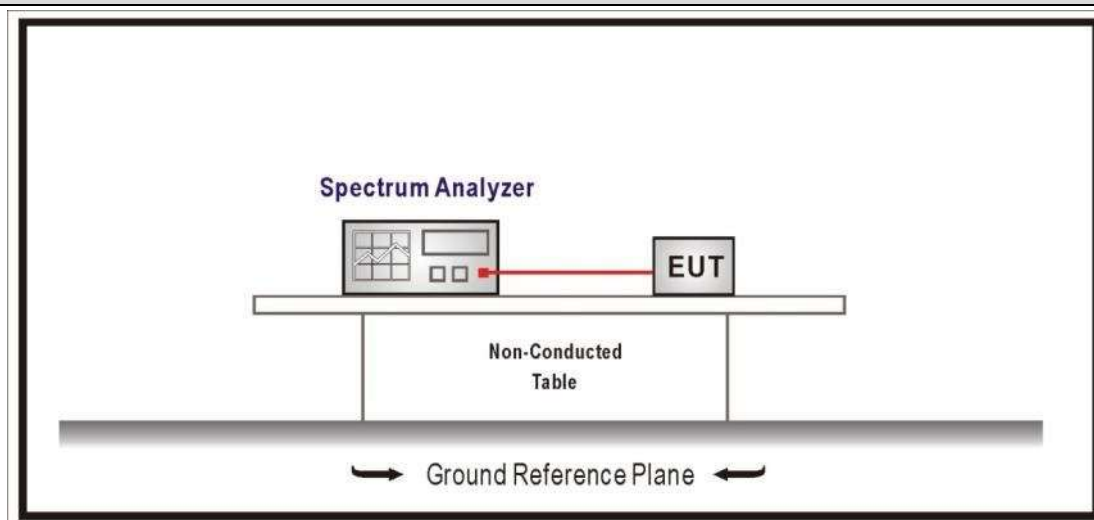
4.3 Emissions in non-restricted frequency band	VERDICT: PASS
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4.3.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.247(d)
RF Output power (Detection methods)	Limit(dB)
RF Output power(Average detector)	30dBc(Note1)
RF Output power(PK detector)	20dBc(Note2)

Note 1: If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

Note 2: If the maximum peak conducted output power procedure was used, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).

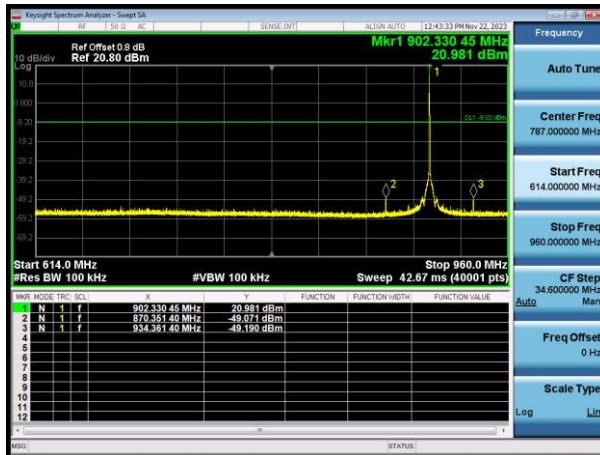
4.3.2 Test Setup**4.3.3 Test Procedure**

References Rule	Chapter	Description
☒ ANSI C63.10	11.11	Emissions in non-restricted frequency bands
☒ ANSI C63.10	11.11.1	General
☒ ANSI C63.10	11.11.2	Reference level measurement
☒ ANSI C63.10	11.11.3	Emission level measurement

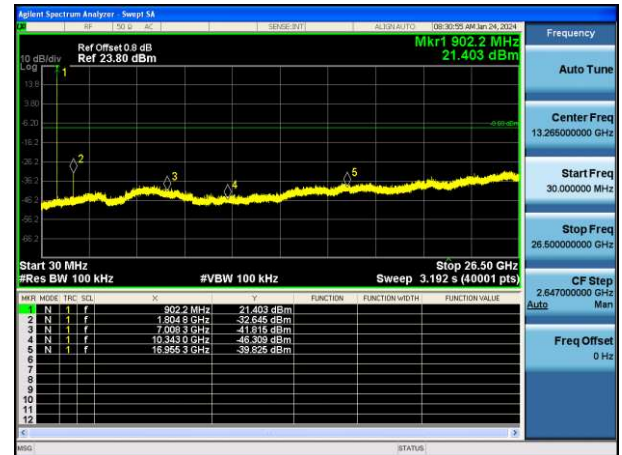
4.3.4 Test Data

LoRa(FHSS) 125kHz bandwidth

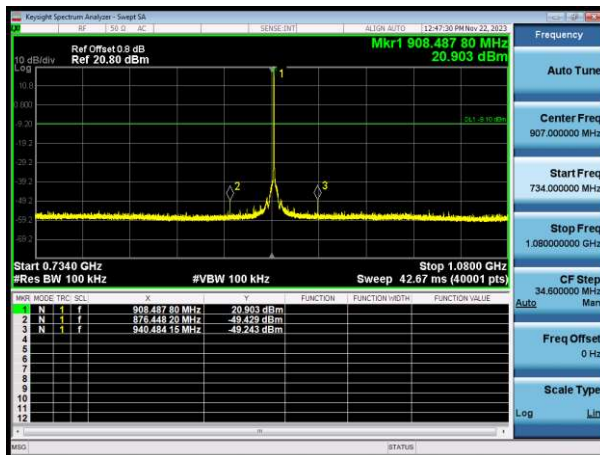
Channel0 902.3MHz



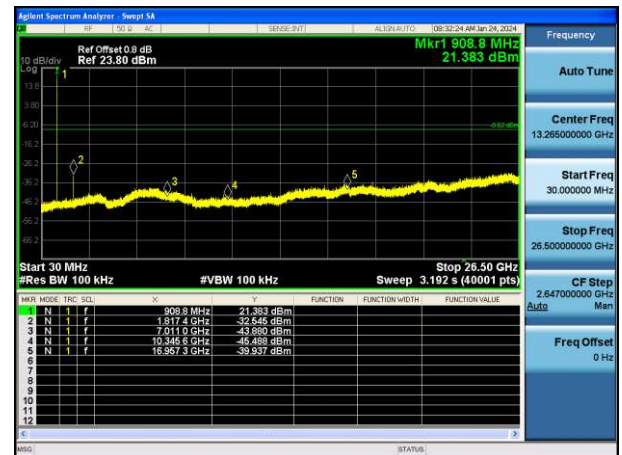
Channel0 902.3MHz



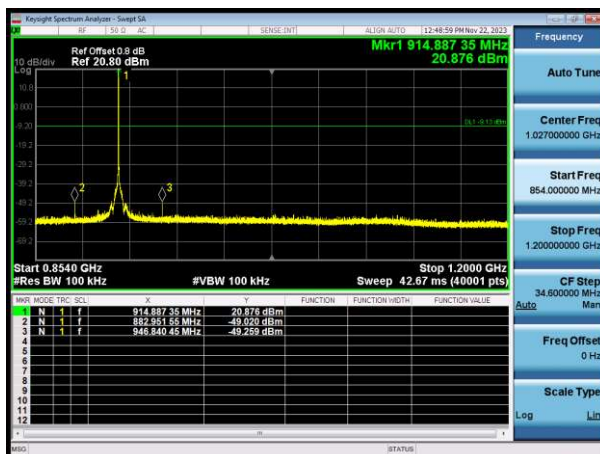
Channel31 908.5MHz



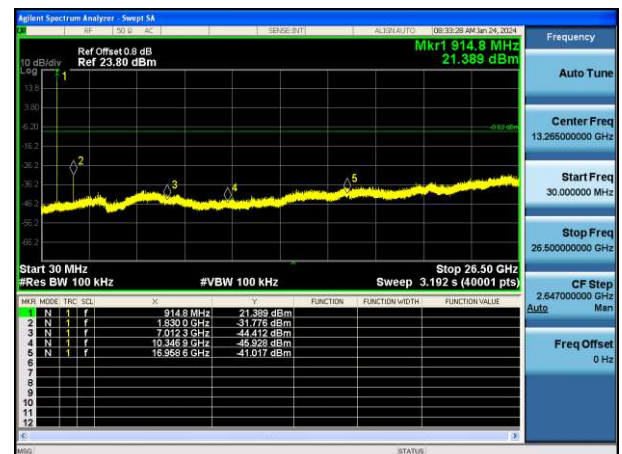
Channel31 908.5MHz

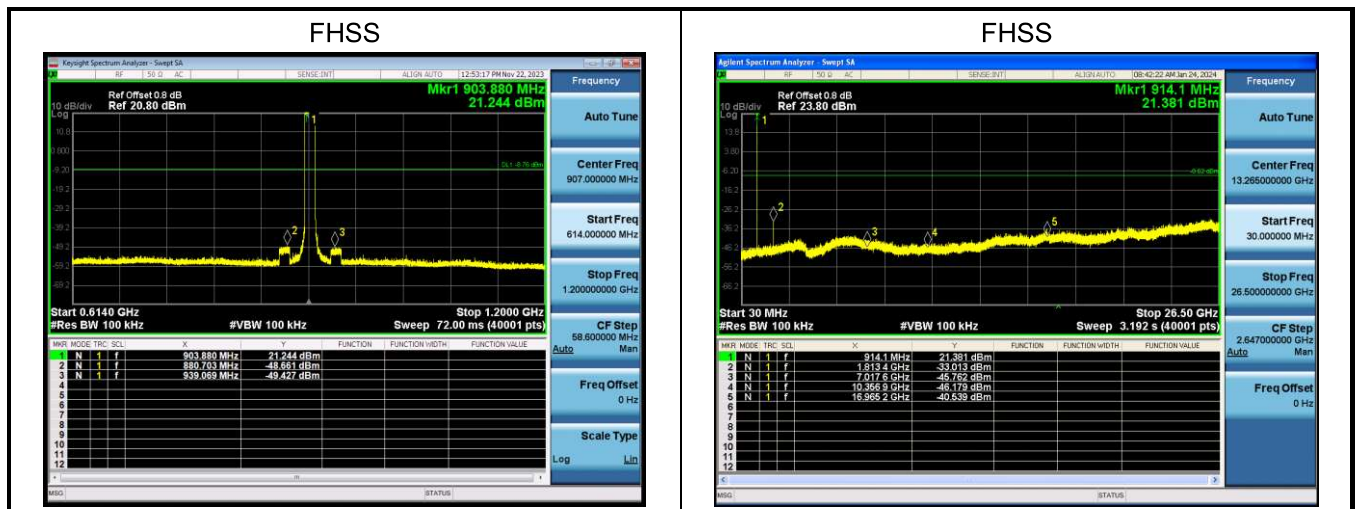


Channel63 914.9MHz



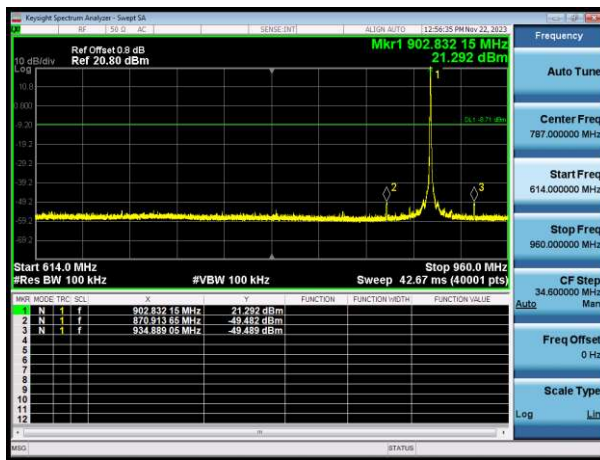
Channel63 914.9MHz





LoRa(DTS) 500kHz bandwidth

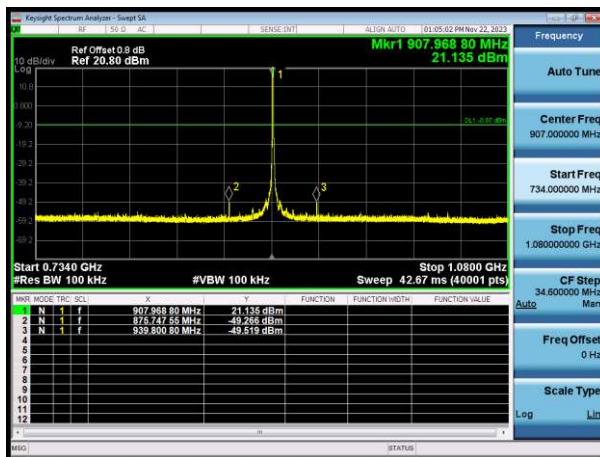
Channel64 903MHz



Channel64 903MHz



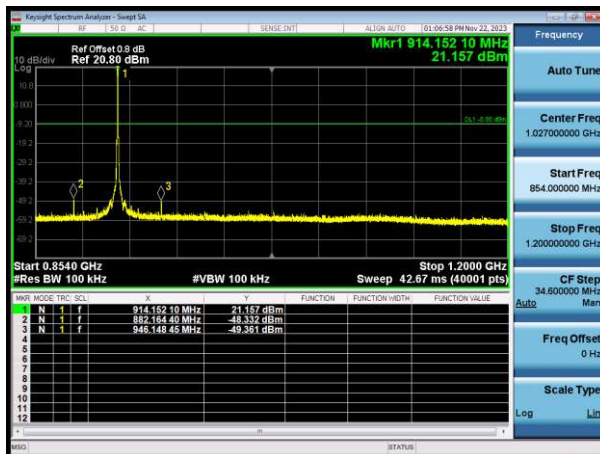
Channel67 907.8MHz



Channel67 907.8MHz



Channel71 914.2MHz

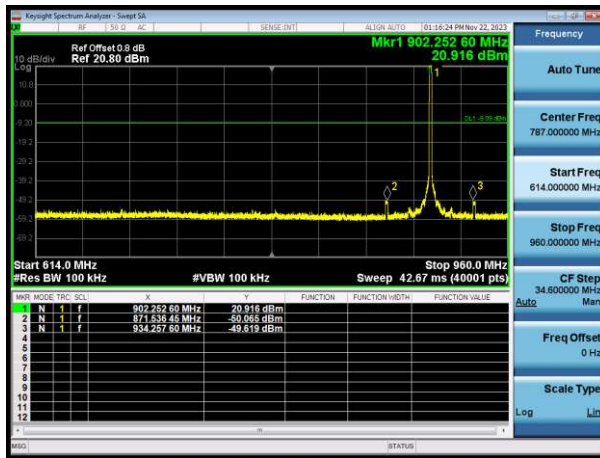


Channel71 914.2MHz



LR-FHSS 1.523MHz bandwidth

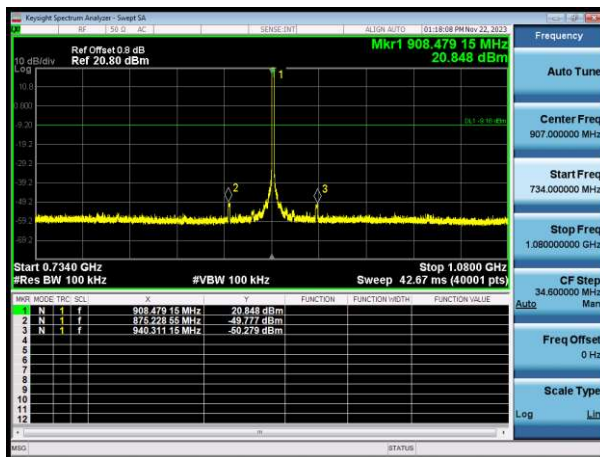
Channel64 903MHz



Channel64 903MHz



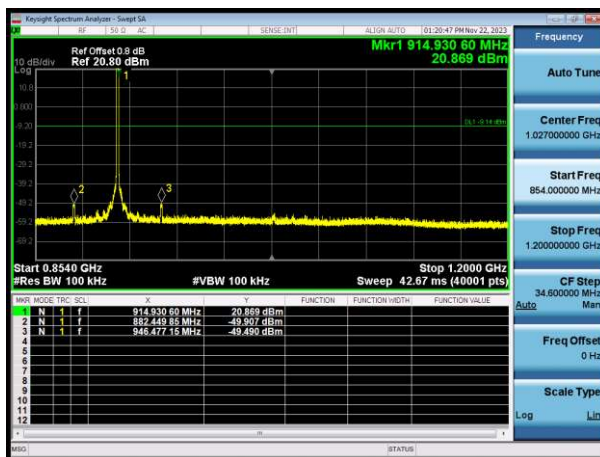
Channel67 907.8MHz



Channel67 907.8MHz



Channel71 914.2MHz



Channel71 914.2MHz

