

Test Report No.50172874 001

Appendix D: Radiated and Mains Spurious Emission Data

(File: 50172874AppendixD)

Contents

Spurious Emissions, TX Mode, 1-10G..... 3

Spurious Emissions, TX Mode, 30M-1G 9

Spurious Emissions, TX Mode, 9k-30M11

Spurious Emissions, RX Mode, 1-10G 13

Spurious Emissions, RX Mode, 30M-1G 15

Spurious Emissions, RX Mode, 9K-30M..... 17

Mains 19

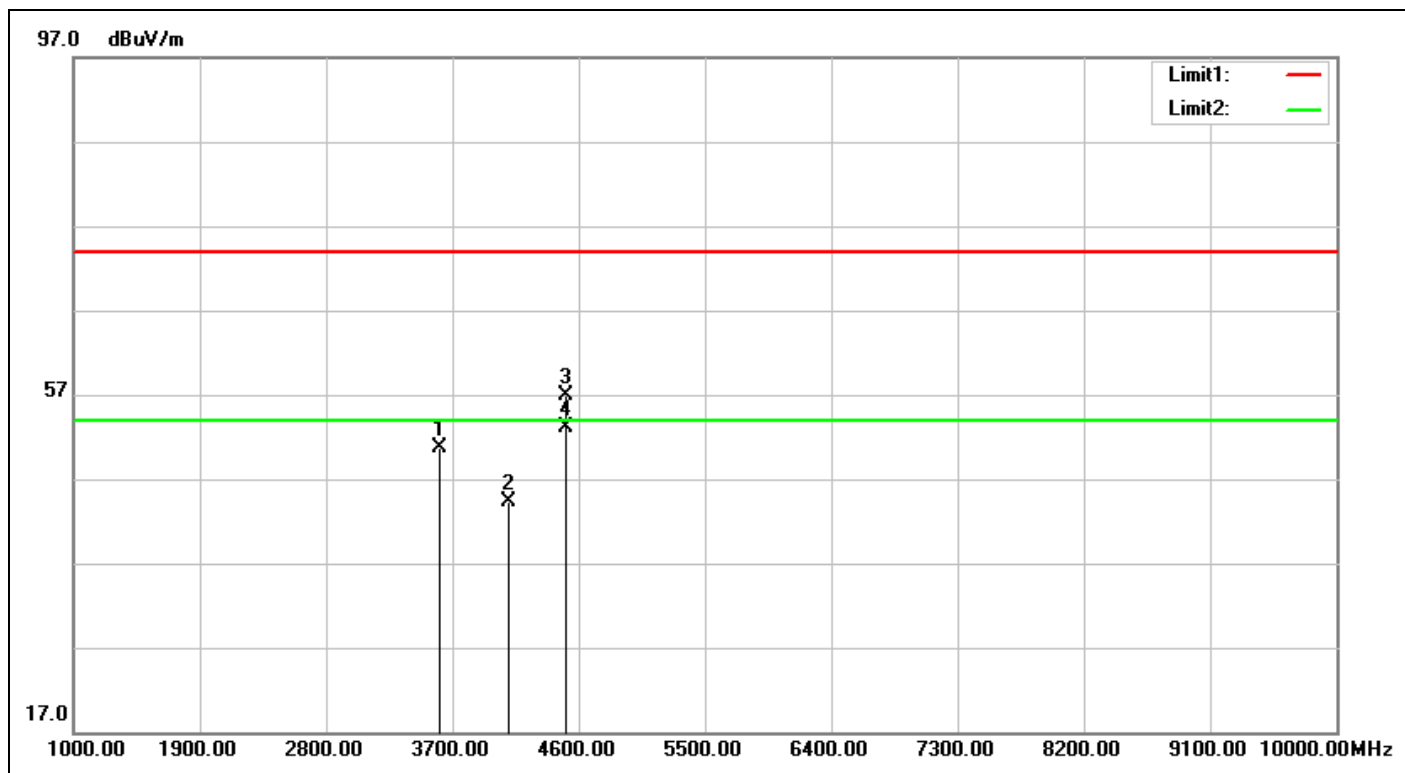
Spurious Emissions, TX Mode, 1-10G



TUV Rheinland Taiwan Ltd.

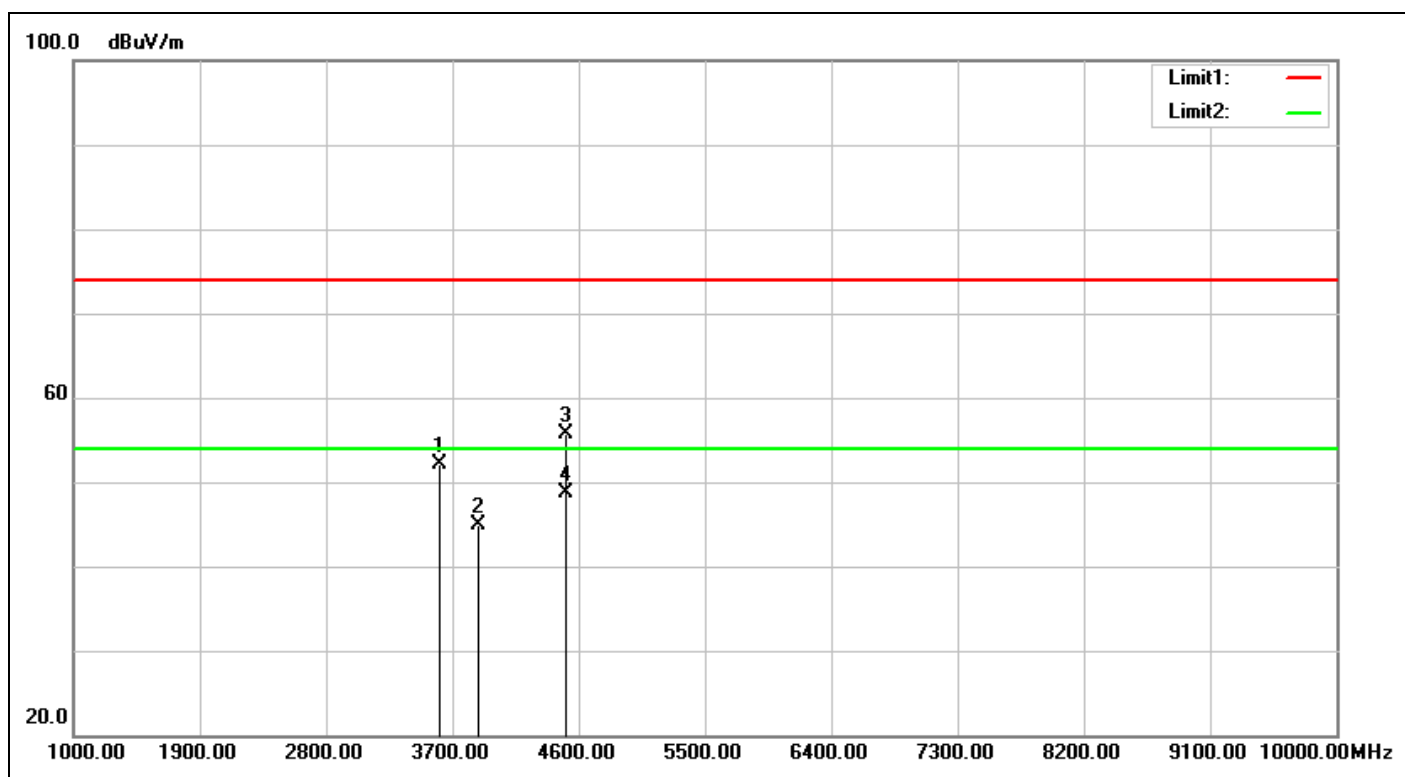
11F., No.758, Sec.4 Bade Road. Songshan Dist, Taipei City 105

Tel:+886-2172-7000 fax:+886-2528-0018



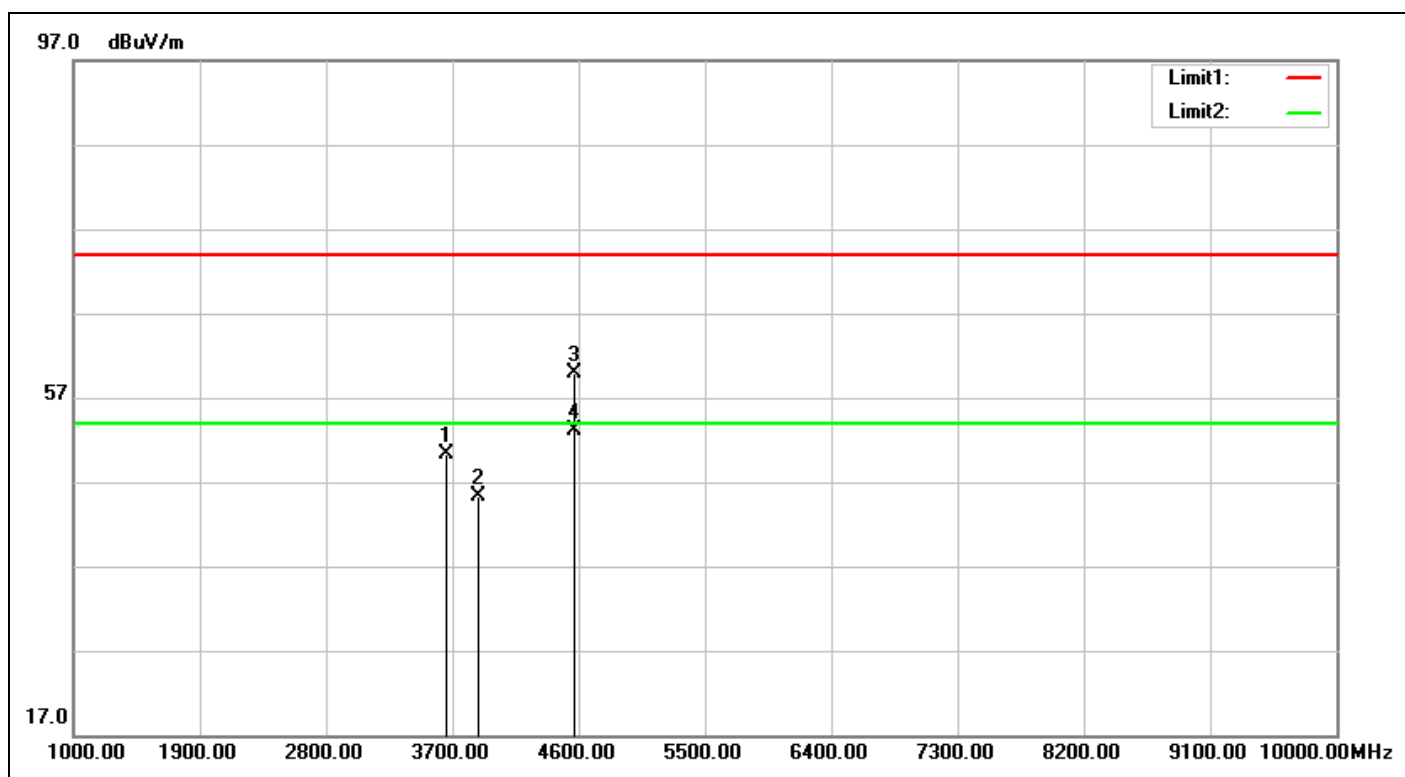
Service No.:	114076041	Test Distance:	3m
Test Standard:	FCC Above 1G PEAK	Ant. Polarization:	Horizontal
Test item:	Radiation Emission	Test Time:	2018/8/6 20:00:38
Applicant:	REYAX	Test Rating:	DC 3.3V
Product:	RYLR896 Lora Antenna Transceiver	Temp.(°C)/Hum.(%):	19.1(°C)/61%
	Module		
Model No.:	RYLR896	Test Engineer:	Kevin Kuo
Test Mode:	TX-903		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	3614.000	-6.54	57.23	50.69	74.00	-23.31	peak	100	83	
2	4096.000	-5.37	49.71	44.34	74.00	-29.66	peak	100	50	
3	4515.000	-3.92	60.85	56.93	74.00	-17.07	peak	100	19	
4	4515.000	-3.92	56.94	53.02	54.00	-0.98	AVG	100	19	



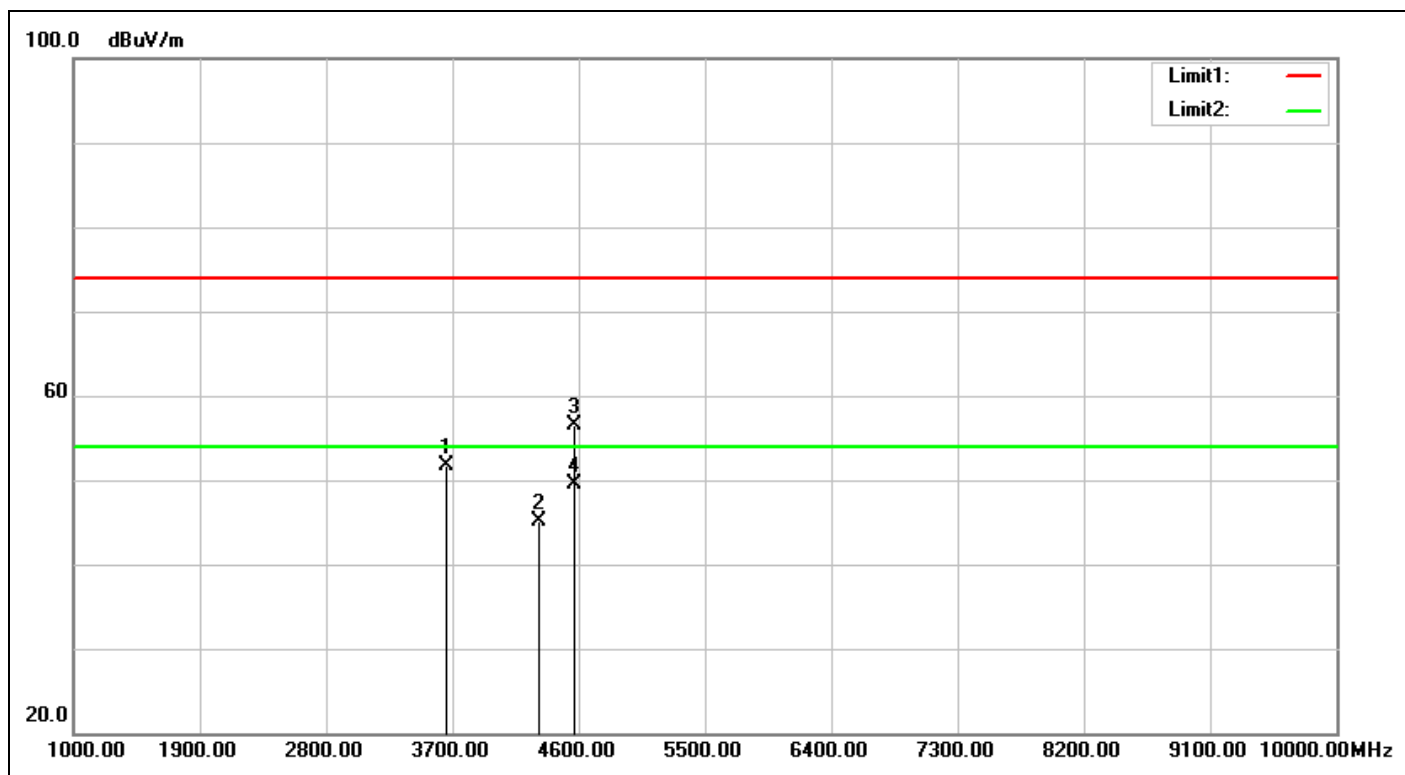
Service No.:	114076041	Test Distance:	3m
Test Standard:	FCC Above 1G PEAK	Ant. Polarization:	Vertical
Test item:	Radiation Emission	Test Time:	2018/8/6 20:02:51
Applicant:	REYAX	Test Rating:	DC 3.3V
Product:	RYLR896 Lora Antenna Transceiver	Temp.(°C)/Hum.(%)	19.1(°C)/61%
	Module		
Model No.:	RYLR896	Test Engineer:	Kevin Kuo
Test Mode:	TX-903		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	3614.000	-6.54	58.61	52.07	74.00	-21.93	peak	100	172	
2	3889.000	-5.95	50.78	44.83	74.00	-29.17	peak	100	161	
3	4515.000	-3.92	59.71	55.79	74.00	-18.21	peak	100	147	
4	4515.000	-3.92	52.66	48.74	54.00	-5.26	AVG	100	147	



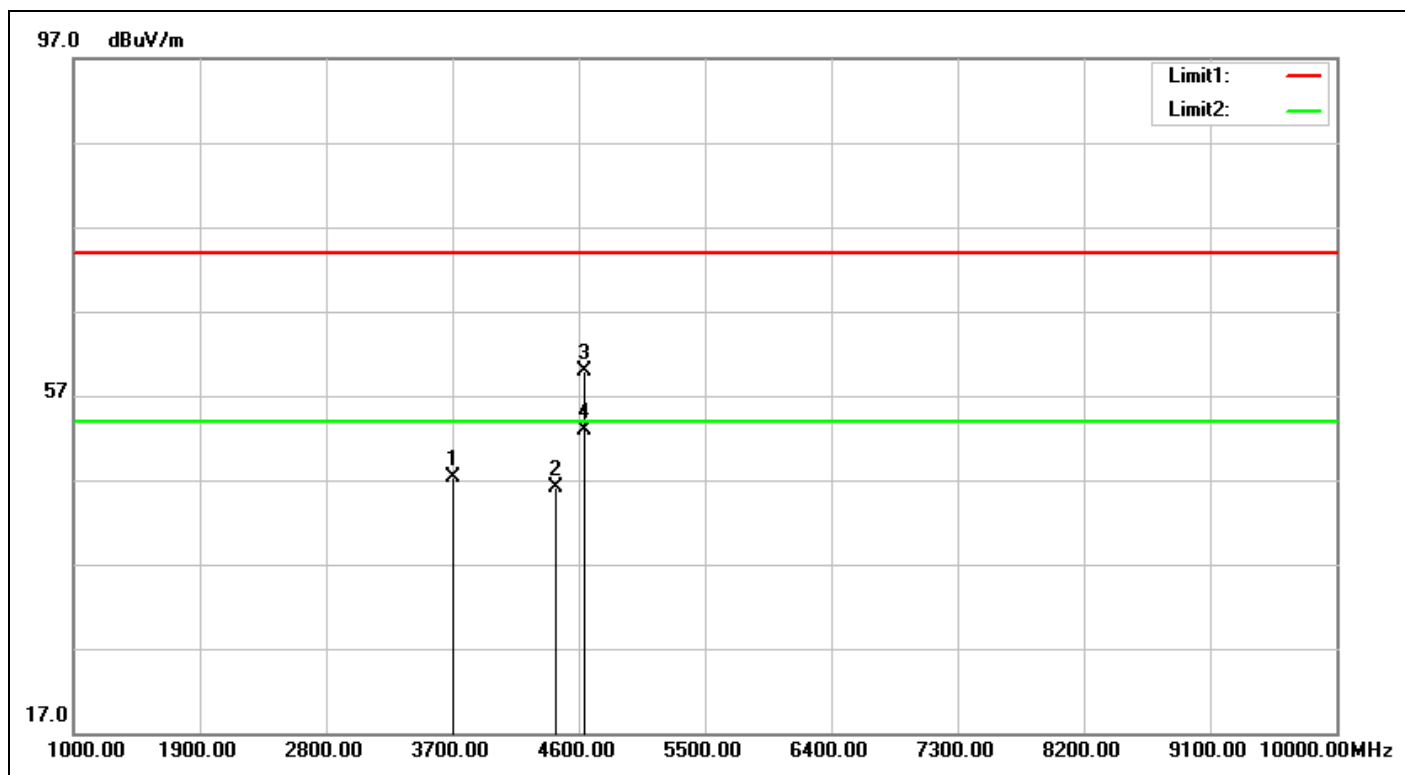
Service No.:	114076041	Test Distance:	3m
Test Standard:	FCC Above 1G PEAK	Ant. Polarization:	Horizontal
Test item:	Radiation Emission	Test Time:	2018/8/6 20:06:03
Applicant:	REYAX	Test Rating:	DC 3.3V
Product:	RYLR896 Lora Antenna Transceiver	Temp.(°C)/Hum.(%):	19.1(°C)/61%
	Module		
Model No.:	RYLR896	Test Engineer:	Kevin Kuo
Test Mode:	TX-914.2		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	3656.800	-6.45	56.81	50.36	74.00	-23.64	peak	100	48	
2	3889.000	-5.95	51.24	45.29	74.00	-28.71	peak	100	0	
3	4571.000	-3.84	63.66	59.82	74.00	-14.18	peak	100	17	
4	4571.000	-3.84	56.96	53.12	54.00	-0.88	AVG	100	17	



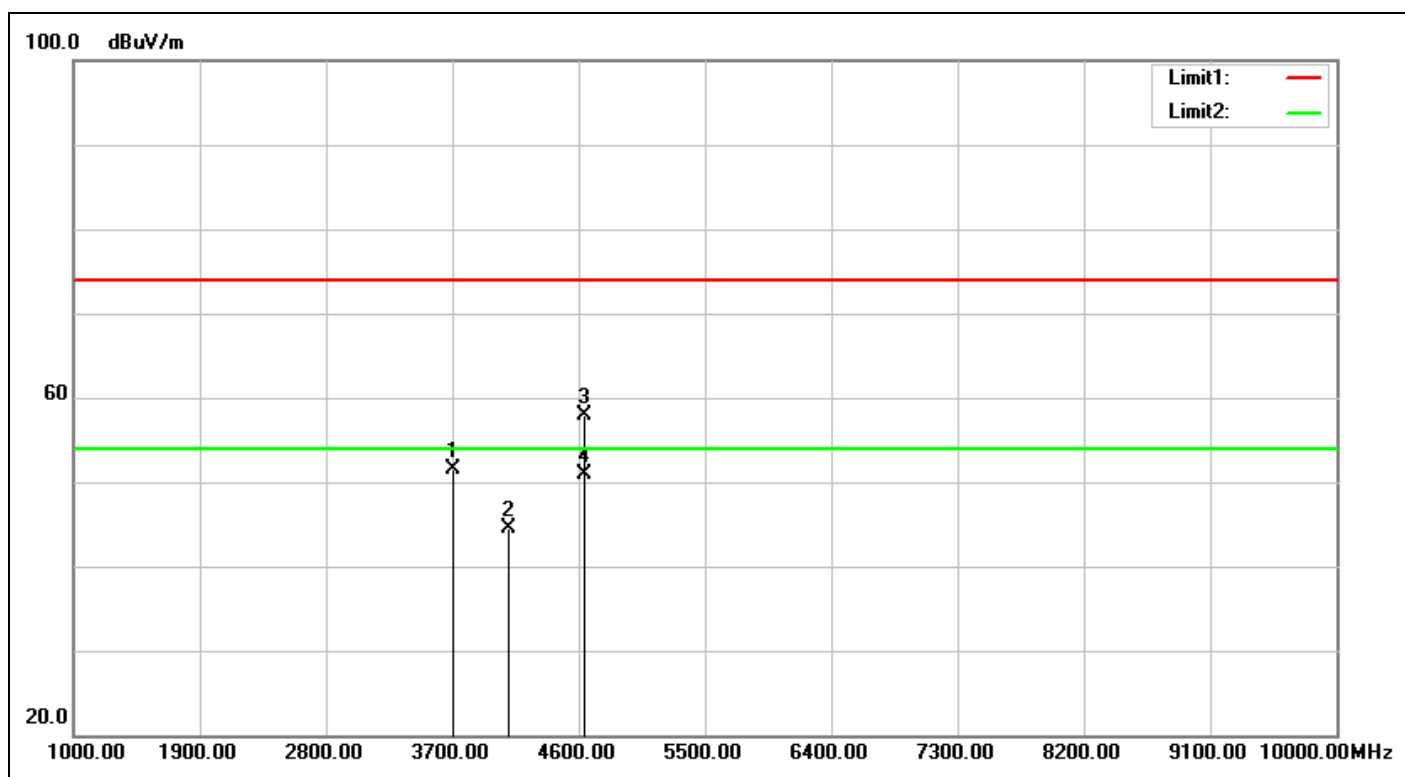
Service No.:	114076041	Test Distance:	3m
Test Standard:	FCC Above 1G PEAK	Ant. Polarization:	Vertical
Test item:	Radiation Emission	Test Time:	2018/8/6 20:08:34
Applicant:	REYAX	Test Rating:	DC 3.3V
Product:	RYLR896 Lora Antenna Transceiver	Temp.(°C)/Hum.(%):	19.1(°C)/61%
	Module		
Model No.:	RYLR896	Test Engineer:	Kevin Kuo
Test Mode:	TX-914.2		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	3656.800	-6.45	58.18	51.73	74.00	-22.27	peak	100	159	
2	4321.000	-4.58	49.61	45.03	74.00	-28.97	peak	100	109	
3	4571.000	-3.84	60.30	56.46	74.00	-17.54	peak	100	175	
4	4571.000	-3.84	53.26	49.42	54.00	-4.58	AVG	100	175	



Service No.:	114076041	Test Distance:	3m
Test Standard:	FCC Above 1G PEAK	Ant. Polarization:	Horizontal
Test item:	Radiation Emission	Test Time:	2018/8/6 20:11:08
Applicant:	REYAX	Test Rating:	DC 3.3V
Product:	RYLR896 Lora Antenna Transceiver	Temp.(°C)/Hum.(%)	19.1(°C)/61%
	Module		
Model No.:	RYLR896	Test Engineer:	Kevin Kuo
Test Mode:	TX-927.5		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	3710.000	-6.34	53.57	47.23	74.00	-26.77	peak	100	0	
2	4438.000	-4.17	50.34	46.17	74.00	-27.83	peak	100	0	
3	4637.500	-3.72	63.53	59.81	74.00	-14.19	peak	100	17	
4	4637.500	-3.72	56.64	52.92	54.00	-1.08	AVG	100	17	



Service No.:	114076041	Test Distance:	3m
Test Standard:	FCC Above 1G PEAK	Ant. Polarization:	Vertical
Test item:	Radiation Emission	Test Time:	2018/8/6 20:12:55
Applicant:	REYAX	Test Rating:	DC 3.3V
Product:	RYLR896 Lora Antenna Transceiver	Temp.(°C)/Hum.(%)	19.1(°C)/61%
	Module		
Model No.:	RYLR896	Test Engineer:	Kevin Kuo
Test Mode:	TX-927.5		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	3710.000	-6.34	57.93	51.59	74.00	-22.41	peak	100	181	
2	4096.000	-5.37	49.78	44.41	74.00	-29.59	peak	100	294	
3	4637.500	-3.72	61.53	57.81	74.00	-16.19	peak	100	150	
4	4637.500	-3.72	54.61	50.89	54.00	-3.11	AVG	100	150	

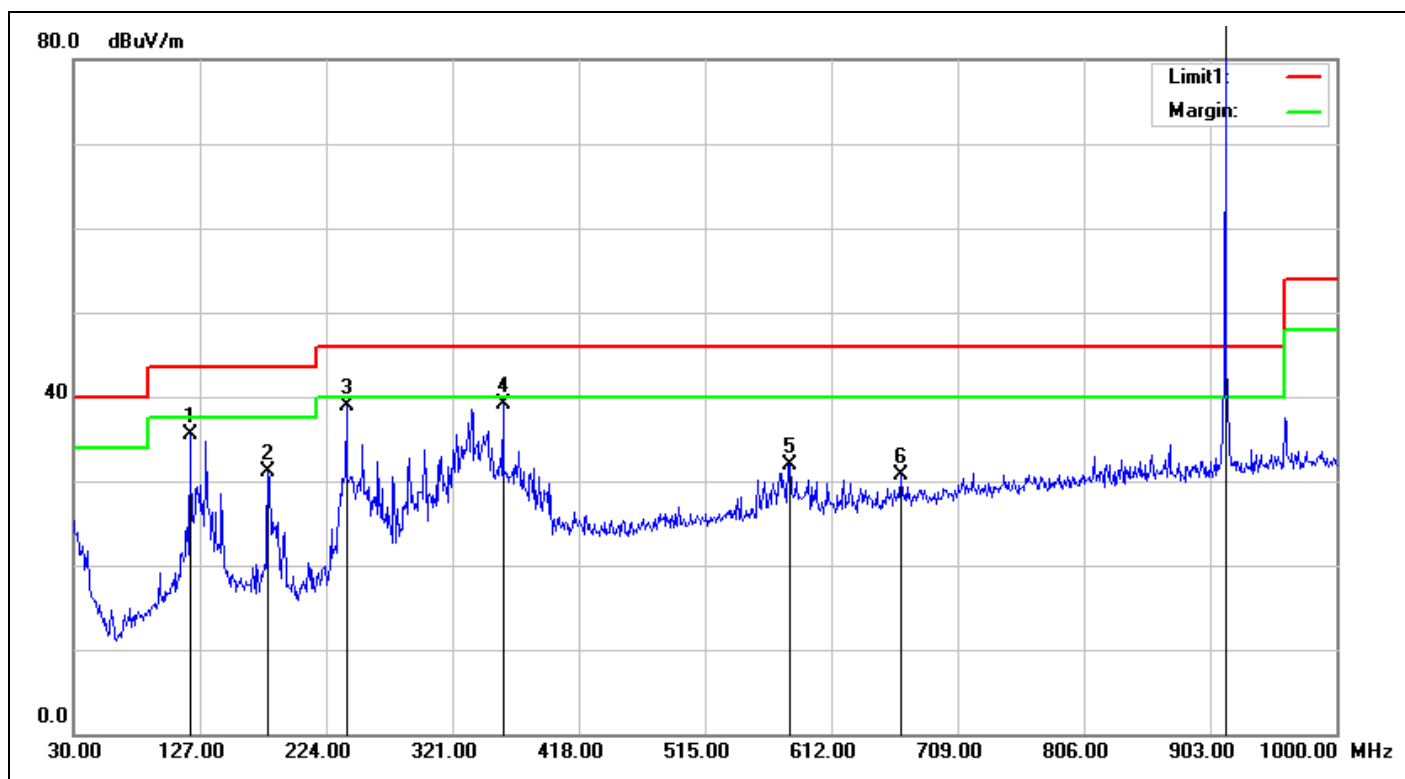
Spurious Emissions, TX Mode, 30M-1G



TUV Rheinland Taiwan Ltd.

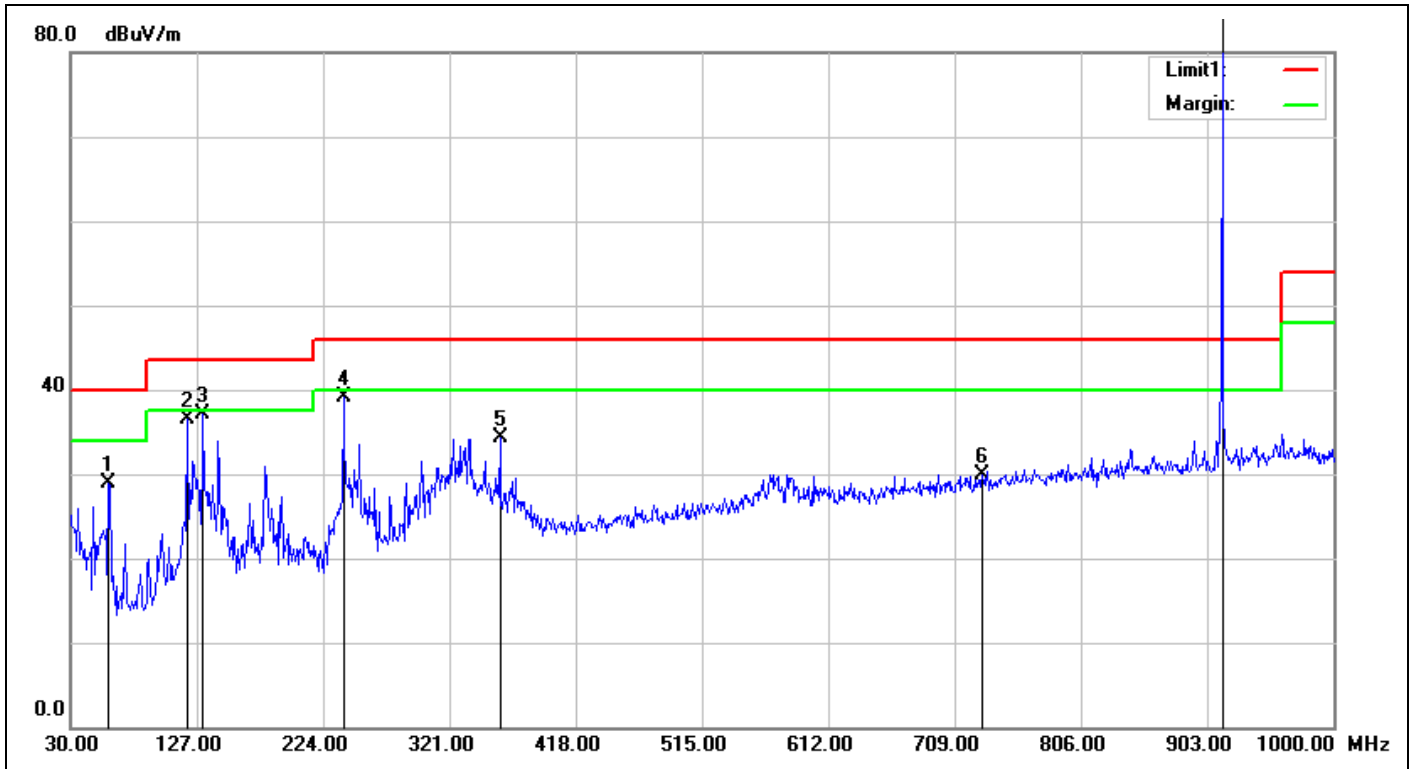
11F., No.758, Sec.4 Bade Road. Songshan Dist, Taipei City 105

Tel: +886-2172-7000 fax: +886-2528-0018



Service No.:	114076041	Test Distance:	3m
Test Standard:	FCC Class B 3M Radiation	Ant. Polarization:	Horizontal
Test item:	Radiation Emission	Test Time:	2018/8/3 17:02:58
Applicant:	REYAX	Test Rating:	DC 3.3V
Product:	RYLR896 Lora Antenna Transceiver	Temp.(°C)/Hum.(%)	20(°C)/55%
	Module		
Model No.:	RYLR896	Test Engineer:	Kevin Kuo
Test Mode:	TX-914.2		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	119.2399	-7.44	42.98	35.54	43.50	-7.96	QP	100	254	
2	179.3799	-9.50	40.57	31.07	43.50	-12.43	QP	100	123	
3	239.5200	-6.73	45.70	38.97	46.00	-7.03	QP	100	107	
4	359.8000	-3.00	42.01	39.01	46.00	-6.99	QP	100	136	
5	579.9900	0.17	31.72	31.89	46.00	-14.11	QP	100	169	
6	665.3500	1.09	29.70	30.79	46.00	-15.21	QP	100	19	
7	914.2000	4.87	102.73	107.60	46.00	61.60	QP	100	97	Fundamental



Service No.:	114076041	Test Distance:	3m
Test Standard:	FCC Class B 3M Radiation	Ant. Polarization:	Vertical
Test item:	Radiation Emission	Test Time:	2018/8/3 17:04:01
Applicant:	REYAX	Test Rating:	DC 3.3V
Product:	RYLR896 Lora Antenna Transceiver	Temp.(°C)/Hum.(%):	20(°C)/55%
	Module		
Model No.:	RYLR896	Test Engineer:	Kevin Kuo
Test Mode:	TX-914.2		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	59.1000	-13.52	42.48	28.96	40.00	-11.04	QP	100	128	
2	119.2400	-7.44	44.04	36.60	43.50	-6.90	QP	100	19	
3	131.8500	-7.07	44.11	37.04	43.50	-6.46	QP	100	189	
4	239.5200	-6.73	45.74	39.01	46.00	-6.99	QP	100	106	
5	359.8000	-3.00	37.34	34.34	46.00	-11.66	QP	100	1	
6	730.3400	2.32	27.57	29.89	46.00	-16.11	QP	100	48	
7	914.2000	4.87	100.02	104.89	46.00	58.89	QP	100	354	Fundamental

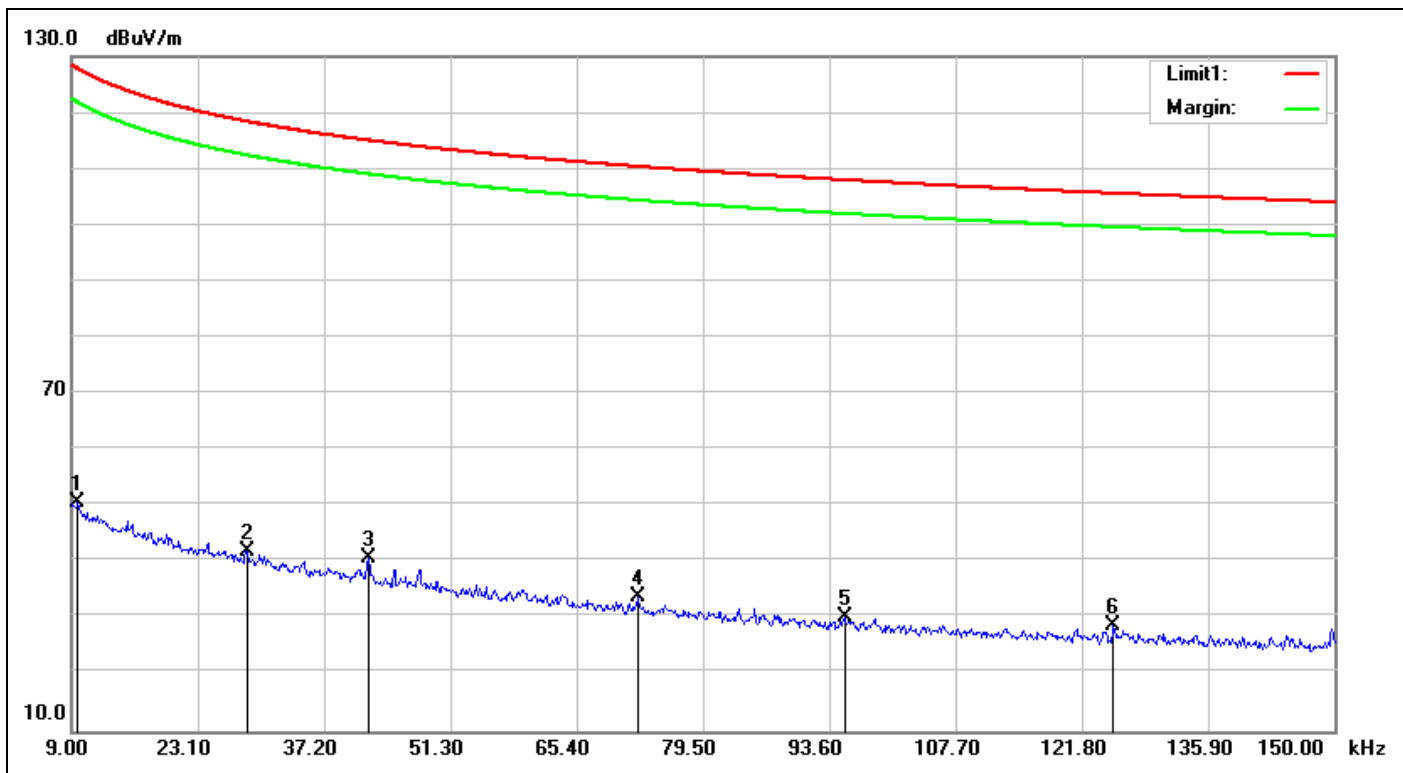
Spurious Emissions, TX Mode, 9k-30M



TUV Rheinland Taiwan Ltd.

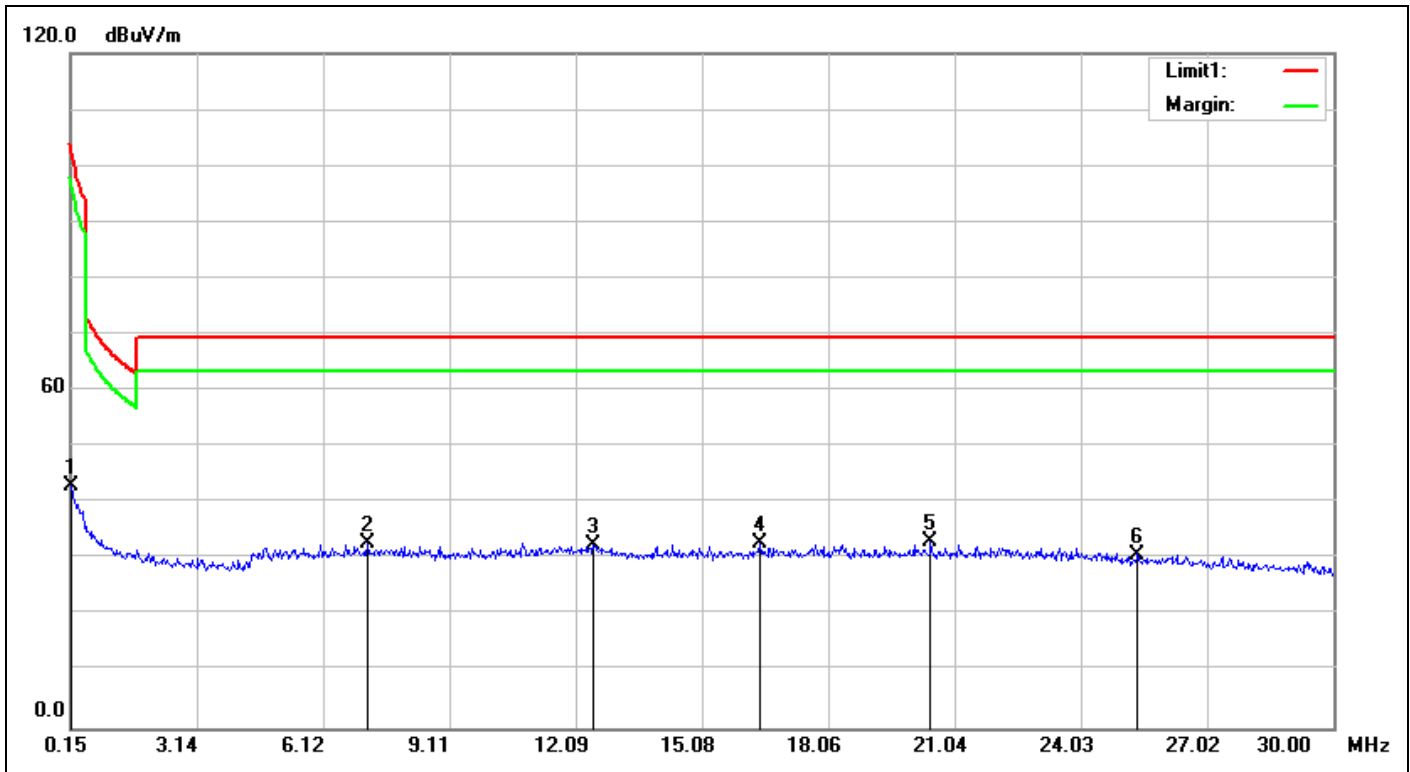
11F., No.758, Sec.4 Bade Road. Songshan Dist, Taipei City 105

Tel:+886-2172-7000 fax:+886-2528-0018



Service No.:	114076041	Test Distance:	3m
Test Standard:	FCC15.209_9k-1G_3m	Ant. Polarization:	N/A
Test item:	Radiation Emission	Test Time:	2018/8/3 19:09:42
Applicant:	REYAX	Test Rating:	DC 3.3V
Product:	RYLR896 Lora Antenna Transceiver	Temp.(°C)/Hum.(%)	20(°C)/55%
	Module		
Model No.:	RYLR896	Test Engineer:	Kevin Kuo
Test Mode:	TX-914.2		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	0.0097	18.47	32.15	50.62	127.75	-77.13	QP	100	78	
2	0.0285	19.26	22.80	42.06	118.42	-76.36	QP	100	56	
3	0.0421	19.08	21.66	40.74	115.05	-74.31	QP	100	214	
4	0.0722	18.65	15.15	33.80	110.38	-76.58	QP	100	265	
5	0.0953	18.39	11.78	30.17	107.97	-77.80	QP	100	334	
6	0.1253	18.34	10.54	28.88	105.60	-76.72	QP	100	201	



Service No.:	114076041	Test Distance:	3m
Test Standard:	FCC15.209_9k-1G_3m	Ant. Polarization:	N/A
Test item:	Radiation Emission	Test Time:	2018/8/3 19:11:26
Applicant:	REYAX	Test Rating:	DC 3.3V
Product:	RYLR896 Lora Antenna Transceiver	Temp.(°C)/Hum.(%):	20(°C)/55%
	Module		
Model No.:	RYLR896	Test Engineer:	Kevin Kuo
Test Mode:	TX-914.2		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	0.1799	18.37	24.82	43.19	102.47	-59.28	QP	100	118	
2	7.1647	19.89	13.00	32.89	69.50	-36.61	QP	100	59	
3	12.5079	20.74	11.77	32.51	69.50	-36.99	QP	100	105	
4	16.4481	21.19	11.58	32.77	69.50	-36.73	QP	100	114	
5	20.4779	21.62	11.49	33.11	69.50	-36.39	QP	100	68	
6	25.3732	21.80	9.10	30.90	69.50	-38.60	QP	100	57	

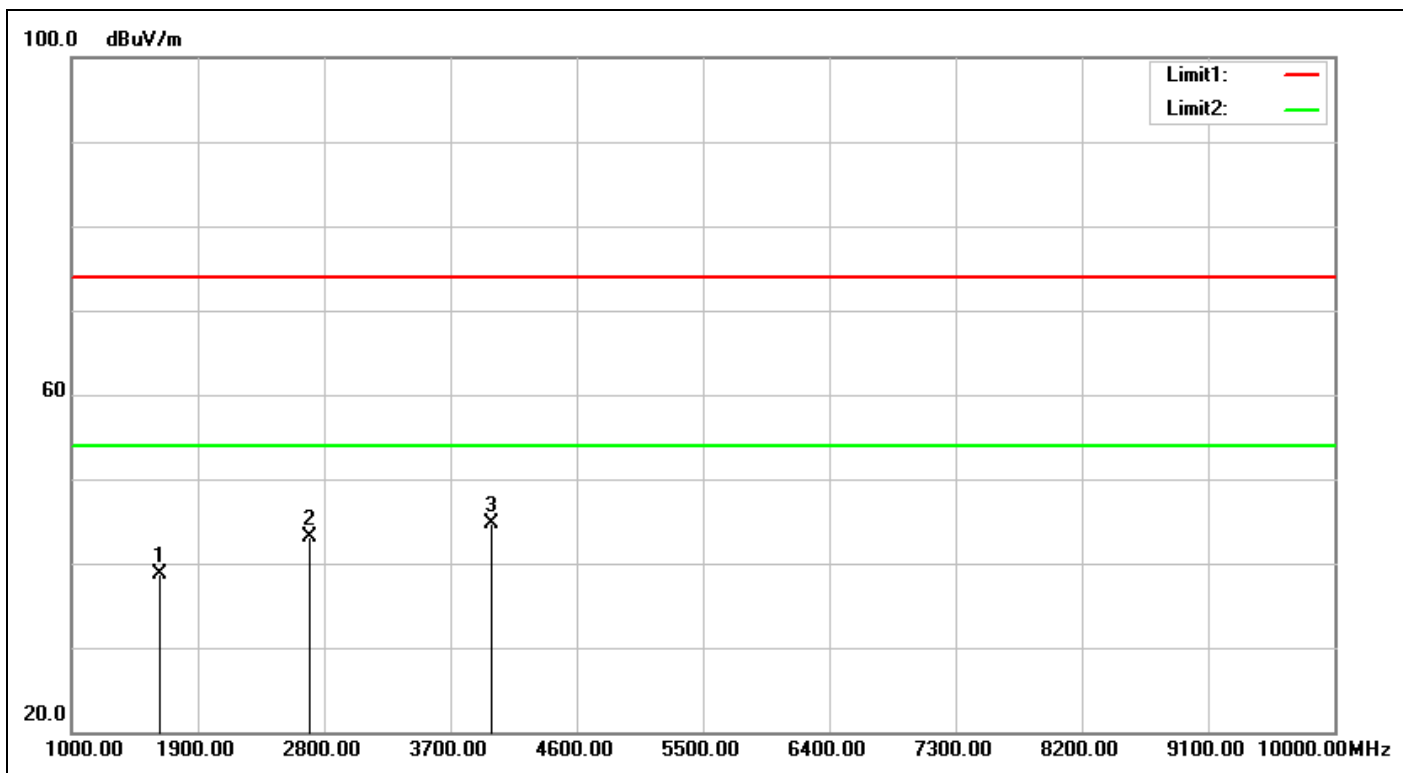
Spurious Emissions, RX Mode, 1-10G



TUV Rheinland Taiwan Ltd.

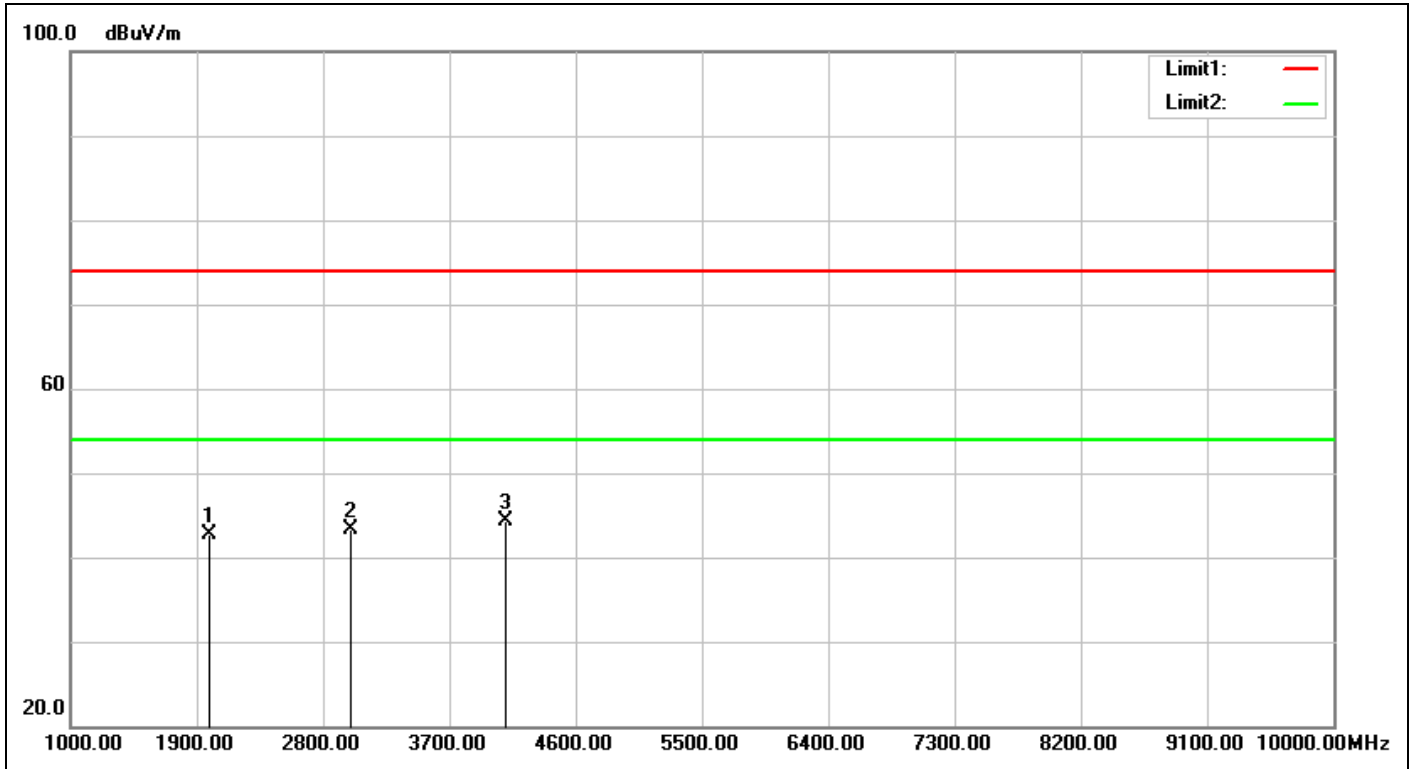
11F., No.758, Sec.4 Bade Road. Songshan Dist, Taipei City 105

Tel:+886-2172-7000 fax:+886-2528-0018



Service No.:	114076041	Test Distance:	3m
Test Standard:	FCC Above 1G PEAK	Ant. Polarization:	Horizontal
Test item:	Radiation Emission	Test Time:	2018/8/6 19:40:22
Applicant:	REYAX	Test Rating:	DC 3.3V
Product:	RYLR896 Lora Antenna Transceiver	Temp.(°C)/Hum.(%):	19.1(°C)/61%
	Module		
Model No.:	RYLR896	Test Engineer:	Kevin Kuo
Test Mode:	RX-914.2		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	1630.000	-10.65	49.44	38.79	74.00	-35.21	peak	100	100	
2	2692.000	-7.71	50.76	43.05	74.00	-30.95	peak	100	269	
3	3988.000	-5.74	50.51	44.77	74.00	-29.23	peak	100	108	



Service No.:	114076041	Test Distance:	3m
Test Standard:	FCC Above 1G PEAK	Ant. Polarization:	Vertical
Test item:	Radiation Emission	Test Time:	2018/8/6 19:41:25
Applicant:	REYAX	Test Rating:	DC 3.3V
Product:	RYLR896 Lora Antenna Transceiver	Temp.(°C)/Hum.(%):	19.1(°C)/61%
	Module		
Model No.:	RYLR896	Test Engineer:	Kevin Kuo
Test Mode:	RX-914.2		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	1990.000	-8.20	50.88	42.68	74.00	-31.32	peak	100	8	
2	2998.000	-7.19	50.43	43.24	74.00	-30.76	peak	100	246	
3	4096.000	-5.37	49.70	44.33	74.00	-29.67	peak	100	215	

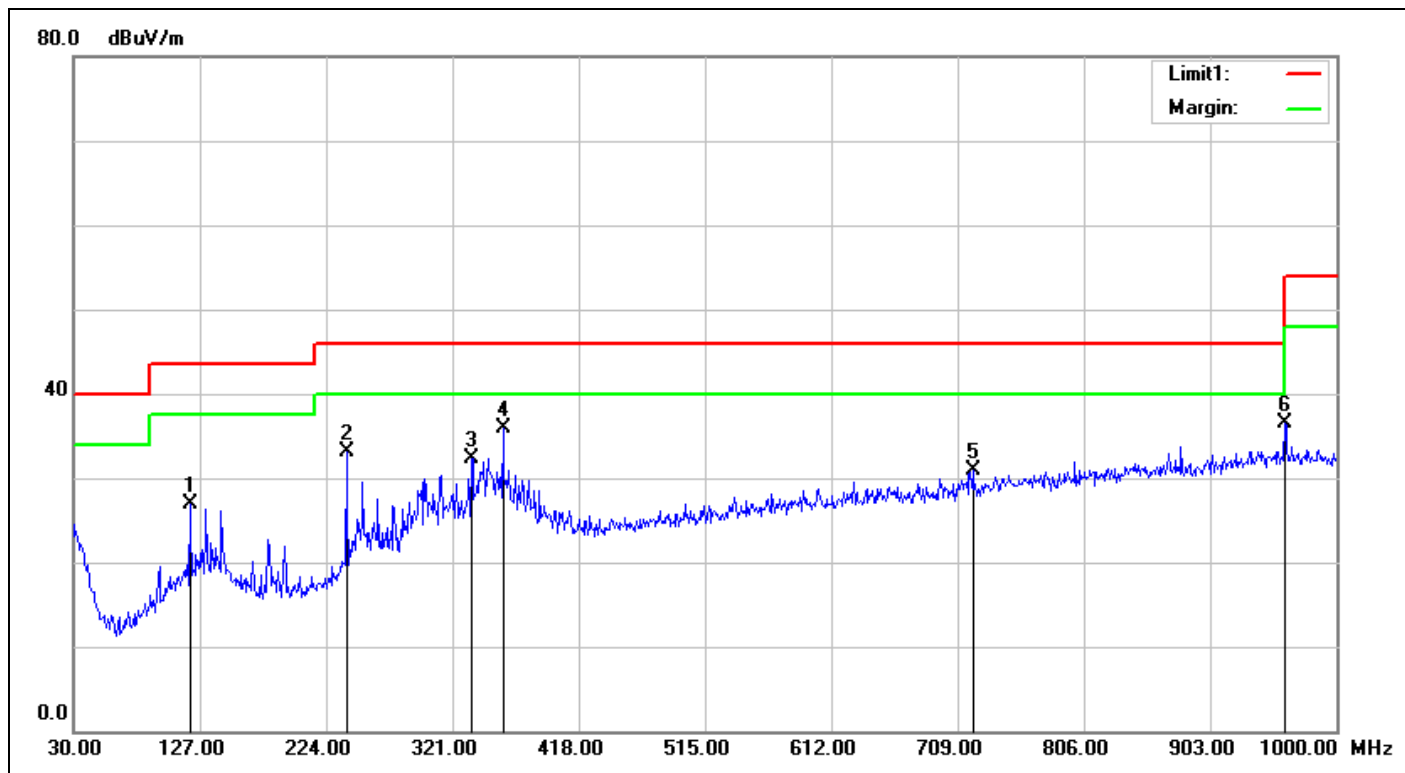
Spurious Emissions, RX Mode, 30M-1G



TUV Rheinland Taiwan Ltd.

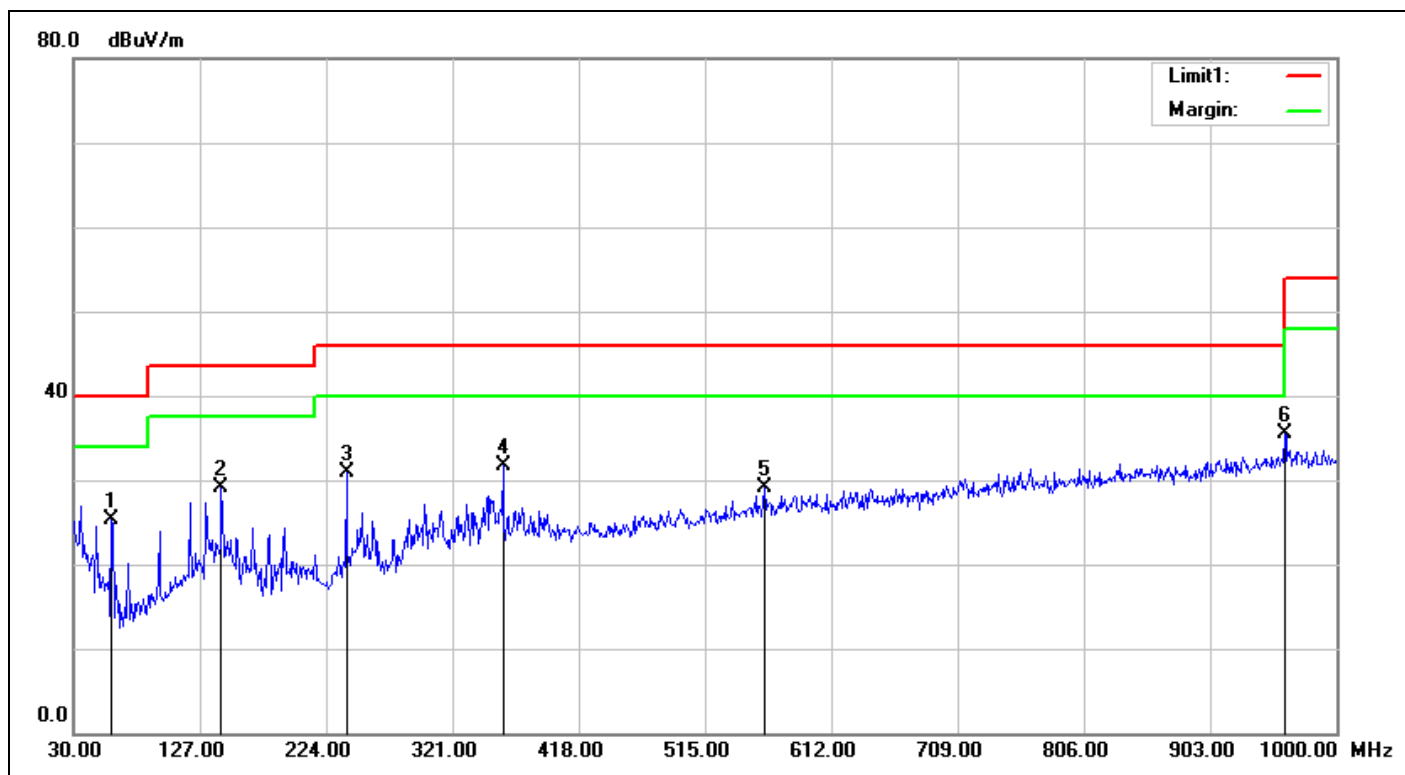
11F., No.758, Sec.4 Bade Road. Songshan Dist, Taipei City 105

Tel: +886-2172-7000 fax: +886-2528-0018



Service No.:	114076041	Test Distance:	3m
Test Standard:	FCC Class B 3M Radiation	Ant. Polarization:	Horizontal
Test item:	Radiation Emission	Test Time:	2018/8/3 17:10:52
Applicant:	REYAX	Test Rating:	DC 3.3V
Product:	RYLR896 Lora Antenna Transceiver	Temp.(°C)/Hum.(%)	20(°C)/55%
	Module		
Model No.:	RYLR896	Test Engineer:	Kevin Kuo
Test Mode:	RX-914.2		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	119.2399	-7.44	34.35	26.91	43.50	-16.59	QP	100	277	
2	239.5200	-6.73	39.92	33.19	46.00	-12.81	QP	100	114	
3	335.5500	-3.54	35.89	32.35	46.00	-13.65	QP	100	109	
4	359.8000	-3.00	38.88	35.88	46.00	-10.12	QP	100	109	
5	720.6399	2.10	28.76	30.86	46.00	-15.14	QP	100	213	
6	960.2300	5.92	30.61	36.53	54.00	-17.47	QP	100	205	



Service No.:	114076041	Test Distance:	3m
Test Standard:	FCC Class B 3M Radiation	Ant. Polarization:	Vertical
Test item:	Radiation Emission	Test Time:	2018/8/3 17:11:55
Applicant:	REYAX	Test Rating:	DC 3.3V
Product:	RYLR896 Lora Antenna Transceiver	Temp.(°C)/Hum.(%):	20(°C)/55%
	Module		
Model No.:	RYLR896	Test Engineer:	Kevin Kuo
Test Mode:	RX-914.2		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	59.1000	-13.52	38.82	25.30	40.00	-14.70	QP	100	177	
2	143.4900	-7.05	36.14	29.09	43.50	-14.41	QP	100	166	
3	239.5200	-6.73	37.56	30.83	46.00	-15.17	QP	100	91	
4	359.8000	-3.00	34.78	31.78	46.00	-14.22	QP	100	33	
5	560.5900	-0.05	29.23	29.18	46.00	-16.82	QP	100	211	
6	960.2300	5.92	29.60	35.52	54.00	-18.48	QP	100	81	

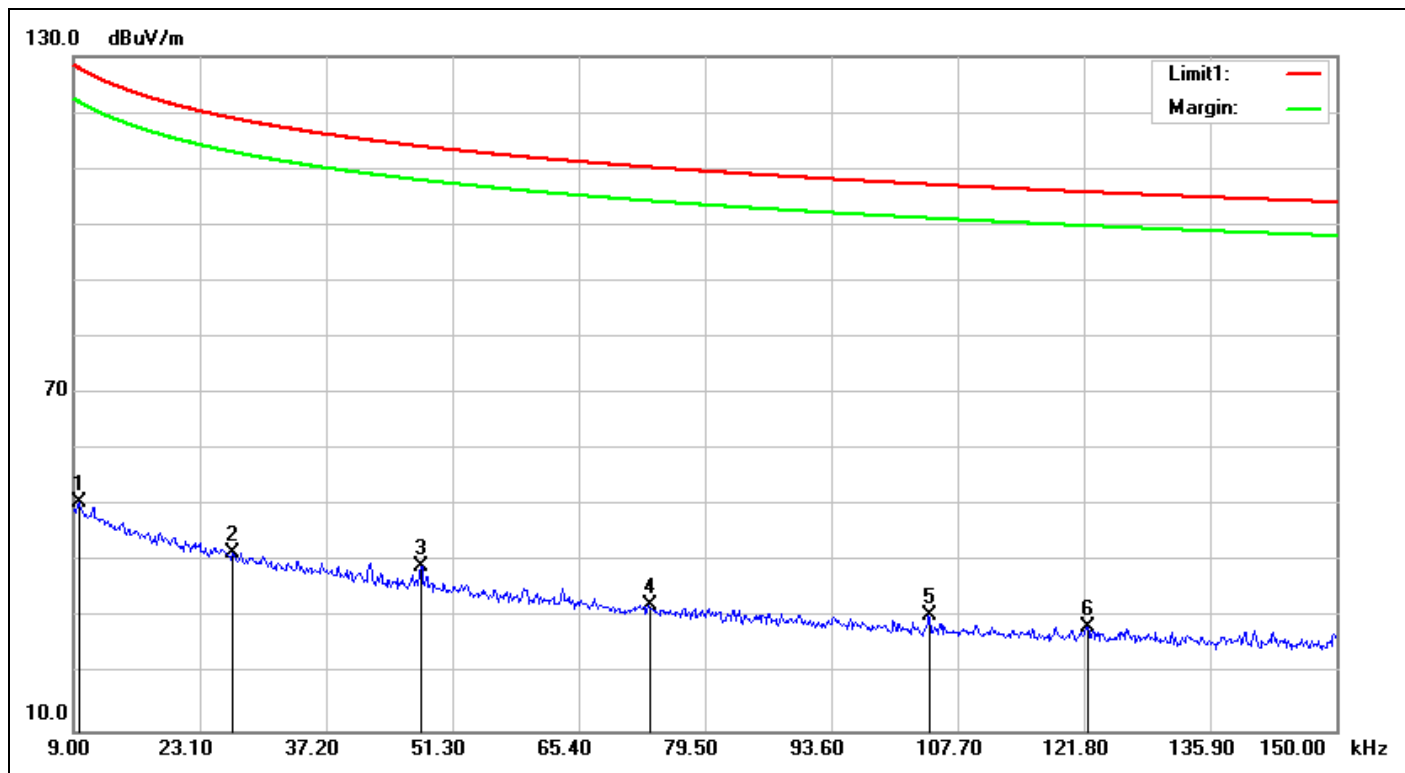
Spurious Emissions, RX Mode, 9K-30M



TUV Rheinland Taiwan Ltd.

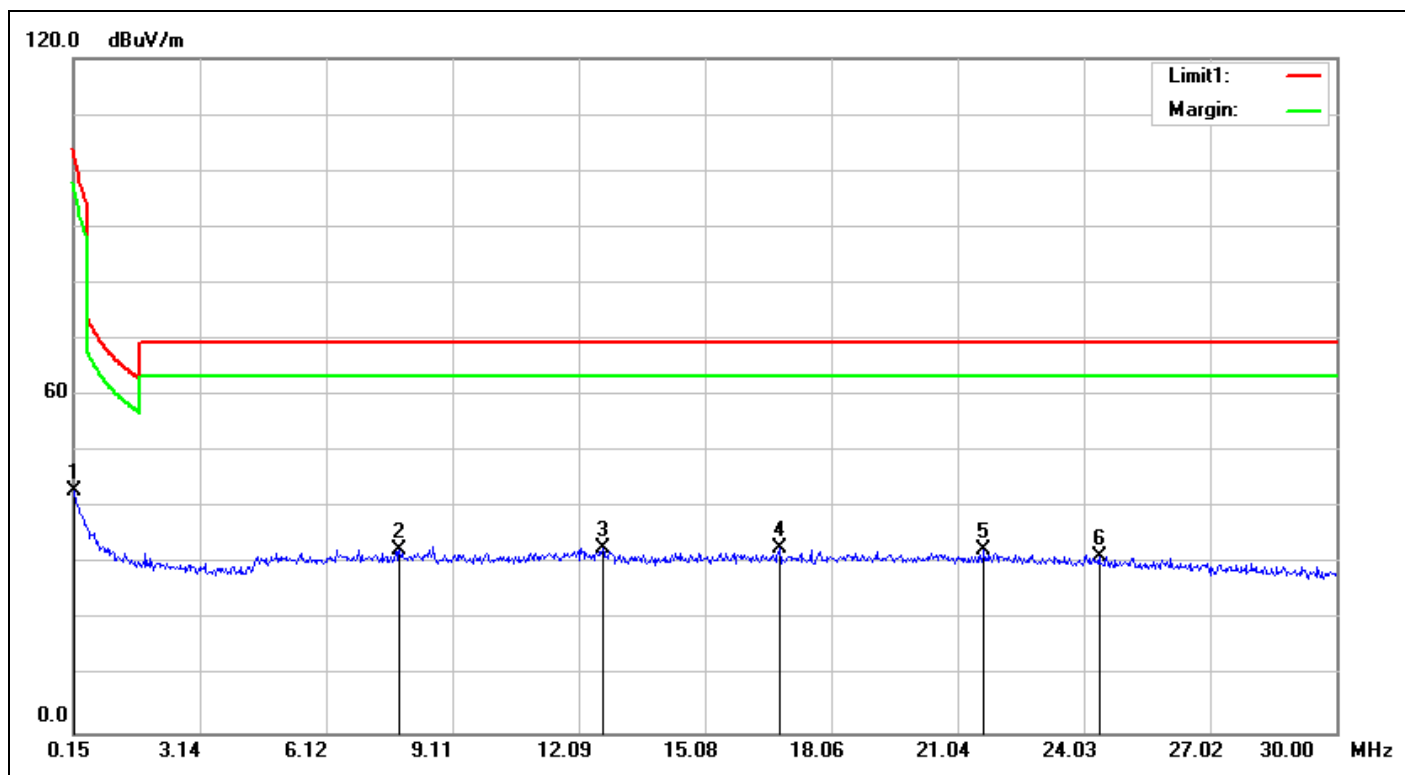
11F., No.758, Sec.4 Bade Road. Songshan Dist, Taipei City 105

Tel:+886-2172-7000 fax:+886-2528-0018



Service No.:	114076041	Test Distance:	3m
Test Standard:	FCC15.209_9k-1G_3m	Ant. Polarization:	N/A
Test item:	Radiation Emission	Test Time:	2018/8/3 19:14:36
Applicant:	REYAX	Test Rating:	DC 3.3V
Product:	RYLR896 Lora Antenna Transceiver	Temp.(°C)/Hum.(%)	20(°C)/55%
	Module		
Model No.:	RYLR896	Test Engineer:	Kevin Kuo
Test Mode:	RX-914.2		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	0.0096	18.45	32.22	50.67	127.84	-77.17	QP	100	118	
2	0.0268	19.20	22.33	41.53	118.96	-77.43	QP	100	201	
3	0.0478	18.96	20.30	39.26	113.95	-74.69	QP	100	321	
4	0.0732	18.64	13.61	32.25	110.26	-78.01	QP	100	335	
5	0.1045	18.33	12.20	30.53	107.18	-76.65	QP	100	109	
6	0.1222	18.34	10.06	28.40	105.82	-77.42	QP	100	95	



Service No.:	114076041	Test Distance:	3m
Test Standard:	FCC15.209_9k-1G_3m	Ant. Polarization:	N/A
Test item:	Radiation Emission	Test Time:	2018/8/3 19:13:01
Applicant:	REYAX	Test Rating:	DC 3.3V
Product:	RYLR896 Lora Antenna Transceiver	Temp.(°C)/Hum.(%):	20(°C)/55%
	Module		
Model No.:	RYLR896	Test Engineer:	Kevin Kuo
Test Mode:	RX-914.2		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	0.1799	18.37	24.69	43.06	102.47	-59.41	QP	100	34	
2	7.8513	20.02	12.62	32.64	69.50	-36.86	QP	100	21	
3	12.6571	20.75	12.11	32.86	69.50	-36.64	QP	100	108	
4	16.8361	21.23	11.65	32.88	69.50	-36.62	QP	100	336	
5	21.6718	21.67	10.86	32.53	69.50	-36.97	QP	100	25	
6	24.3882	21.76	9.45	31.21	69.50	-38.29	QP	100	257	

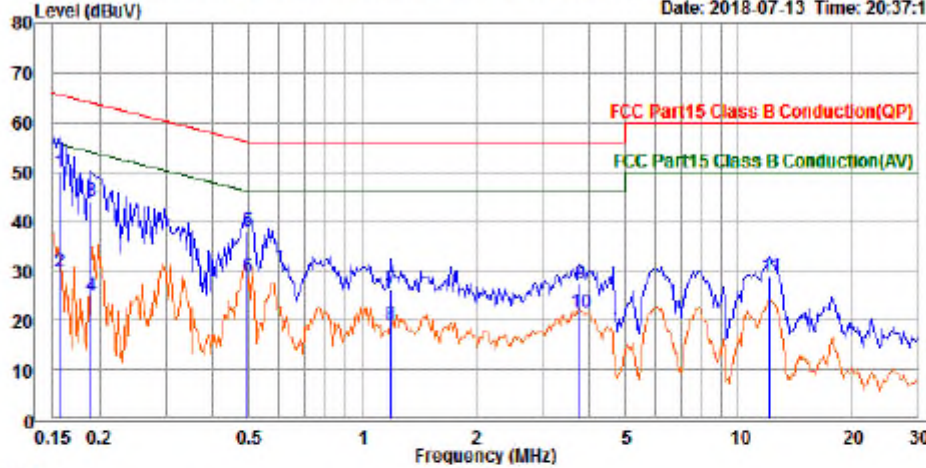
Mains



TUV Rheinland Taiwan Ltd.
11F., No. 758, Sec. 4 Bade Road, Songshan Dist, Taipei City 105
Tel: +886-2172-7000 Fax: +886-2528-0018

File: C:\EMC\Report\2018\REYAX(LoRa)\FCC\114076041(REYAX)_00001.EMI

Date: 2018-07-13 Time: 20:37:12



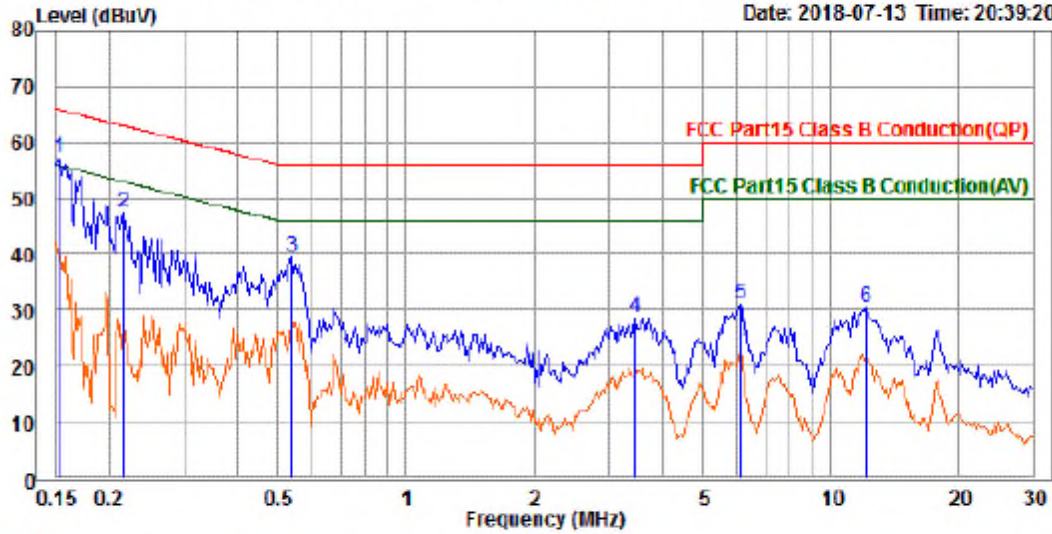
Trace: 1

Site : Conduction room
Condition : FCC Part15 Class B Conduction(QP) line1
Test Engineer: Kevin Kuo
Applicant : REYAX TECHNOLOGY CO.,LTD.
Product : RYLR896 Lora Antenna Transceiver Module
Model No. : RYLR896
Test Rating : 110Vac/60Hz
Tmp/Hum : 23.3°C / 37%
Memo : AC Mains

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.156	40.19	9.68	49.87	65.67	-15.80	QP
2	0.156	20.25	9.68	29.93	55.67	-25.74	Average
3	0.190	34.42	9.68	44.10	64.02	-19.92	QP
4	0.190	15.24	9.68	24.92	54.02	-29.10	Average
5	0.494	28.28	9.69	37.97	56.09	-18.12	QP
6	0.494	19.32	9.69	29.01	46.09	-17.08	Average
7	1.186	16.45	9.70	26.15	56.00	-29.85	QP
8	1.186	9.39	9.70	19.09	46.00	-26.91	Average
9	3.795	17.70	9.74	27.44	56.00	-28.56	QP
10	3.795	11.84	9.74	21.58	46.00	-24.42	Average
11	12.141	19.07	9.84	28.91	60.00	-31.09	QP

File: C:\EMC\Report\2018\REYAX(LoRa)\FCC\114076041(REYAX)_00003.EMI

Date: 2018-07-13 Time: 20:39:20



Trace: 1

Site : Conduction room
Condition : FCC Part15 Class B Conduction(QP) neutral
Test Engineer: Kevin Kuo
Applicant : REYAX TECHNOLOGY CO.,LTD.
Product : RYLR896 Lora Antenna Transceiver Module
Model No. : RYLR896
Test Rating : 110Vac/60Hz
Tmp/Hum : 23.3°C / 37%
Memo : AC Mains

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.151	47.45	9.68	57.13	65.92	-8.79	Peak
2	0.217	37.63	9.68	47.31	62.95	-15.64	Peak
3	0.535	29.77	9.68	39.45	56.00	-16.55	Peak
4	3.470	18.86	9.74	28.60	56.00	-27.40	Peak
5	6.115	21.28	9.79	31.07	60.00	-28.93	Peak
6	12.141	20.63	9.86	30.49	60.00	-29.51	Peak