FCC Test Report

Report No.:	RFACXM-WTW-P22040515-6
FCC ID:	2AEUPBHASG001
Test Model:	5F48E9
Received Date:	2022/4/14
Test Date:	2022/6/29 ~ 2022/8/7
Issued Date:	2022/9/13
Applicant:	Ring LLC
Address:	12515 Cerise Ave, Hawthorne, CA 90250, USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / Designation Number:	723255 / TW2022

Testing Laboratory
2022

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RFACXM-WTW-P22040515-6	Original Release	2022/9/13

1 Certificate of Conformity

Product:	Amazon Sidewalk Bridge Pro by Ring
Brand:	Ring
Test Model:	5F48E9
Sample Status:	Engineering sample
Applicant:	Ring LLC
Test Date:	2022/6/29 ~ 2022/8/7
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Cherry Chuo , **Date:** 2022/9/13

Cherry Chuo / Specialist

Approved by : , **Date:** 2022/9/13

May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -5.77 dB at 0.40000 MHz.
15.247(a)(1)(i)	Number of Hopping Frequency Used	Pass	Meet the requirement of limit.
15.247(a)(1)(i)	Dwell Time on Each Channel	Pass	Meet the requirement of limit.
15.247(a)(1)	1. Hopping Channel Separation 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	Pass	Meet the requirement of limit.
15.247(b)(2)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -8.9 dB at 63.23 MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is R-N type(F) and R-N type(M). (The device is professionally installed)

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.9 dB
Conducted emissions	-	2.5 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.1 dB
	30MHz ~ 1GHz	5.1 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.0 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Amazon Sidewalk Bridge Pro by Ring
Brand	Ring
Test Model	5F48E9
DSN No.	For Conducted & Radiated Emissions test items: GBA1VV012212000F For other test items: GBA1VV012212000H
Sample Status	Engineering sample
Power Supply Rating	DC 6V from battery or DC 53V from POE
Modulation Type	LoRa
Modulation Technology	FHSS
Transfer Rate	Refer to Note
Operating Frequency	902.2 ~ 927.8 MHz
Number of Channel	129
Channel Spacing	200 kHz
Output Power	610.942 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Cable Supplied	NA

Note:

1. The EUT has three Configurations, please refer to the following table:

Configuration	Function	Semtech transceiver	Modulation	Mode
1	BP OFF	LR1110	FSK	FHSS
			Lora	FHSS
				DTS_800kHz
2	BP OFF	LR1110	FSK	FHSS
		SX1303	Lora	FHSS
				DTS_800kHz
				DTS_600kHz
				Hybrid
3	BP ON	LR1110	FSK	FHSS
		SX1303	Lora	DTS_800kHz
				DTS_600kHz
				Hybrid

2. The LoRa technology information as below table.

Mode	Channel Spacing	Data Rate	Number of Channel	Bandwidth
FHSS	200 kHz	DR3 (SF7) /125kHz: 5.47kbps DR4 (SF8) /125kHz: 12.5kbps DR1 (SF9) /125kHz: 1.76kbps	129	BW: 125 kHz
Note: From the above Data Rate, the worst case was found in **DR3 (SF7)**. Therefore only the test data of the Data Rate were recorded in this report.				

3. For Radiated Emission test, the EUT was pre-tested under the following modes:

Pre-test Mode	Description
Mode A	**Power from POE**
Mode B	Power from Battery
From the above modes, the worst case was found in **Mode A**. Therefore only the test data of the mode was recorded in this report.	

4. The EUT contains certified WWAN (LTE) modular which FCC ID: ZMONL668AM00.

5. The EUT has below radios as following table:

Radio 1	Radio 2	Radio 3	Radio 4
WLAN 2.4GHz+ WLAN 5GHz+ Bluetooth	WWAN (LTE)	GPS	LoRa + FSK

6. Simultaneously transmission condition.

Condition	Technology			
1	WLAN (2.4GHz)	LoRa	Bluetooth	-
2	WLAN (5GHz)	LoRa	Bluetooth	-
3	WLAN (2.4GHz)	FSK	Bluetooth	-
4	WLAN (5GHz)	FSK	Bluetooth	-
5	LTE	LoRa	Bluetooth	-
6	LTE	FSK	Bluetooth	-
7	WLAN (2.4GHz)	LoRa	FSK	Bluetooth
8	WLAN (5GHz)	LoRa	FSK	Bluetooth
9	LTE	LoRa	FSK	Bluetooth
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.				

7. The EUT must be supplied with a battery and following below table:

Brand	Model No.	Spec.
WELLTECH ENERGY INC.	5F48E9	6 Vdc, 3100 mAh

8. The antennas provided to the EUT, please refer to the following table:

RF Chain No	Brand	Model	Antenna Net Gain (dBi)	Frequency Range	Antenna Type	Connector Type	Cable Length (mm)
LoRa/FSK (Outdoor)	Inpaq	RFDPA563600AFRBX01	5.5	902~928 MHz	Dipole	R-N type(F)	1000
			5	902~928 MHz	Dipole	R-N type(F)	3000
LoRa/FSK (Indoor)	Inpaq	FDPA161500AMUB801	2.8	902~928 MHz	Dipole	R-N type(M)	NA
Note: For Radiated Emission test item the max. gain was selected for the final test .							

9. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

10. Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

3.2 Description of Test Modes

129 channels are provided for EUT (125kHz Bandwidth):

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	902.2	26	907.4	52	912.6	78	917.8	104	923
1	902.4	27	907.6	53	912.8	79	918	105	923.2
2	902.6	28	907.8	54	913	80	918.2	106	923.4
3	902.8	29	908	55	913.2	81	918.4	107	923.6
4	903	30	908.2	56	913.4	82	918.6	108	923.8
5	903.2	31	908.4	57	913.6	83	918.8	109	924
6	903.4	32	908.6	58	913.8	84	919	110	924.2
7	903.6	33	908.8	59	914	85	919.2	111	924.4
8	903.8	34	909	60	914.2	86	919.4	112	924.6
9	904	35	909.2	61	914.4	87	919.6	113	924.8
10	904.2	36	909.4	62	914.6	88	919.8	114	925
11	904.4	37	909.6	63	914.8	89	920	115	925.2
12	904.6	38	909.8	64	915	90	920.2	116	925.4
13	904.8	39	910	65	915.2	91	920.4	117	925.6
14	905	40	910.2	66	915.4	92	920.6	118	925.8
15	905.2	41	910.4	67	915.6	93	920.8	119	926
16	905.4	42	910.6	68	915.8	94	921	120	926.2
17	905.6	43	910.8	69	916	95	921.2	121	926.4
18	905.8	44	911	70	916.2	96	921.4	122	926.6
19	906	45	911.2	71	916.4	97	921.6	123	926.8
20	906.2	46	911.4	72	916.6	98	921.8	124	927
21	906.4	47	911.6	73	916.8	99	922	125	927.2
22	906.6	48	911.8	74	917	100	922.2	126	927.4
23	906.8	49	912	75	917.2	101	922.4	127	927.6
24	907	50	912.2	76	917.4	102	922.6	128	927.8
25	907.2	51	912.4	77	917.6	103	922.8		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE≥1G	RE<1G	PLC	APCM	
1	√	√	√	√	Configuration 1 (LR110 Chip)
2	√	√	√	√	Configuration 2 (SX1303 Chip)

Where RE≥1G: Radiated Emission above 1GHz & Bandedge Measurement RE<1G: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission APCM: Antenna Port Conducted Measurement

Radiated Emission Test (Above 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
1, 2	0 to 128	0, 64, 128	LoRa

Radiated Emission Test (Below 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
1	0 to 128	128	LoRa
2	0 to 128	64	LoRa

Power Line Conducted Emission Test:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
1	0 to 128	128	LoRa
2	0 to 128	64	LoRa

Antenna Port Conducted Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
1, 2	0 to 128	0, 64, 128	LoRa

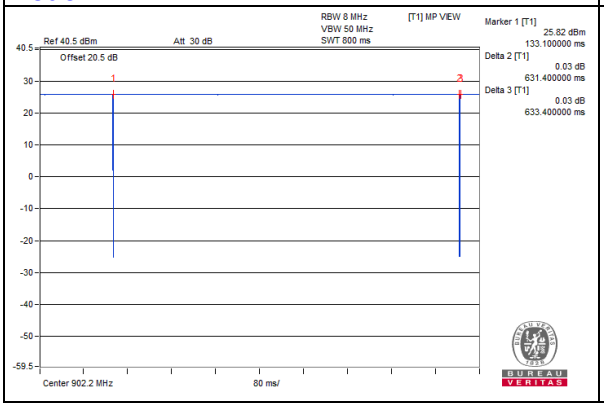
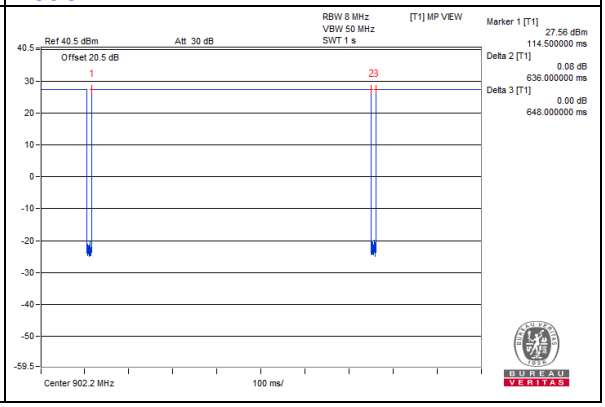
Test Condition:

Applicable to	Environmental Conditions	Input Power (System)	Tested by
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Carter Lin
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Carter Lin
PLC	25deg. C, 75%RH	120Vac, 60Hz	Ryan Du
APCM	25deg. C, 60%RH	120Vac, 60Hz	Eric Peng

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is > 98 %, duty factor shall be considered.

Mode 1: Duty cycle = 631.4 ms/633.4 ms = 0.997
Mode 2: Duty cycle = 636 ms/648 ms = 0.981

Mode 1	Mode 2
	

3.4 Description of Support Units

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.

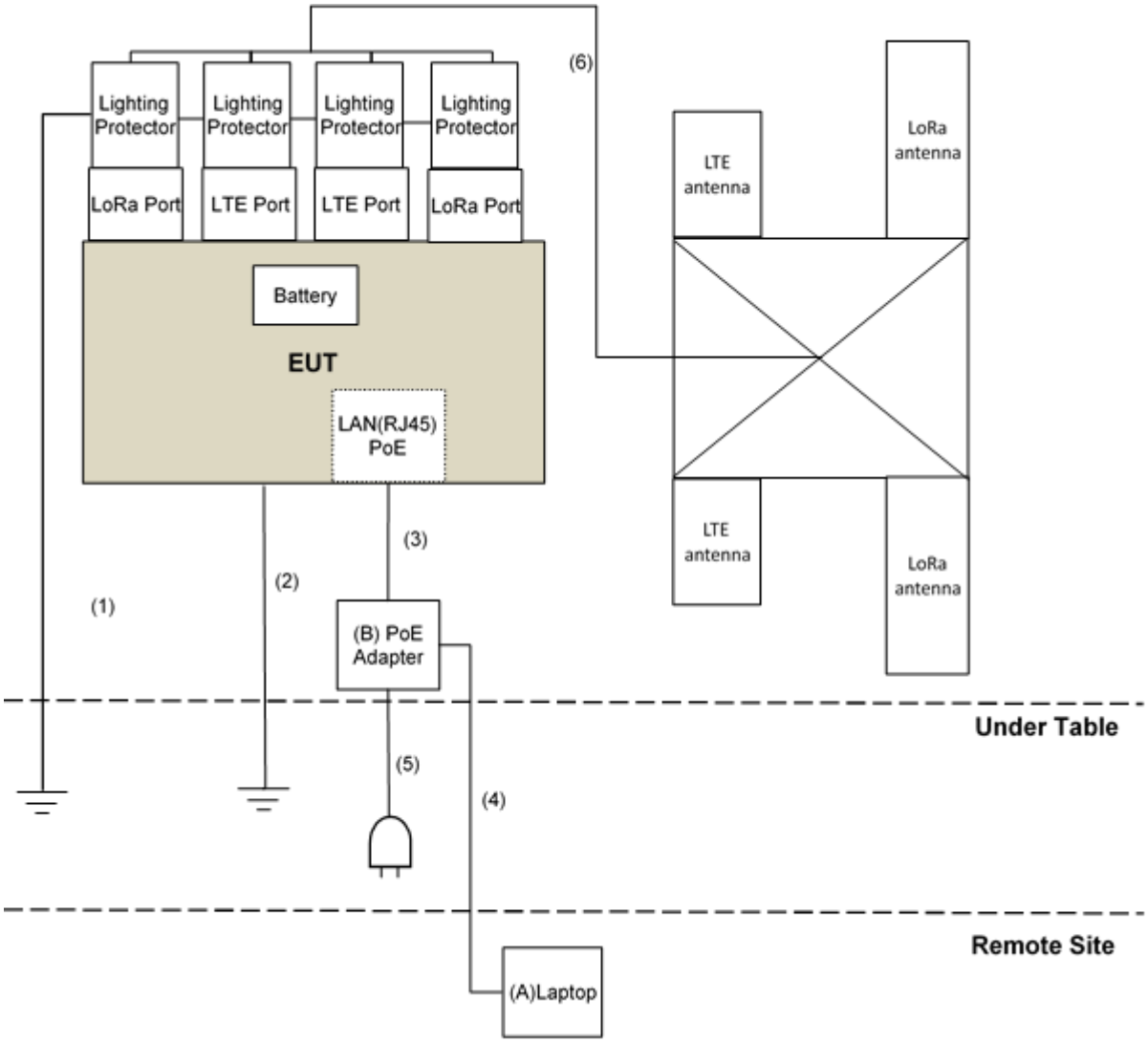
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	Lenovo	20U5S01X00 L14	PF-1ANPYA	NA	Provided by Lab
B.	PoE Adapter	Gospower	G0545-530-060-PSE1000	NA	NA	Supplied by applicant

Note: 1. All power cords of the above support units are non-shielded (1.8m).

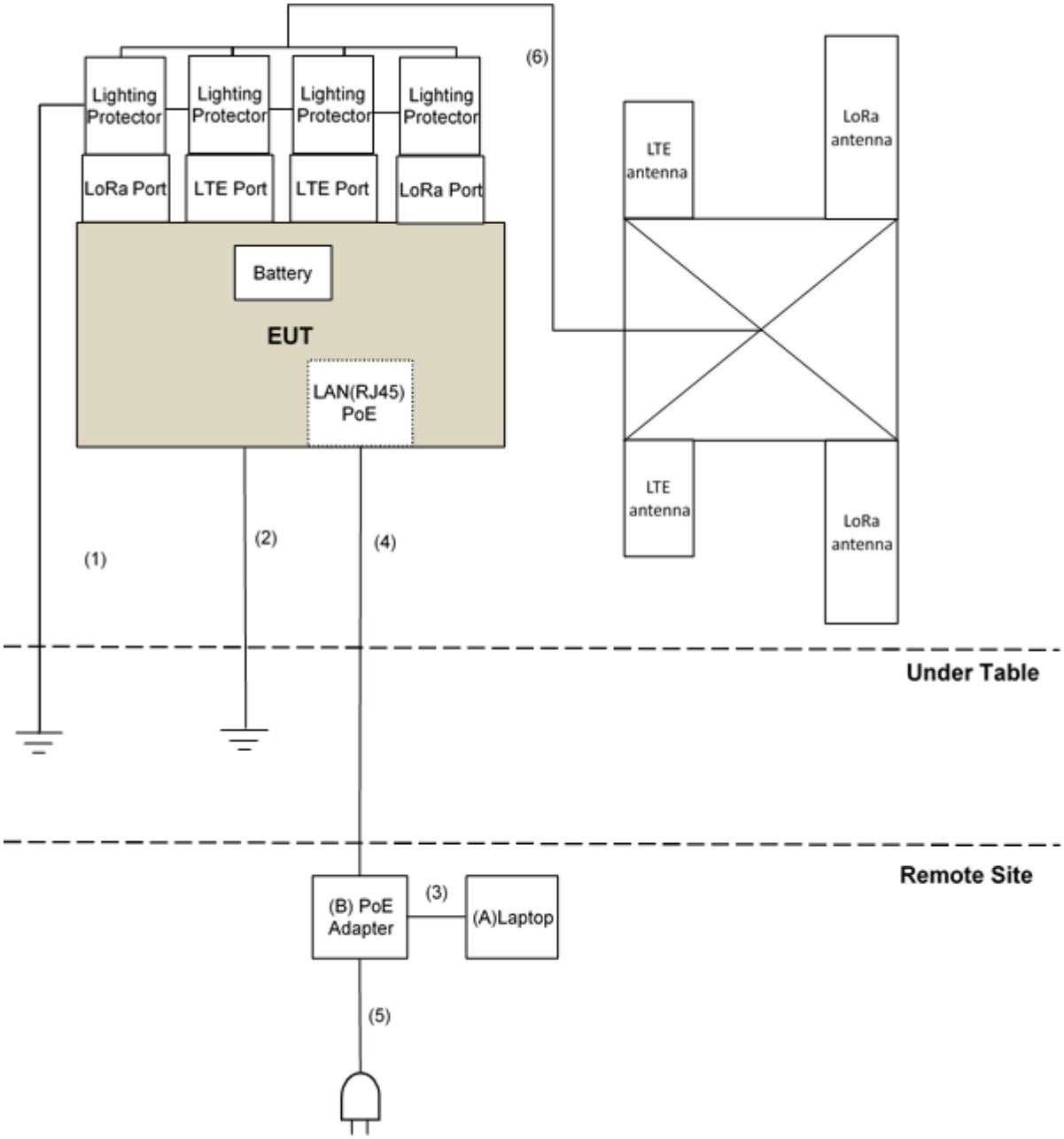
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	GND Cable	1	3	No	0	Provided by Lab
2.	GND Cable	1	3	No	0	Provided by Lab
3.	RJ-45 Cable	1	1.5	No	0	Provided by Lab
4.	RJ-45 Cable	1	10	No	0	Provided by Lab
5.	AC Cable	1	1	No	0	Supplied by applicant
6.	Antenna Cable	4	1	Yes	0	Supplied by applicant

3.4.1 Configuration of System under Test

For AC Power Conducted Emission test:



For Radiated Emission test:



3.5 General Description of Applied Standards and references

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

FCC Part 15, Subpart C (15.247)
ANSI C63.10:2013

All test items have been performed and recorded as per the above standards.

References Test Guidance :

KDB 558074 D01 15.247 Meas Guidance v05r02

All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/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

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 Test Instruments

For Radiated Emission test:

Description & Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Spectrum Analyzer Keysight	N9020B	MY60112410	2022/3/13	2023/3/12
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Test Receiver KEYSIGHT	N9038A	MY59050100	2022/6/20	2023/6/19
Pre_Amplifier EMCI	EMC001340	980142	2022/6/2	2023/6/1
LOOP ANTENNA Electro-Metrics	EM-6879	264	2022/3/18	2023/3/17
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-001	2022/1/6	2023/1/5
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-002	2022/1/6	2023/1/5
Pre_Amplifier(20M-3G) EMCI	EMC330N	980852	2022/3/28	2023/3/27
Bilog Antenna Schwarzbeck	VULB 9168	9168-0942	2021/10/26	2022/10/25
RF Coaxial Cable COMMATE/PEWC	8D	966-6-1	2022/4/25	2023/4/24
RF Coaxial Cable COMMATE/PEWC	8D	966-6-2	2022/4/25	2023/4/24
RF Coaxial Cable COMMATE/PEWC	8D	966-6-3	2022/4/25	2023/4/24
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-01	2022/1/10	2023/1/9
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-2035	2021/11/14	2022/11/13
Pre_Amplifier EMCI	EMC12630SE	980385	2021/8/25	2022/8/24
RF Coaxial Cable EMCI	EMC101G-KM-KM-10000	210708	2021/11/9	2022/11/8
RF Cable EMCI	EMC104-SM-SM-1300	210205	2022/5/10	2023/5/9

Note: 1. The test was performed in 966 Chamber No. 6.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: 2022/6/29 ~ 2022/8/2

For other test items:

Description & Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Spectrum Analyzer R&S	FSV40	101516	2022/3/7	2023/3/6
Power Meter Anritsu	ML2495A	1529002	2022/6/22	2023/6/21
Pulse Power Sensor Anritsu	MA2411B	1726434	2022/6/22	2023/6/21
Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	2022/4/5	2023/4/4
Software	ADT_RF Test Software V6.6.5.4	NA	NA	NA

Note: 1. The test was performed in Oven room 2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: 2022/8/7

4.1.3 Test Procedures

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

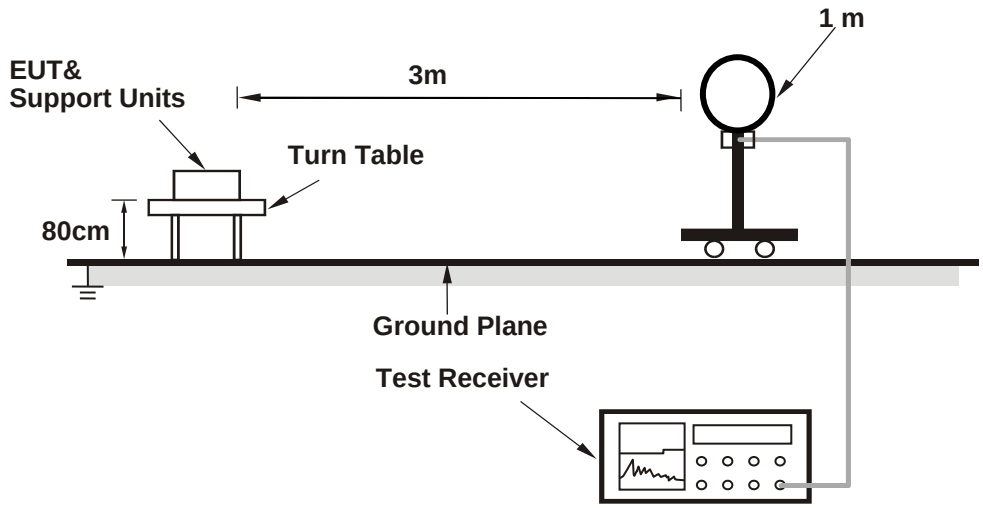
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) and Average detection (AV) at frequency above 1GHz.
3. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

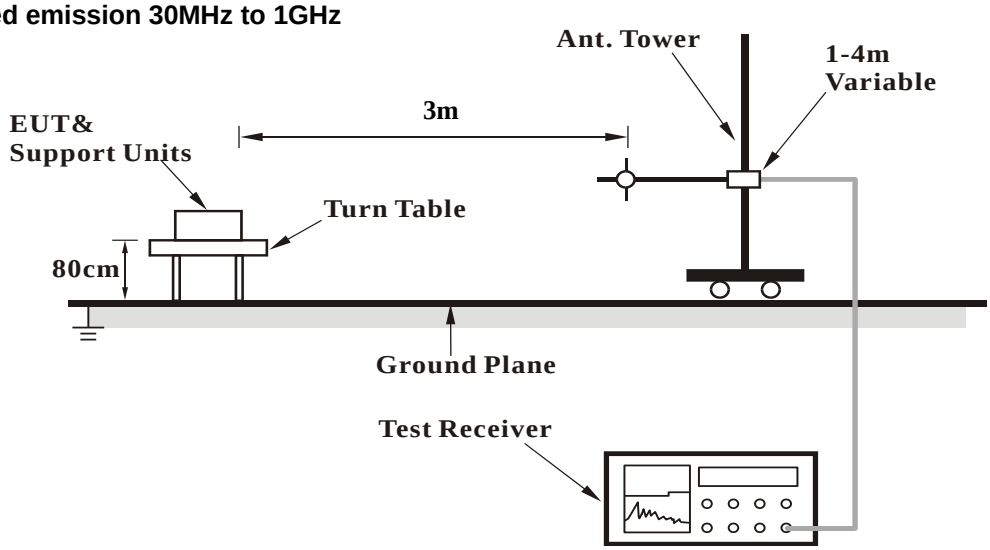
No deviation.

4.1.5 Test Setup

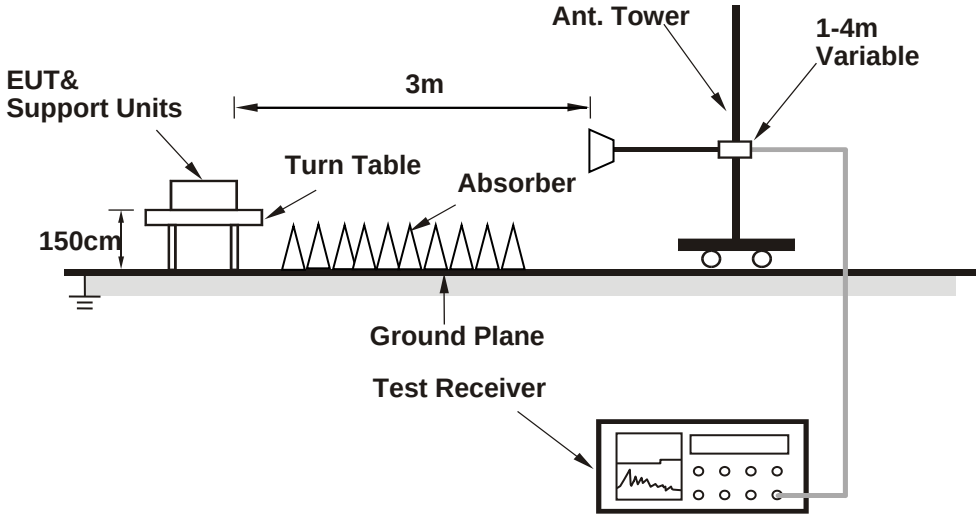
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

a. Set the EUT under transmission condition continuously at specific channel frequency.

b. Controlling software (Run Putty.exe paste Lora and Fsk.txt command) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results (Mode 1)

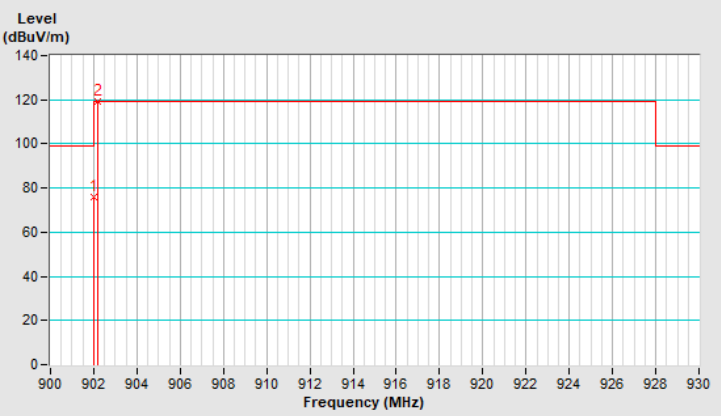
Bandedge Data:

RF Mode	TX LoRa	Channel	CH 0：902.2 MHz
Frequency Range	900MHz ~ 930MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	902.00	76.0 QP	99.3	-23.3	1.00 H	342	45.7	30.3
2	*902.20	119.3 QP			1.00 H	342	89.0	30.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. “ * “: Fundamental frequency.

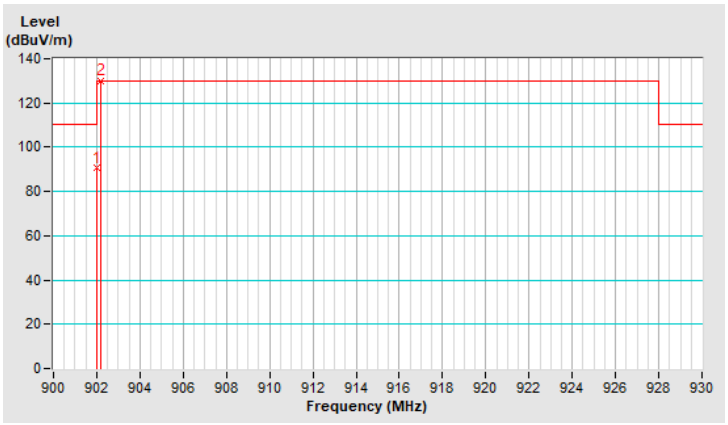


RF Mode	TX LoRa	Channel	CH 0：902.2 MHz
Frequency Range	900MHz ~ 930MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	902.00	90.6 QP	110.1	-19.5	1.00 V	148	60.3	30.3
2	*902.20	130.1 QP			1.00 V	148	99.8	30.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. “ * “: Fundamental frequency.

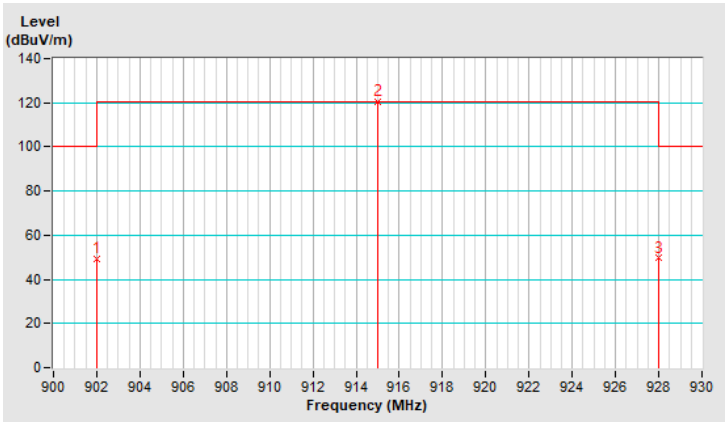


RF Mode	TX LoRa	Channel	CH 64：915 MHz
Frequency Range	900MHz ~ 930MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	902.00	49.5 QP	100.5	-51.0	1.39 H	131	19.2	30.3
2	*915.00	120.5 QP			1.39 H	131	89.8	30.7
3	928.00	49.7 QP	100.5	-50.8	1.39 H	131	18.8	30.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. “ * “: Fundamental frequency.

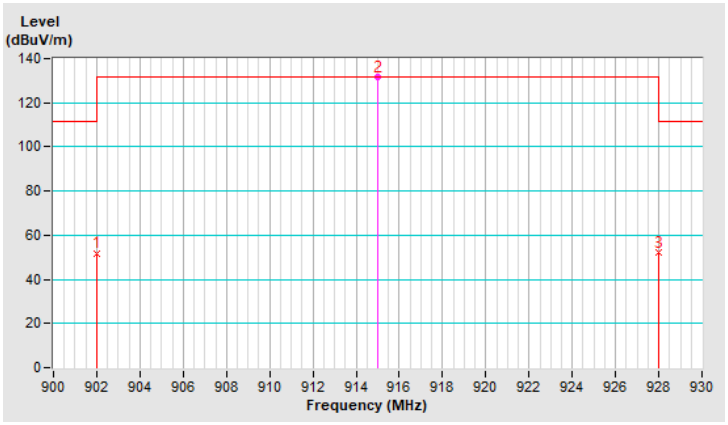


RF Mode	TX LoRa	Channel	CH 64：915 MHz
Frequency Range	900MHz ~ 930MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	902.00	51.7 QP	111.7	-60.0	1.00 V	148	21.4	30.3
2	*915.00	131.7 QP			1.00 V	148	101.0	30.7
3	928.00	52.0 QP	111.7	-59.7	1.00 V	148	21.1	30.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. “ * “: Fundamental frequency.

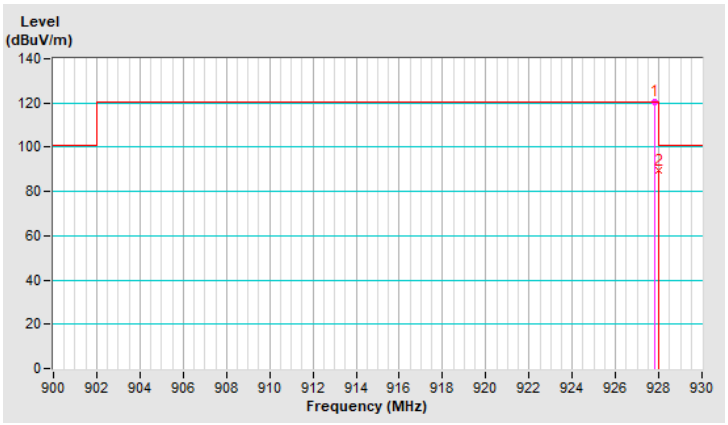


RF Mode	TX LoRa	Channel	CH 128：927.8 MHz
Frequency Range	900MHz ~ 930MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*927.80	120.7 QP			1.33 H	123	89.8	30.9
2	928.00	89.6 QP	100.7	-11.1	1.33 H	123	58.7	30.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. “ * “: Fundamental frequency.

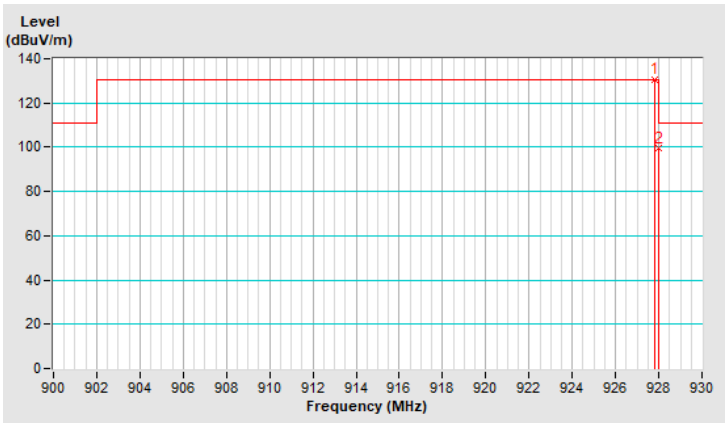


RF Mode	TX LoRa	Channel	CH 128：927.8 MHz
Frequency Range	900MHz ~ 930MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*927.80	130.7 QP			1.00 V	148	99.8	30.9
2	928.00	99.6 QP	110.7	-11.1	1.00 V	148	68.7	30.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. “ * “: Fundamental frequency.



Above 1GHz Data:

RF Mode	TX LoRa	Channel	CH 0：902.2 MHz
Frequency Range	1GHz ~ 10GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2706.60	35.4 PK	74.0	-38.6	1.45 H	211	38.3	-2.9
2	2706.60	24.2 AV	54.0	-29.8	1.45 H	211	27.1	-2.9
3	3608.80	35.0 PK	74.0	-39.0	1.07 H	127	36.3	-1.3
4	3608.80	23.8 AV	54.0	-30.2	1.07 H	127	25.1	-1.3
5	4511.00	35.2 PK	74.0	-38.8	1.38 H	160	34.8	0.4
6	4511.00	24.1 AV	54.0	-29.9	1.38 H	160	23.7	0.4
7	5413.20	37.6 PK	74.0	-36.4	1.45 H	167	36.0	1.6
8	5413.20	26.4 AV	54.0	-27.6	1.45 H	167	24.8	1.6
9	8119.80	43.7 PK	74.0	-30.3	1.48 H	194	35.6	8.1
10	8119.80	31.0 AV	54.0	-23.0	1.48 H	194	22.9	8.1
11	9022.00	43.9 PK	74.0	-30.1	1.48 H	179	35.4	8.5
12	9022.00	33.3 AV	54.0	-20.7	1.48 H	179	24.8	8.5
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2706.60	35.9 PK	74.0	-38.1	1.08 V	174	38.8	-2.9
2	2706.60	28.7 AV	54.0	-25.3	1.08 V	174	31.6	-2.9
3	3608.80	37.4 PK	74.0	-36.6	1.96 V	193	38.7	-1.3
4	3608.80	28.4 AV	54.0	-25.6	1.96 V	193	29.7	-1.3
5	4511.00	35.2 PK	74.0	-38.8	1.34 V	168	34.8	0.4
6	4511.00	24.2 AV	54.0	-29.8	1.34 V	168	23.8	0.4
7	5413.20	37.4 PK	74.0	-36.6	1.44 V	154	35.8	1.6
8	5413.20	26.2 AV	54.0	-27.8	1.44 V	154	24.6	1.6
9	8119.80	43.6 PK	74.0	-30.4	1.48 V	209	35.5	8.1
10	8119.80	30.9 AV	54.0	-23.1	1.48 V	209	22.8	8.1
11	9022.00	44.4 PK	74.0	-29.6	1.51 V	182	35.9	8.5
12	9022.00	33.8 AV	54.0	-20.2	1.51 V	182	25.3	8.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.

RF Mode	TX LoRa	Channel	CH 64：915 MHz
Frequency Range	1GHz ~ 10GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2745.00	35.5 PK	74.0	-38.5	1.60 H	229	38.3	-2.8
2	2745.00	24.1 AV	54.0	-29.9	1.60 H	229	26.9	-2.8
3	3660.00	34.9 PK	74.0	-39.1	1.22 H	137	36.0	-1.1
4	3660.00	24.2 AV	54.0	-29.8	1.22 H	137	25.3	-1.1
5	4575.00	35.5 PK	74.0	-38.5	1.76 H	170	35.0	0.5
6	4575.00	23.9 AV	54.0	-30.1	1.76 H	170	23.4	0.5
7	7320.00	42.2 PK	74.0	-31.8	1.37 H	182	35.5	6.7
8	7320.00	30.5 AV	54.0	-23.5	1.37 H	182	23.8	6.7
9	8235.00	43.5 PK	74.0	-30.5	1.73 H	157	35.7	7.8
10	8235.00	31.1 AV	54.0	-22.9	1.73 H	157	23.3	7.8
11	9150.00	44.0 PK	74.0	-30.0	1.77 H	166	34.9	9.1
12	9150.00	32.9 AV	54.0	-21.1	1.77 H	166	23.8	9.1
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2745.00	36.6 PK	74.0	-37.4	1.18 V	172	39.4	-2.8
2	2745.00	29.3 AV	54.0	-24.7	1.18 V	172	32.1	-2.8
3	3660.00	36.9 PK	74.0	-37.1	1.95 V	191	38.0	-1.1
4	3660.00	28.0 AV	54.0	-26.0	1.95 V	191	29.1	-1.1
5	4575.00	35.5 PK	74.0	-38.5	1.36 V	172	35.0	0.5
6	4575.00	24.4 AV	54.0	-29.6	1.36 V	172	23.9	0.5
7	7320.00	43.6 PK	74.0	-30.4	1.87 V	148	36.9	6.7
8	7320.00	32.2 AV	54.0	-21.8	1.87 V	148	25.5	6.7
9	8235.00	44.2 PK	74.0	-29.8	1.50 V	206	36.4	7.8
10	8235.00	31.3 AV	54.0	-22.7	1.50 V	206	23.5	7.8
11	9150.00	43.8 PK	74.0	-30.2	1.49 V	166	34.7	9.1
12	9150.00	33.2 AV	54.0	-20.8	1.49 V	166	24.1	9.1

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.

RF Mode	TX LoRa	Channel	CH 128：927.8 MHz
Frequency Range	1GHz ~ 10GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2783.40	35.2 PK	74.0	-38.8	1.48 H	226	37.9	-2.7
2	2783.40	24.3 AV	54.0	-29.7	1.48 H	226	27.0	-2.7
3	3711.20	34.9 PK	74.0	-39.1	1.07 H	130	35.9	-1.0
4	3711.20	23.9 AV	54.0	-30.1	1.07 H	130	24.9	-1.0
5	4639.00	35.3 PK	74.0	-38.7	1.43 H	194	34.7	0.6
6	4639.00	23.9 AV	54.0	-30.1	1.43 H	194	23.3	0.6
7	7422.40	42.1 PK	74.0	-31.9	1.40 H	173	34.9	7.2
8	7422.40	30.9 AV	54.0	-23.1	1.40 H	173	23.7	7.2
9	8350.20	43.3 PK	74.0	-30.7	1.50 H	183	36.1	7.2
10	8350.20	30.8 AV	54.0	-23.2	1.50 H	183	23.6	7.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2783.40	37.4 PK	74.0	-36.6	2.24 V	144	40.1	-2.7
2	2783.40	30.5 AV	54.0	-23.5	2.24 V	144	33.2	-2.7
3	3711.20	37.2 PK	74.0	-36.8	1.99 V	191	38.2	-1.0
4	3711.20	28.2 AV	54.0	-25.8	1.99 V	191	29.2	-1.0
5	4639.00	34.9 PK	74.0	-39.1	1.39 V	166	34.3	0.6
6	4639.00	23.9 AV	54.0	-30.1	1.39 V	166	23.3	0.6
7	7422.40	43.6 PK	74.0	-30.4	1.78 V	155	36.4	7.2
8	7422.40	34.1 AV	54.0	-19.9	1.78 V	155	26.9	7.2
9	8350.20	43.8 PK	74.0	-30.2	1.50 V	196	36.6	7.2
10	8350.20	30.8 AV	54.0	-23.2	1.50 V	196	23.6	7.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.

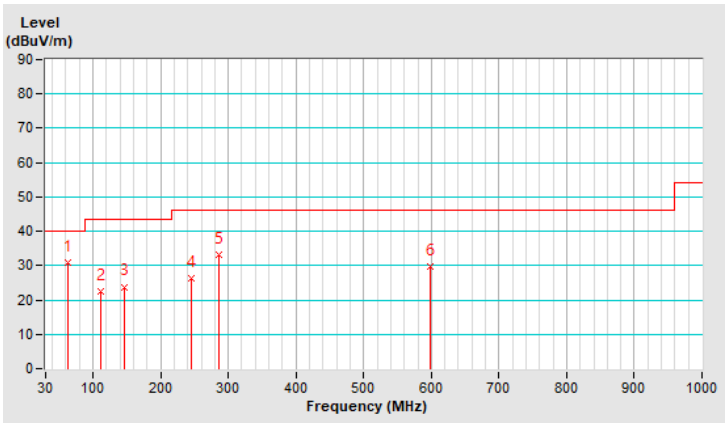
Below 1GHz Data:

RF Mode	TX LoRa	Channel	CH 128：927.8 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	62.02	30.8 QP	40.0	-9.2	1.00 H	51	44.0	-13.2
2	111.80	22.6 QP	43.5	-20.9	2.00 H	241	38.0	-15.4
3	145.59	23.8 QP	43.5	-19.7	1.50 H	360	36.3	-12.5
4	245.66	26.2 QP	46.0	-19.8	2.00 H	130	40.2	-14.0
5	285.19	33.1 QP	46.0	-12.9	1.50 H	109	45.4	-12.3
6	597.90	29.6 QP	46.0	-16.4	1.50 H	171	34.3	-4.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

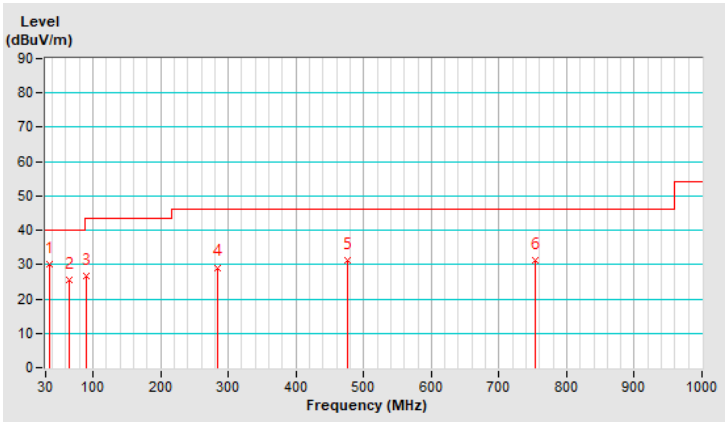


RF Mode	TX LoRa	Channel	CH 128：927.8 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	36.19	30.1 QP	40.0	-9.9	1.00 V	175	43.5	-13.4
2	64.59	25.6 QP	40.0	-14.4	1.50 V	0	39.2	-13.6
3	89.85	26.5 QP	43.5	-17.0	2.00 V	79	44.9	-18.4
4	284.39	29.2 QP	46.0	-16.8	2.00 V	79	41.5	-12.3
5	477.15	31.2 QP	46.0	-14.8	1.50 V	202	38.9	-7.7
6	753.55	31.1 QP	46.0	-14.9	1.00 V	226	33.6	-2.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.1.8 Test Results (Mode 2)

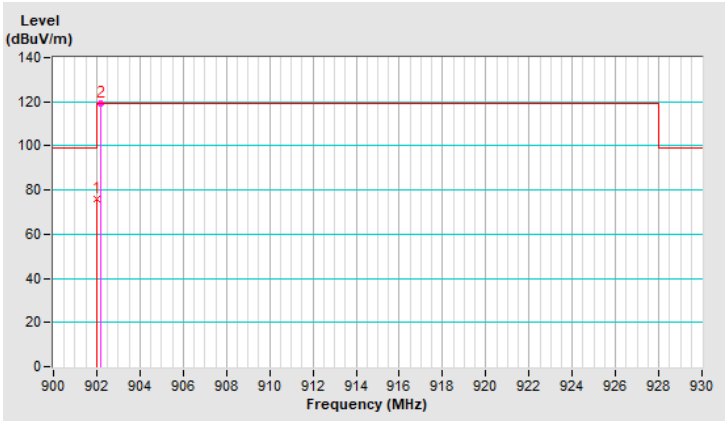
Bandedge Data:

RF Mode	TX LoRa	**Channel**	CH 0：902.2 MHz
Frequency Range	900MHz ~ 930MHz	**Detector Function**	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	902.00	76.2 QP	99.3	-23.1	1.00 H	340	45.9	30.3
2	*902.20	119.3 QP			1.00 H	340	89.0	30.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. “ * “: Fundamental frequency.

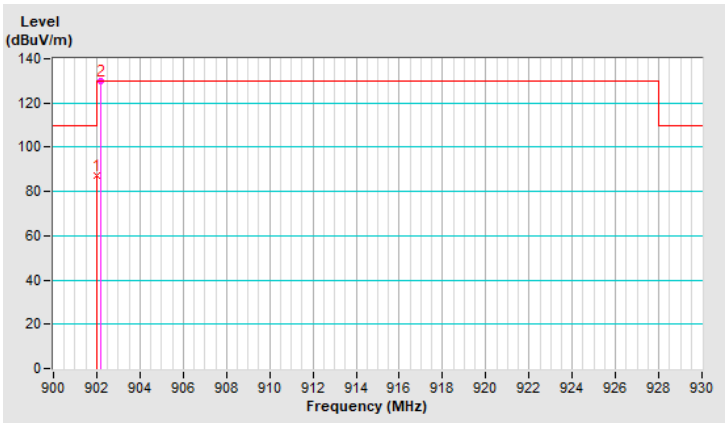


RF Mode	TX LoRa	Channel	CH 0：902.2 MHz
Frequency Range	900MHz ~ 930MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	902.00	87.0 QP	109.8	-22.8	2.31 V	170	56.7	30.3
2	*902.20	129.8 QP			2.31 V	170	99.5	30.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. “ * “: Fundamental frequency.

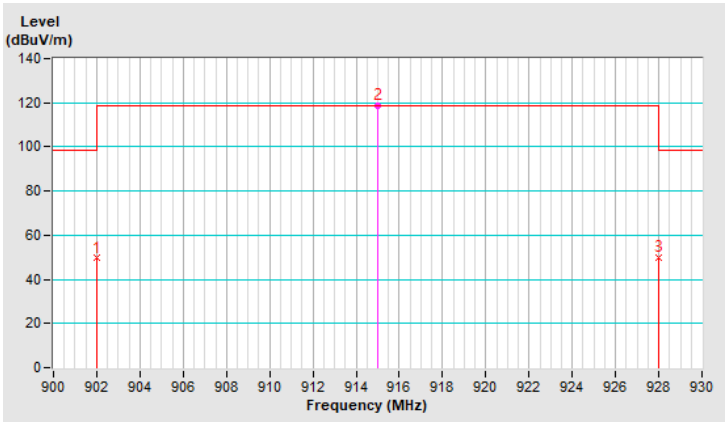


RF Mode	TX LoRa	Channel	CH 64：915 MHz
Frequency Range	900MHz ~ 930MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	902.00	49.7 QP	98.7	-49.0	1.20 H	213	19.4	30.3
2	*915.00	118.7 QP			1.20 H	213	88.0	30.7
3	928.00	49.9 QP	98.7	-48.8	1.20 H	213	19.0	30.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. “ * “: Fundamental frequency.

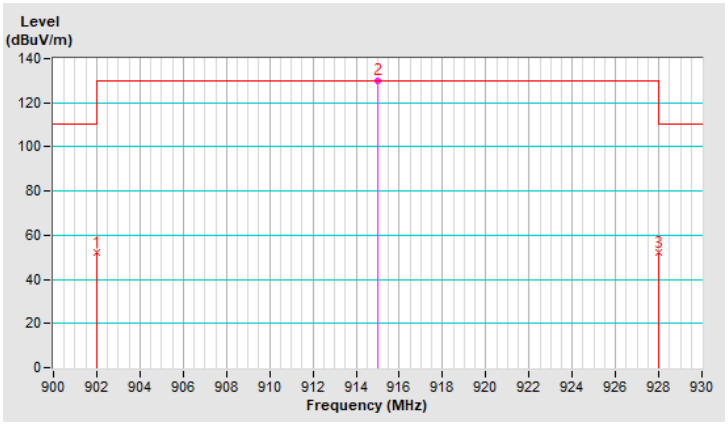


RF Mode	TX LoRa	Channel	CH 64：915 MHz
Frequency Range	900MHz ~ 930MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	902.00	52.2 QP	110.1	-57.9	2.31 V	170	21.9	30.3
2	*915.00	130.1 QP			2.31 V	170	99.4	30.7
3	928.00	52.0 QP	110.1	-58.1	2.31 V	170	21.1	30.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. “ * “: Fundamental frequency.

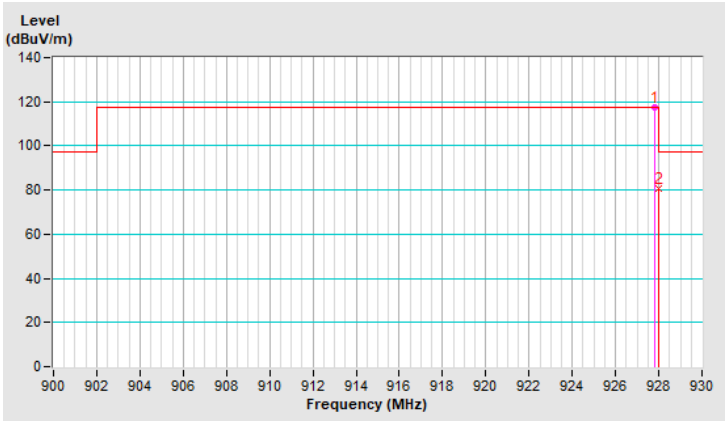


RF Mode	TX LoRa	Channel	CH 128：927.8 MHz
Frequency Range	900MHz ~ 930MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*927.80	117.2 QP			2.20 H	149	86.3	30.9
2	928.00	80.5 QP	97.2	-16.7	2.20 H	149	49.6	30.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. “ * “: Fundamental frequency.

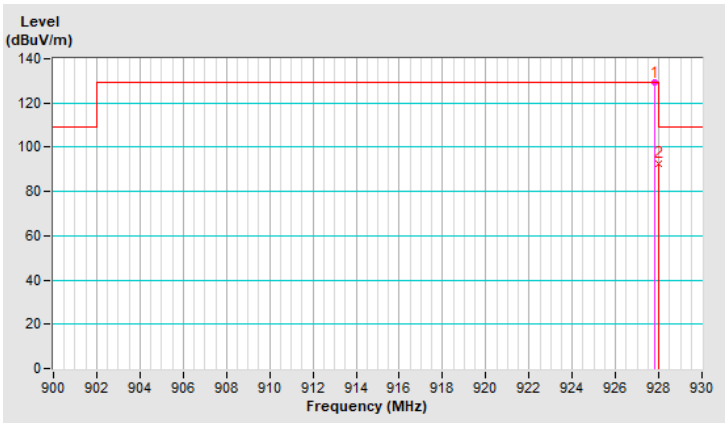


RF Mode	TX LoRa	Channel	CH 128：927.8 MHz
Frequency Range	900MHz ~ 930MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*927.80	129.2 QP			2.23 V	150	98.3	30.9
2	928.00	92.6 QP	109.2	-16.6	2.23 V	150	61.7	30.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. “ * “: Fundamental frequency.



Above 1GHz Data:

RF Mode	TX LoRa	Channel	CH 0：902.2 MHz
Frequency Range	1GHz ~ 10GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2706.60	35.3 PK	74.0	-38.7	1.50 H	216	38.2	-2.9
2	2706.60	24.0 AV	54.0	-30.0	1.50 H	216	26.9	-2.9
3	3608.80	35.3 PK	74.0	-38.7	1.22 H	127	36.6	-1.3
4	3608.80	24.3 AV	54.0	-29.7	1.22 H	127	25.6	-1.3
5	4511.00	35.4 PK	74.0	-38.6	1.60 H	158	35.0	0.4
6	4511.00	24.3 AV	54.0	-29.7	1.60 H	158	23.9	0.4
7	5413.20	37.9 PK	74.0	-36.1	1.75 H	148	36.3	1.6
8	5413.20	26.4 AV	54.0	-27.6	1.75 H	148	24.8	1.6
9	8119.80	43.5 PK	74.0	-30.5	1.68 H	176	35.4	8.1
10	8119.80	31.3 AV	54.0	-22.7	1.68 H	176	23.2	8.1
11	9022.00	44.5 PK	74.0	-29.5	1.72 H	160	36.0	8.5
12	9022.00	33.1 AV	54.0	-20.9	1.72 H	160	24.6	8.5
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2706.60	36.9 PK	74.0	-37.1	1.56 V	148	39.8	-2.9
2	2706.60	30.9 AV	54.0	-23.1	1.56 V	148	33.8	-2.9
3	3608.80	35.3 PK	74.0	-38.7	1.21 V	139	36.6	-1.3
4	3608.80	24.3 AV	54.0	-29.7	1.21 V	139	25.6	-1.3
5	4511.00	35.5 PK	74.0	-38.5	1.42 V	164	35.1	0.4
6	4511.00	24.3 AV	54.0	-29.7	1.42 V	164	23.9	0.4
7	5413.20	38.1 PK	74.0	-35.9	1.43 V	172	36.5	1.6
8	5413.20	26.8 AV	54.0	-27.2	1.43 V	172	25.2	1.6
9	8119.80	44.3 PK	74.0	-29.7	1.99 V	226	36.2	8.1
10	8119.80	33.8 AV	54.0	-20.2	1.99 V	226	25.7	8.1
11	9022.00	45.2 PK	74.0	-28.8	1.42 V	190	36.7	8.5
12	9022.00	34.3 AV	54.0	-19.7	1.42 V	190	25.8	8.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.

RF Mode	TX LoRa	Channel	CH 64：915 MHz
Frequency Range	1GHz ~ 10GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2745.00	35.3 PK	74.0	-38.7	1.52 H	226	38.1	-2.8
2	2745.00	24.5 AV	54.0	-29.5	1.52 H	226	27.3	-2.8
3	3660.00	35.0 PK	74.0	-39.0	1.00 H	146	36.1	-1.1
4	3660.00	24.2 AV	54.0	-29.8	1.00 H	146	25.3	-1.1
5	4575.00	35.4 PK	74.0	-38.6	1.57 H	168	34.9	0.5
6	4575.00	24.3 AV	54.0	-29.7	1.57 H	168	23.8	0.5
7	7320.00	42.1 PK	74.0	-31.9	1.69 H	174	35.4	6.7
8	7320.00	30.5 AV	54.0	-23.5	1.69 H	174	23.8	6.7
9	8235.00	43.6 PK	74.0	-30.4	1.64 H	188	35.8	7.8
10	8235.00	30.9 AV	54.0	-23.1	1.64 H	188	23.1	7.8
11	9150.00	44.4 PK	74.0	-29.6	1.74 H	161	35.3	9.1
12	9150.00	33.4 AV	54.0	-20.6	1.74 H	161	24.3	9.1
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2745.00	38.0 PK	74.0	-36.0	1.50 V	136	40.8	-2.8
2	2745.00	30.7 AV	54.0	-23.3	1.50 V	136	33.5	-2.8
3	3660.00	35.3 PK	74.0	-38.7	1.00 V	154	36.4	-1.1
4	3660.00	24.2 AV	54.0	-29.8	1.00 V	154	25.3	-1.1
5	4575.00	35.1 PK	74.0	-38.9	1.52 V	157	34.6	0.5
6	4575.00	24.3 AV	54.0	-29.7	1.52 V	157	23.8	0.5
7	7320.00	45.5 PK	74.0	-28.5	2.03 V	183	38.8	6.7
8	7320.00	38.0 AV	54.0	-16.0	2.03 V	183	31.3	6.7
9	8235.00	42.9 PK	74.0	-31.1	1.59 V	226	35.1	7.8
10	8235.00	32.2 AV	54.0	-21.8	1.59 V	226	24.4	7.8
11	9150.00	44.7 PK	74.0	-29.3	1.71 V	147	35.6	9.1
12	9150.00	33.6 AV	54.0	-20.4	1.71 V	147	24.5	9.1

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.

RF Mode	TX LoRa	Channel	CH 128：927.8 MHz
Frequency Range	1GHz ~ 10GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2783.40	35.5 PK	74.0	-38.5	1.76 H	231	38.2	-2.7
2	2783.40	24.3 AV	54.0	-29.7	1.76 H	231	27.0	-2.7
3	3711.20	34.9 PK	74.0	-39.1	1.08 H	128	35.9	-1.0
4	3711.20	24.3 AV	54.0	-29.7	1.08 H	128	25.3	-1.0
5	4639.00	35.1 PK	74.0	-38.9	1.46 H	190	34.5	0.6
6	4639.00	24.4 AV	54.0	-29.6	1.46 H	190	23.8	0.6
7	7422.40	41.8 PK	74.0	-32.2	1.53 H	179	34.6	7.2
8	7422.40	30.6 AV	54.0	-23.4	1.53 H	179	23.4	7.2
9	8350.20	43.2 PK	74.0	-30.8	1.70 H	158	36.0	7.2
10	8350.20	30.9 AV	54.0	-23.1	1.70 H	158	23.7	7.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2783.40	37.7 PK	74.0	-36.3	1.46 V	151	40.4	-2.7
2	2783.40	31.7 AV	54.0	-22.3	1.46 V	151	34.4	-2.7
3	3711.20	35.2 PK	74.0	-38.8	1.00 V	155	36.2	-1.0
4	3711.20	24.3 AV	54.0	-29.7	1.00 V	155	25.3	-1.0
5	4639.00	35.7 PK	74.0	-38.3	1.60 V	166	35.1	0.6
6	4639.00	24.4 AV	54.0	-29.6	1.60 V	166	23.8	0.6
7	7422.40	47.2 PK	74.0	-26.8	4.00 V	215	40.0	7.2
8	7422.40	41.4 AV	54.0	-12.6	4.00 V	215	34.2	7.2
9	8350.20	43.1 PK	74.0	-30.9	1.47 V	224	35.9	7.2
10	8350.20	32.0 AV	54.0	-22.0	1.47 V	224	24.8	7.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.

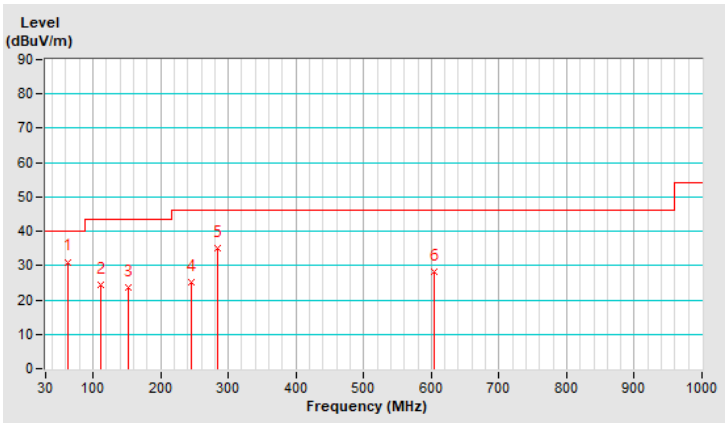
Below 1GHz Data:

RF Mode	TX LoRa	Channel	CH 64：915 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	**63.23**	**31.1 QP**	**40.0**	**-8.9**	**1.00 H**	**64**	**44.4**	**-13.3**
2	111.40	24.5 QP	43.5	-19.0	1.50 H	252	40.0	-15.5
3	152.70	23.5 QP	43.5	-20.0	1.00 H	360	35.8	-12.3
4	246.19	25.0 QP	46.0	-21.0	2.00 H	133	39.0	-14.0
5	283.95	35.2 QP	46.0	-10.8	1.50 H	117	47.5	-12.3
6	604.19	28.2 QP	46.0	-17.8	1.50 H	162	32.7	-4.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

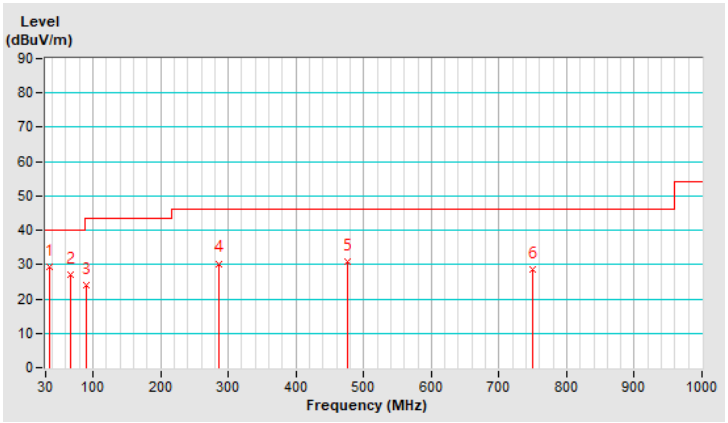


RF Mode	TX LoRa	Channel	CH 64：915 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	35.47	29.4 QP	40.0	-10.6	1.00 V	165	42.8	-13.4
2	66.38	27.1 QP	40.0	-12.9	1.50 V	6	41.0	-13.9
3	89.75	23.9 QP	43.5	-19.6	2.00 V	106	42.3	-18.4
4	286.55	30.3 QP	46.0	-15.7	1.50 V	71	42.6	-12.3
5	477.07	30.9 QP	46.0	-15.1	1.50 V	190	38.6	-7.7
6	750.65	28.7 QP	46.0	-17.3	1.00 V	201	31.3	-2.6

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 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.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
TEST RECEIVER R&S	ESCS 30	847124/029	2021/10/13	2022/10/12
LISN R&S	ESH3-Z5	848773/004	2021/10/29	2022/10/28
50 ohms Terminator NA	50	3	2021/10/27	2022/10/26
RF Coaxial Cable JYEBO	5D-FB	COCCAB-001	2021/9/25	2022/9/24
Fixed attenuator STI	STI02-2200-10	005	2021/8/27	2022/8/26
Software BVADT	BVADT_Cond_V7.3.7.4	NA	NA	NA

Note: 1. The test was performed in Conduction 1.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: 2022/8/6

4.2.3 Test Procedures

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

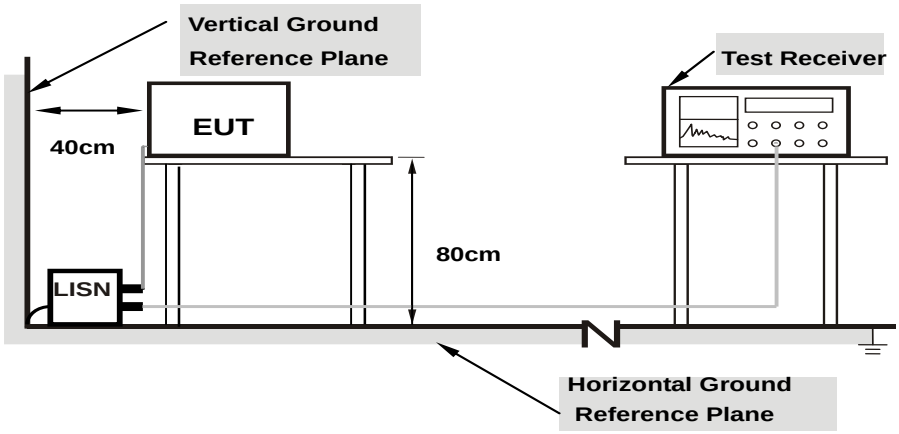
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Conditions

Same as 4.1.6.

4.2.7 Test Results (Mode 1)

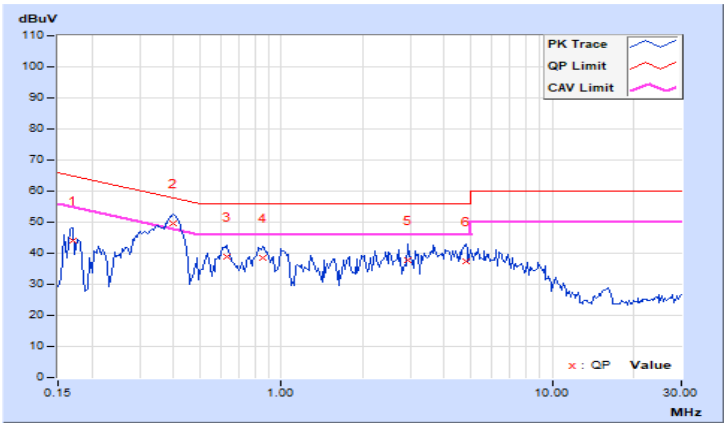
Worst-case data:

RF Mode	TX LoRa	Channel	CH 128：927.8 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	10.05	33.96	24.11	44.01	34.16	64.98	54.98	-20.97	-20.82
2	**0.40000**	**10.07**	**39.45**	**32.01**	**49.52**	**42.08**	**57.85**	**47.85**	**-8.33**	**-5.77**
3	0.62656	10.08	28.91	23.11	38.99	33.19	56.00	46.00	-17.01	-12.81
4	0.85703	10.10	28.36	23.06	38.46	33.16	56.00	46.00	-17.54	-12.84
5	2.94141	10.21	27.72	22.32	37.93	32.53	56.00	46.00	-18.07	-13.47
6	4.79297	10.30	26.93	19.98	37.23	30.28	56.00	46.00	-18.77	-15.72

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

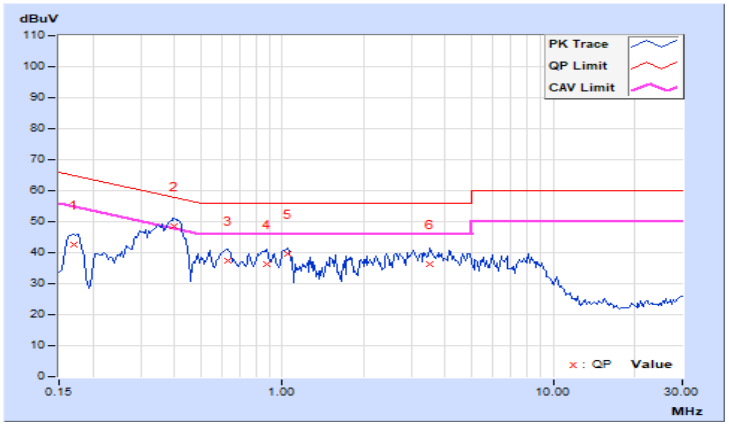


RF Mode	TX LoRa	Channel	CH 128：927.8 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	10.02	32.58	23.23	42.60	33.25	64.98	54.98	-22.38	-21.73
2	0.40000	10.04	38.52	31.08	48.56	41.12	57.85	47.85	-9.29	-6.73
3	0.63438	10.05	27.31	21.01	37.36	31.06	56.00	46.00	-18.64	-14.94
4	0.87656	10.07	26.08	20.58	36.15	30.65	56.00	46.00	-19.85	-15.35
5	1.04297	10.08	29.47	24.39	39.55	34.47	56.00	46.00	-16.45	-11.53
6	3.51953	10.19	25.97	19.29	36.16	29.48	56.00	46.00	-19.84	-16.52

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



4.2.8 Test Results (Mode 2)

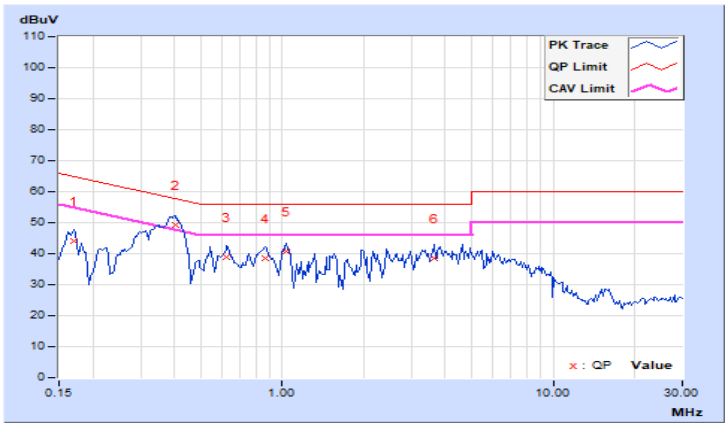
Worst-case data:

RF Mode	TX LoRa	Channel	CH 64：915 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	10.05	33.98	24.33	44.03	34.38	64.98	54.98	-20.95	-20.60
2	0.40391	10.07	39.29	31.81	49.36	41.88	57.77	47.77	-8.41	-5.89
3	0.62266	10.08	28.95	23.33	39.03	33.41	56.00	46.00	-16.97	-12.59
4	0.86094	10.10	28.36	23.18	38.46	33.28	56.00	46.00	-17.54	-12.72
5	1.03516	10.11	30.73	25.63	40.84	35.74	56.00	46.00	-15.16	-10.26
6	3.62500	10.24	28.32	22.38	38.56	32.62	56.00	46.00	-17.44	-13.38

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

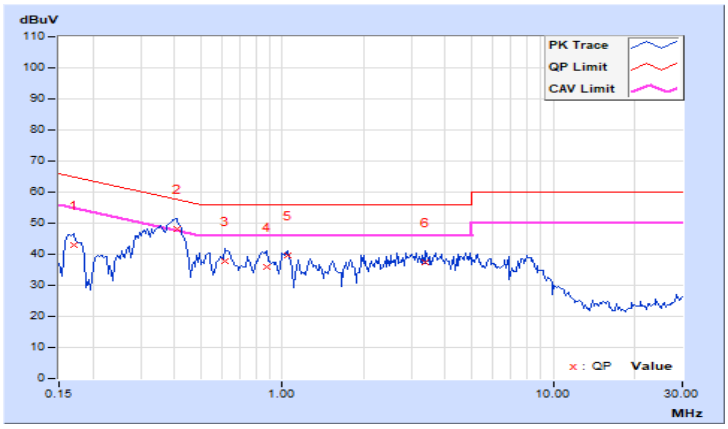


RF Mode	TX LoRa	Channel	CH 64：915 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	10.02	33.11	23.55	43.13	33.57	64.98	54.98	-21.85	-21.41
2	0.40781	10.04	38.28	30.94	48.32	40.98	57.69	47.69	-9.37	-6.71
3	0.61484	10.05	27.72	21.50	37.77	31.55	56.00	46.00	-18.23	-14.45
4	0.88047	10.07	26.04	20.25	36.11	30.32	56.00	46.00	-19.89	-15.68
5	1.04688	10.08	29.59	24.15	39.67	34.23	56.00	46.00	-16.33	-11.77
6	3.37891	10.19	27.05	20.89	37.24	31.08	56.00	46.00	-18.76	-14.92

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

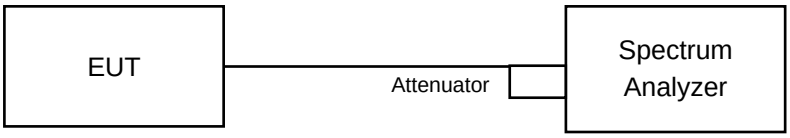


4.3 Number of Hopping Frequency Used

4.3.1 Limits of Hopping Frequency Used Measurement

The 20 dB bandwidth of the hopping channel is less than 250 kHz, at least 50 channels frequencies, and should be equally spaced.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

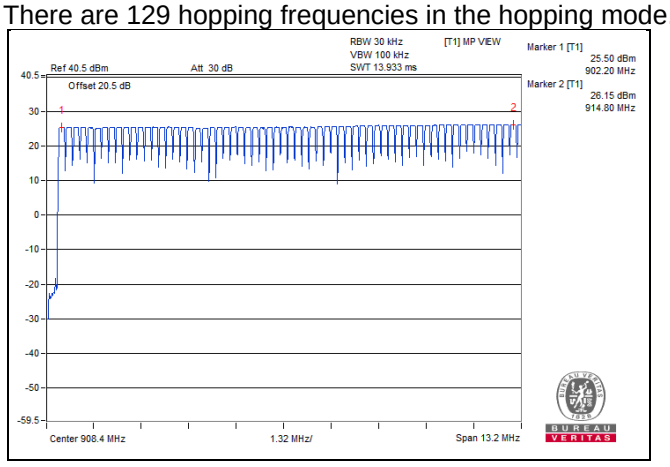
a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
c. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
d. Set the SA on View mode and then plot the result on SA screen.
e. Repeat above procedures until all frequencies measured were complete.

4.3.5 Deviation fromTest Standard

No deviation.

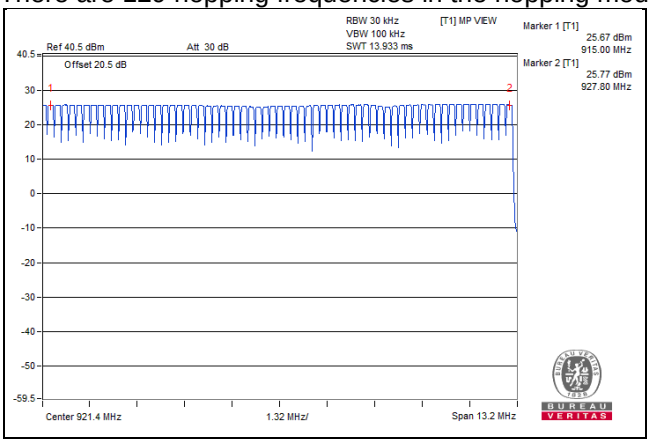
4.3.6 Test Results (Mode 1)

There are 129 hopping frequencies in the hopping mode.



4.3.7 Test Results (Mode 2)

There are 129 hopping frequencies in the hopping mode.

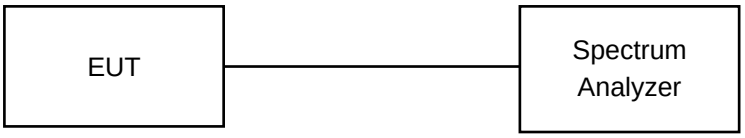


4.4 Dwell Time on Each Channel

4.4.1 Limits of Dwell Time on Each Channel Measurement

The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period. (If the 20 dB bandwidth of the hopping channel is less than 250 kHz)

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
c. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
e. Repeat above procedures until all different time-slot modes have been completed.

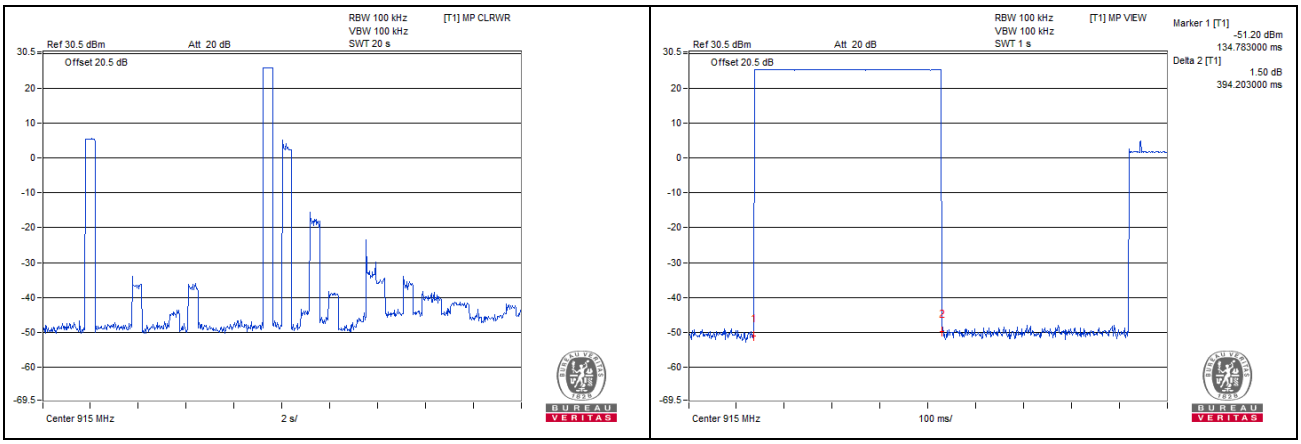
4.4.5 Deviation from Test Standard

No deviation.

4.4.6 Test Results (Mode 1)

Number of transmission in 20 sec	Length of transmission time (msec)	Result (msec)	Limit (msec)
1 time	394.203	394.203	400

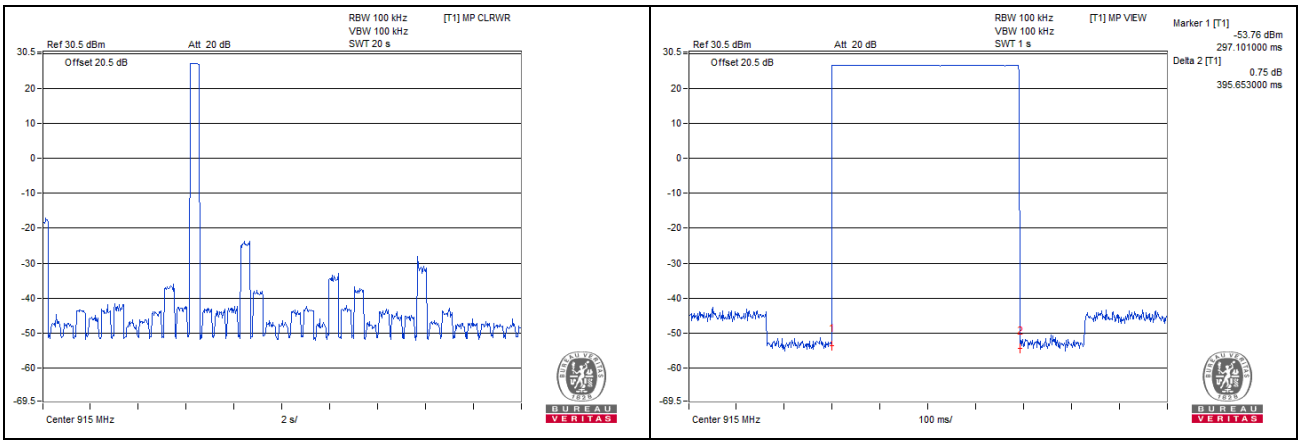
Note: Test plots of the transmitting time slot are shown on following.



4.4.7 Test Results (Mode 2)

Number of transmission in 20 sec	Length of transmission time (msec)	Result (msec)	Limit (msec)
1 time	395.652	395.65	400

Note: Test plots of the transmitting time slot are shown on following.

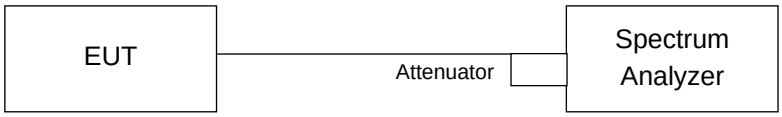


4.5 Channel Bandwidth

4.5.1 Limits of Channel Bandwidth Measurement

The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
d. Repeat above procedures until all frequencies measured were complete.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

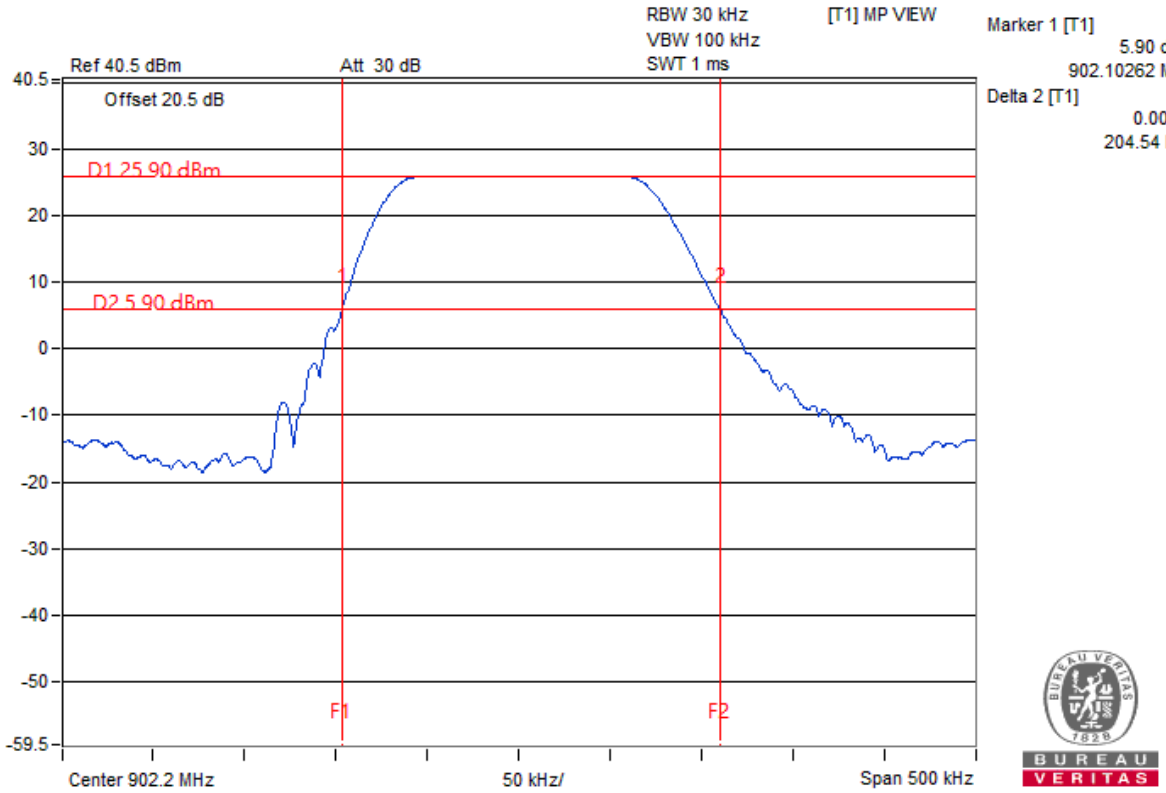
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.5.7 Test Results (Mode 1)

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Maximum Limit (MHz)
0	902.2	0.204	0.5
64	915	0.202	0.5
128	927.8	0.203	0.5

Spectrum Plot of Worst Value

CH 0

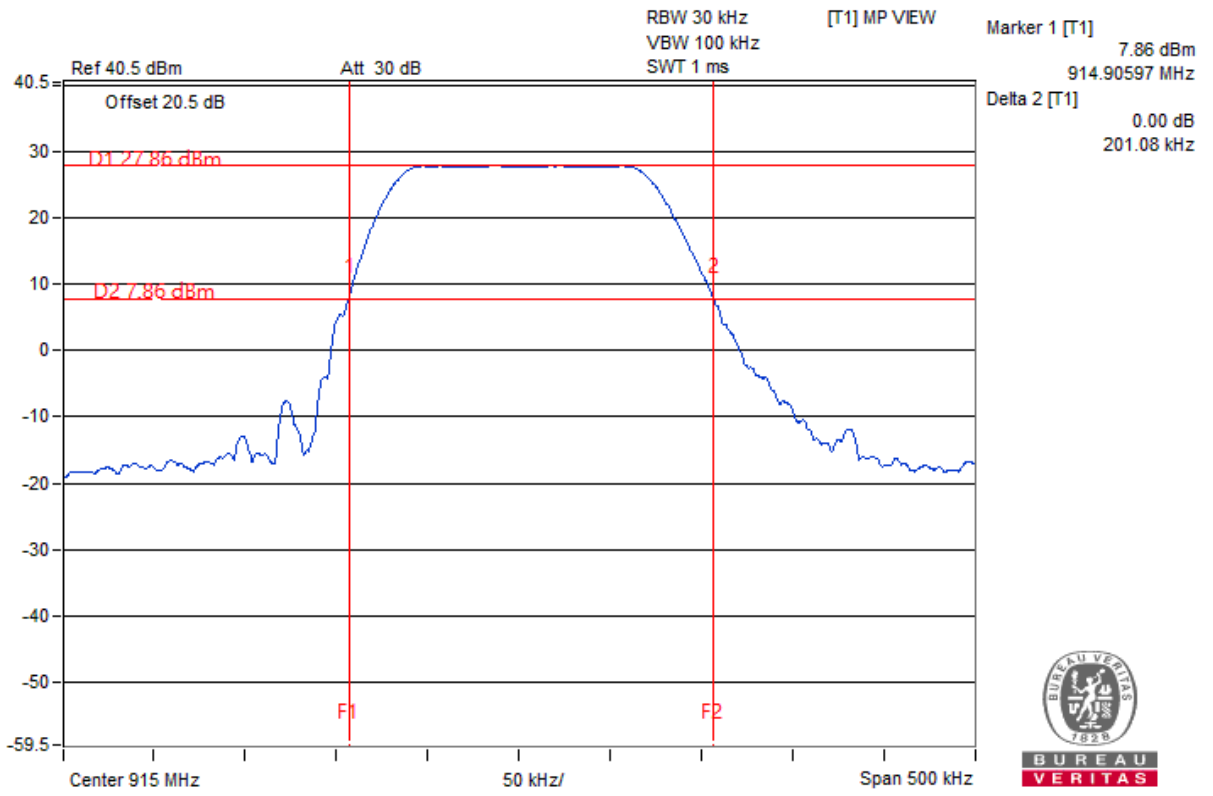


4.5.8 Test Results (Mode 2)

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Maximum Limit (MHz)
0	902.2	0.2	0.5
64	915	0.201	0.5
128	927.8	0.201	0.5

Spectrum Plot of Worst Value

CH 64

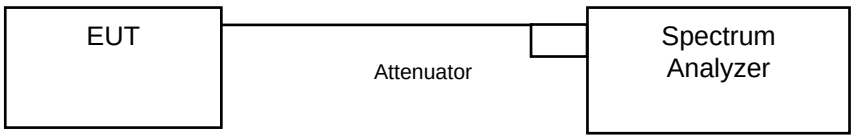


4.6 Hopping Channel Separation

4.6.1 Limits of Hopping Channel Separation Measurement

At least 25kHz or 20dB hopping channel bandwidth (whichever is greater).

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

Measurement Procedure REF

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.

c. By using the MaxHold function record the separation of two adjacent channels.

d. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.

e. Repeat above procedures until all frequencies measured were complete.

4.6.5 Deviation from Test Standard

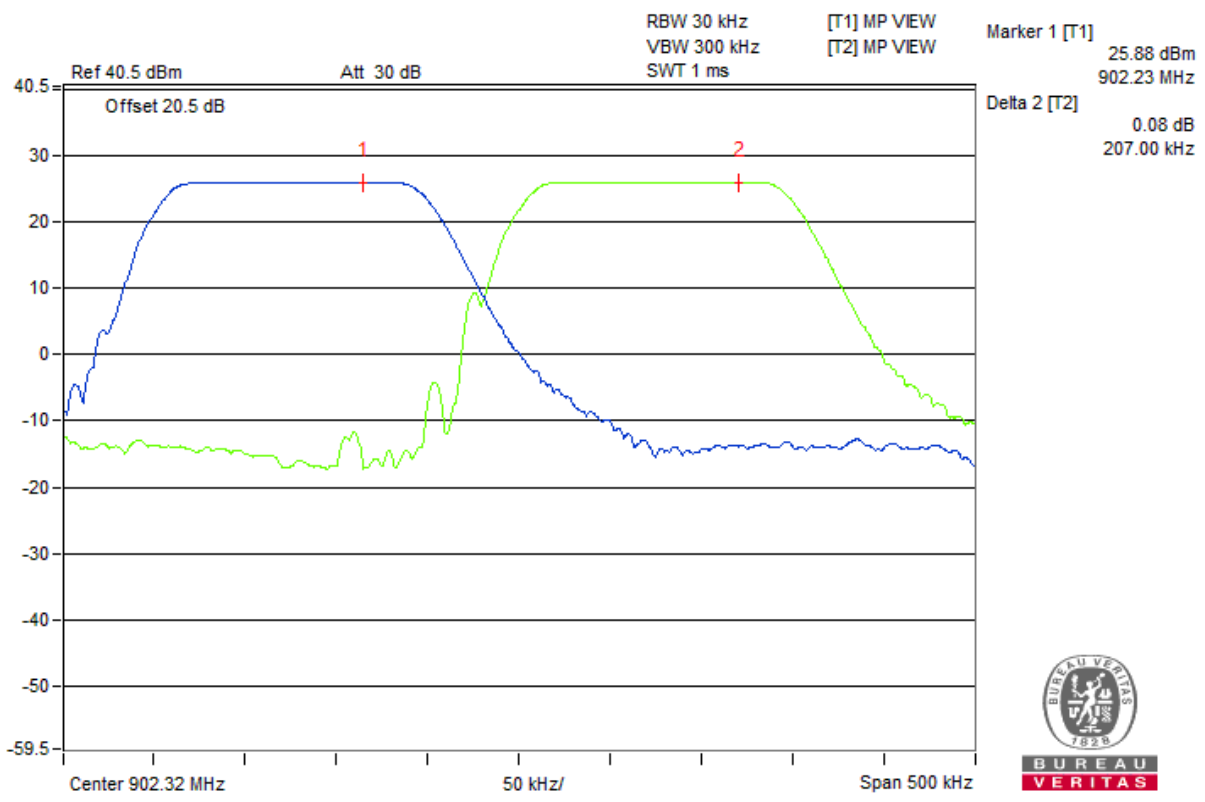
No deviation.

4.6.6 Test Results (Mode 1)

Channel	Frequency (MHz)	Adjacent Channel Separation (MHz)	20dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
0	902.2	0.207	0.204	0.204	Pass
64	915	0.203	0.202	0.202	Pass
128	927.8	0.204	0.203	0.203	Pass

Spectrum Plot of Worst Value

CH 0

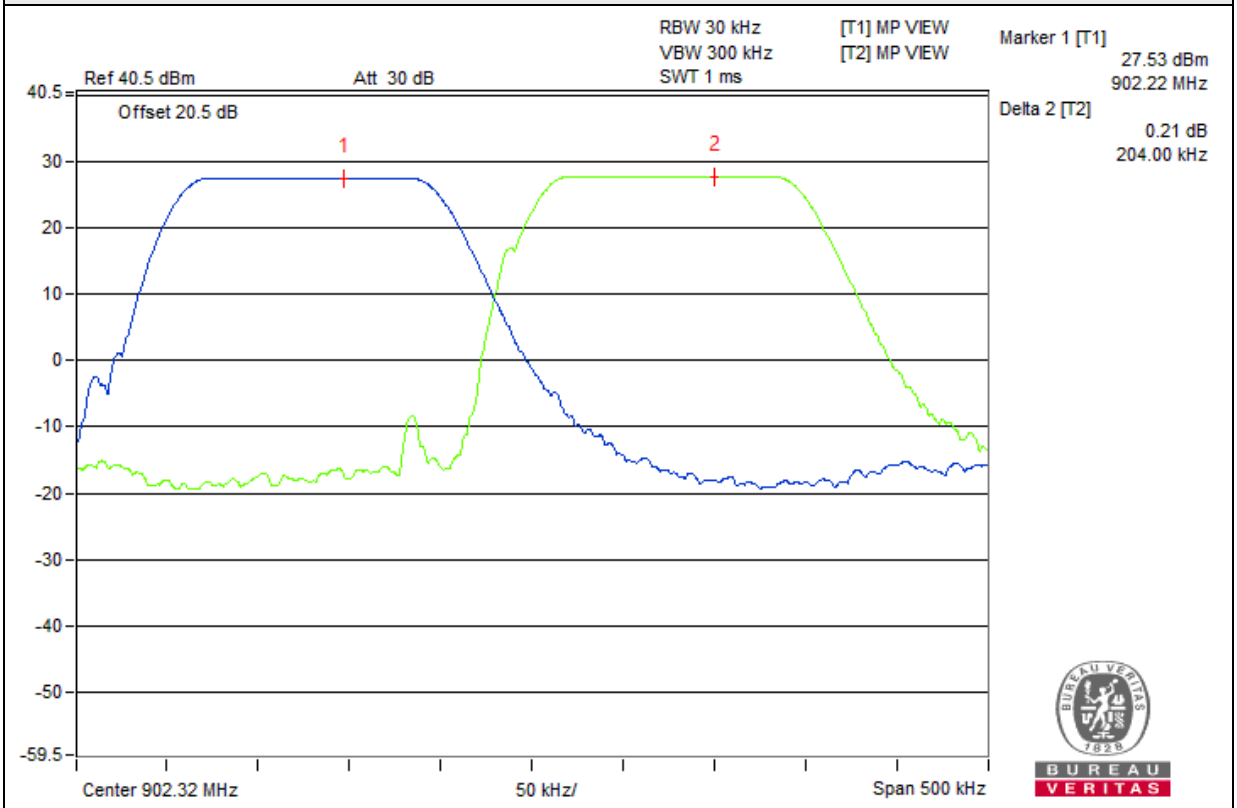


4.6.7 Test Results (Mode 2)

Channel	Frequency (MHz)	Adjacent Channel Separation (MHz)	20dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
0	902.2	0.204	0.2	0.2	Pass
64	915	0.202	0.201	0.201	Pass
128	927.8	0.202	0.201	0.201	Pass

Spectrum Plot of Worst Value

CH 0

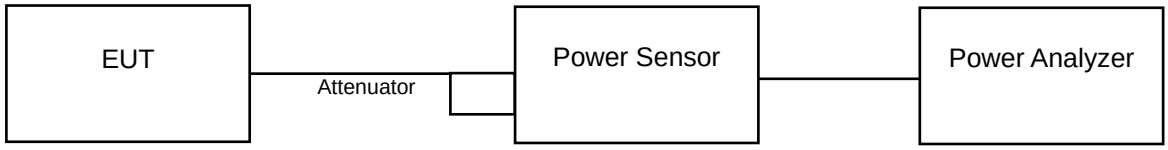


4.7 Conducted Output Power Measurement

4.7.1 Limits of Conducted Output Power Measurement

For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

For Peak Power
A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

For Average Power
Average power sensor was 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. Duty factor is not added to measured value.

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.7.7 Test Results (Mode 1)

FOR PEAK POWER

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Pass / Fail
0	902.2	389.942	25.91	30	Pass
64	915	457.088	26.60	30	Pass
128	927.8	483.059	26.84	30	Pass

FOR AVERAGE POWER

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
0	902.2	388.15	25.89
64	915	453.942	26.57
128	927.8	479.733	26.81

4.7.8 Test Results (Mode 2)

FOR PEAK POWER

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Pass / Fail
0	902.2	522.396	27.18	30	Pass
64	915	610.942	27.86	30	Pass
128	927.8	609.537	27.85	30	Pass

FOR AVERAGE POWER

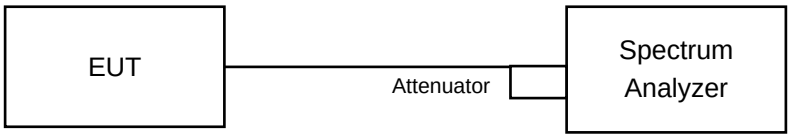
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
0	902.2	518.8	27.15
64	915	606.736	27.83
128	927.8	603.949	27.81

4.8 Conducted Out of Band Emission Measurement

4.8.1 Limits of Conducted Out Of Band Emission Measurement

Below 20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.8.2 Test Setup



4.8.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.8.4 Test Procedure

Measurement Procedure REF

a. Set the RBW = 100 kHz.
b. Set the VBW ≥ 300 kHz.
c. Detector = peak.
d. Sweep time = auto couple.
e. Trace mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

Measurement Procedure OOBE

a. Set RBW = 100 kHz.
b. Set VBW ≥ 300 kHz.
c. Detector = peak.
d. Sweep = auto couple.
e. Trace Mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum amplitude level.

4.8.5 Deviation from Test Standard

No deviation.

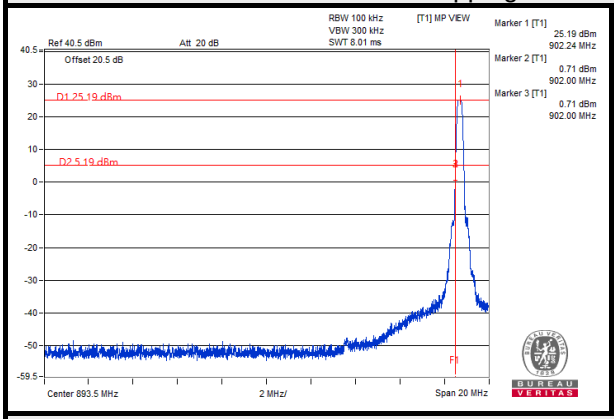
4.8.6 EUT Operating Condition

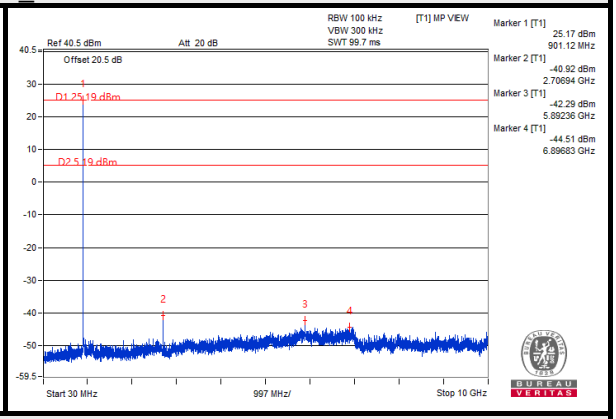
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.8.7 Test Results (Mode 1)

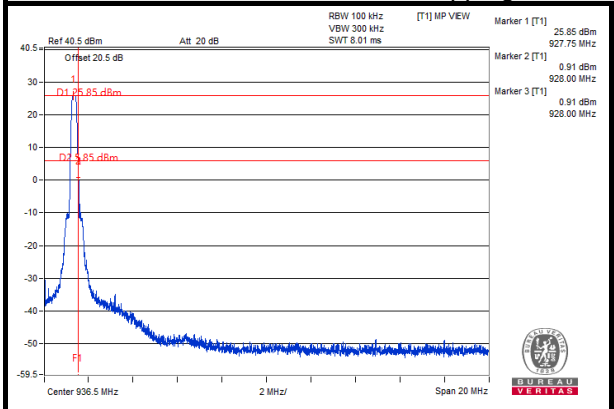
The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

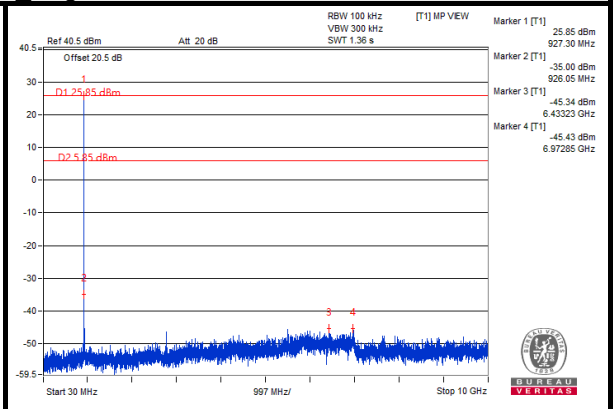
Hopping disabled_ Low Channel



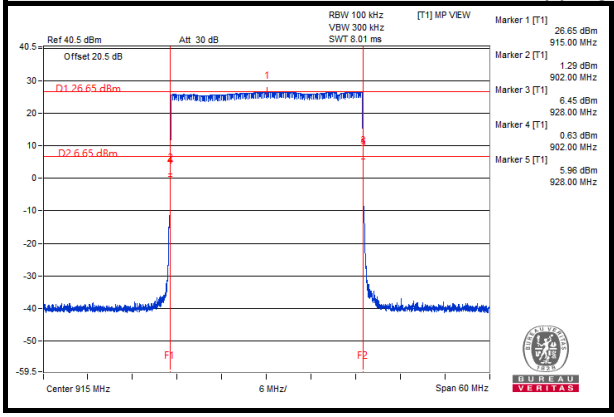


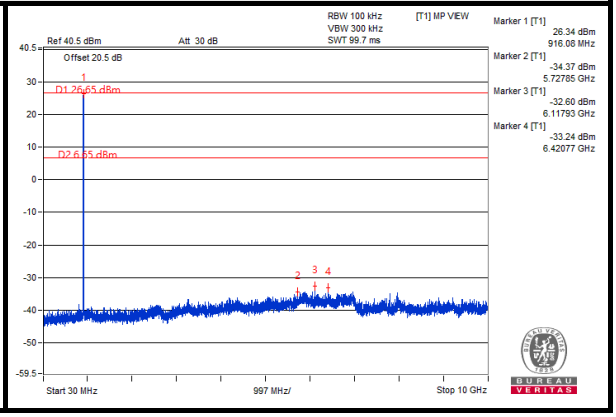
Hopping disabled_ High Channel





Hopping enabled

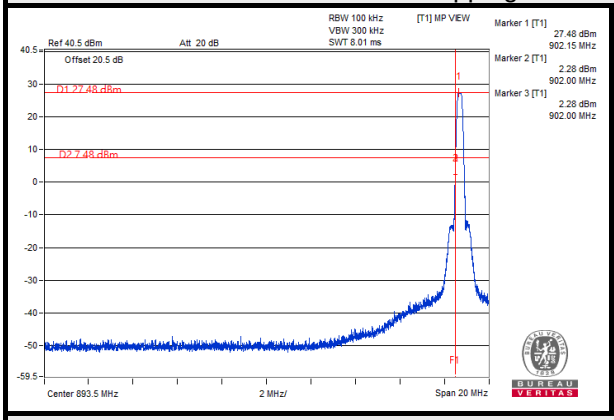


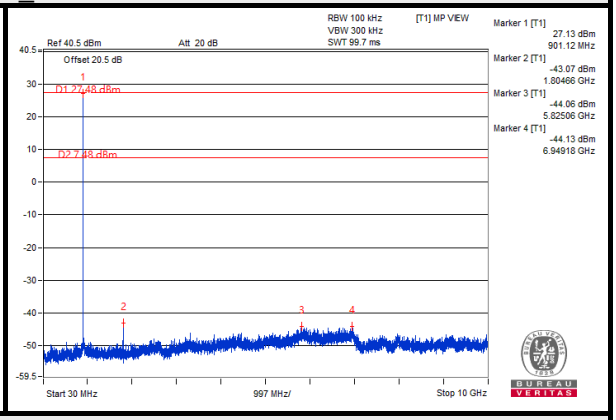


4.8.8 Test Results (Mode 2)

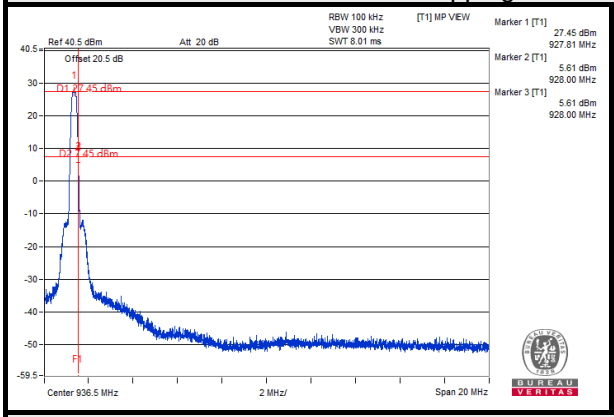
The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

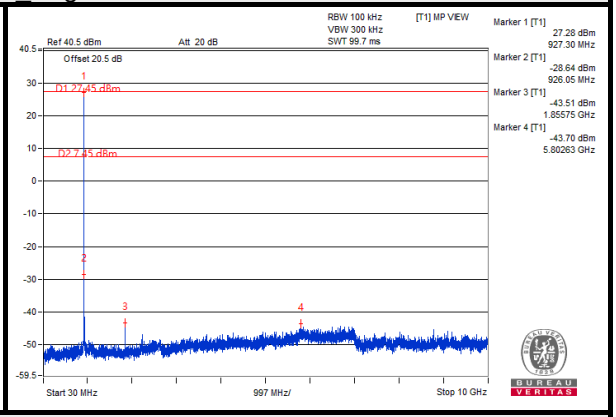
Hopping disabled_ Low Channel



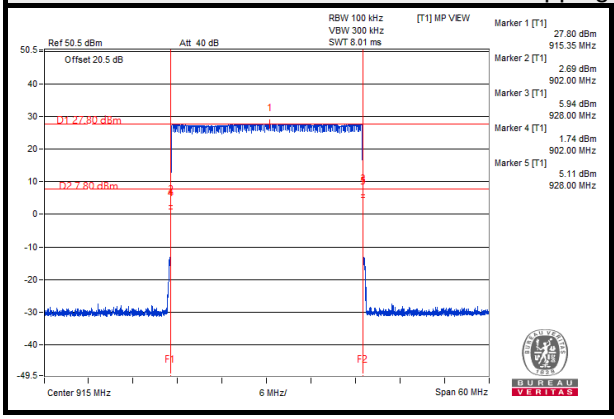


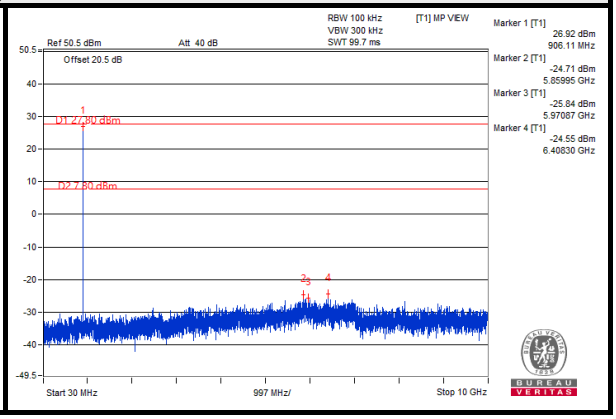
Hopping disabled_ High Channel





Hopping enabled





5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

--- END ---