FCC Test Report

FCC ID	:	**2AX22-VNC0100201**
Equipment	:	**Cattle Rider**
Model No.	:	**VNC-01-00201**
Brand Name	:	**Vence**
Applicant	:	**Vence Corp**
Address	:	**16885 West Bernardo Drive, San Diego, CA 92127**
Standard	:	**47 CFR FCC Part 15.247**
Received Date	:	**Nov. 06, 2020**
Tested Date	:	**Dec. 01, 2020 ~ Jan. 07, 2021**

We, International Certification Corporation, would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by: **Approved by:**

Along Chen / Assistant Manager **Gary Chang / Manager**

Testing Laboratory 2732

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Release Record

Report No.	Version	Description	Issued Date
FR0N0603AH	Rev. 01	Initial issue	Mar. 26, 2021

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	Note	N/A
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 2709.00MHz 45.93 (Margin -8.07dB) - AV	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 21.22	Pass
15.247(a)(2)	6dB Bandwidth	Meet the requirement of limit	Pass
15.247(e)	Power Spectral Density	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass
Note: The EUT consumes power from battery, so the test is not required.			

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information					
Frequency Range (MHz)	**Ch. Freq. (MHz)**	**Channel Number**	**Physical bit rate (bit/sec)**	**Spread Factor**	**Channel Bandwidth (kHz)**
902 ~ 928	903 ~ 914.2	65 ~ 72 [8]	7000	SF8	500
Note 1: RF output power specifies that Maximum Conducted (Average) Output Power. Note 2: The device uses Lora modulation.					

1.1.2 Antenna Details

Ant. No.	Brand	Model	Type	Connector	Gain (dBi)
1	Pulse	Larsen W3012	Chip	N/A	-1.1

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	3.6Vdc

1.1.4 Accessories

N/A

1.1.5 Channel List

Channel	Frequency(MHz)
65	903
66	904.6
67	906.2
68	907.8
69	909.4
70	911
71	912.6
72	914.2

1.1.6 Test Tool and Duty Cycle

Test Tool	cmd, version: 6.1.7601.17514	
Duty Cycle and Duty Factor	Duty Cycle (%)	Duty Factor (dB)
	100%	0

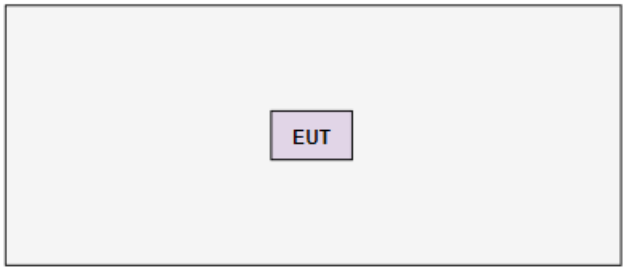
1.1.7 Power Setting

Modulation Mode	Test Frequency (MHz)		
	903	907.8	914.2
CSS	22	22	22

1.2 Local Support Equipment List

Support Equipment List					
No.	**Equipment**	**Brand**	**Model**	**FCC ID**	**Signal cable / Length (m)**
1	Notebook	DELL	Latitude E5470	DoC	---
2	USB console	FTDI	TTL-232R-3V3	---	Provided by applicant.

1.3 Test Setup Chart

Test Setup Diagram


Note: The notebook & USB console are disconnected from EUT and removed from test table after sending command from notebook to control EUT to transmit continuously.

1.4 The Equipment List

Test Item	Radiated Emission				
Test Site	966 chamber 3 / (03CH03-WS)				
Tested Date	Dec. 01, 2020				
Instrument	**Brand**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101499	Jan. 09, 2020	Jan. 08, 2021
Receiver	R&S	ESR3	101657	Feb. 14, 2020	Feb. 13, 2021
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Apr. 29, 2020	Apr. 28, 2021
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1095	Sep. 25, 2020	Sep. 24, 2021
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 17, 2020	Nov. 16, 2021
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 06, 2020	Oct. 05, 2021
Preamplifier	EMC	EMC02325	980187	Aug. 05, 2020	Aug. 04, 2021
Preamplifier	Agilent	83017A	MY39501309	Sep. 02, 2020	Sep. 01, 2021
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/**4**	Sep. 26, 2020	Sep. 25, 2021
RF cable-8M	EMC	EMC104-SM-SM-8000	181107	Sep. 26, 2020	Sep. 25, 2021
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Sep. 26, 2020	Sep. 25, 2021
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800-001	Sep. 26, 2020	Sep. 25, 2021
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Sep. 26, 2020	Sep. 25, 2021
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Sep. 26, 2020	Sep. 25, 2021
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Tested Date	Jan. 07, 2021				
Instrument	**Brand**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101063	Apr. 30, 2020	Apr. 29, 2021
Spectrum Analyzer	R&**S**	FSV40	101499	Jan. 09, 2020	Jan. 08, 2021
TEMP&HUMIDITY CHAMBER	GIANT FORCE	GCT-225-40-SP-SD	MAF1212-002	May. 06, 2020	May. 05, 2021
Power Meter	Anritsu	ML2495A	1241002	Nov. 04, 2020	Nov. 03, 2021
Power Sensor	Anritsu	MA2411B	1207366	Nov. 04, 2020	Nov. 03, 2021
Signal Generator	R&S	SMB100A	175727	Jan. 07, 2021	Jan. 06, 2022
DC POWER SOURCE	GW INSTEK	GPC-6030D	GES855395	Nov. 09, 2020	Nov. 08, 2021
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

47 CFR FCC Part 15.247
ANSI C63.10-2013

1.6 Reference Guidance

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

1.7 Deviation from Test Standard and Measurement Procedure

None

1.8 Measurement Uncertainty

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Measurement Uncertainty	
Parameters	**Uncertainty**
Bandwidth	±34.130 Hz
Conducted power	±0.808 dB
Power density	±0.583 dB
Radiated emission ≤ 1GHz	±3.96 dB
Radiated emission > 1GHz	±4.51 dB

2 Test Configuration

2.1 Testing Facility

Test Laboratory	International Certification Corporation
Test Site	TH01-WS
Address of Test Site	No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)
Test Site	03CH03-WS
Address of Test Site	No.14-1, Lane 19, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 333, Taiwan (R.O.C.)

- FCC Designation No.: TW0009
- FCC site registration No.: 207696
- ISED#: 10807A
- CAB identifier: TW2732

2.2 The Worst Test Modes and Channel Details

Test item	Test Frequency (MHz)	Channel Bandwidth (kHz)	Modulation / SF	Test Configuration
Conducted Emissions Radiated Emissions >1GHz Maximum Output Power 6dB Bandwidth Power Spectral Density	903 / 907.8 / 914.2	500	Lora / 8	---
Radiated Emissions ≤1GHz	903 / 907.8 / 914.2	500	Lora / 8	---

NOTE:
1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **X-plane** result was found as the worst case and was shown in this report.

3 Transmitter Test Results

3.1 6dB and Occupied Bandwidth

3.1.1 Limit of 6dB Bandwidth

The minimum 6dB bandwidth shall be at least 500 kHz.

3.1.2 Test Procedures

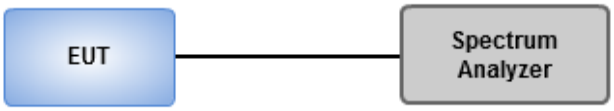
6dB Bandwidth

1. Set resolution bandwidth (RBW) = 100 kHz, Video bandwidth = 300 kHz.
2. Detector = Peak, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6dB relative to the maximum level measured in the fundamental emission.

Occupied Bandwidth

1. Set resolution bandwidth (RBW) = 10kHz, Video bandwidth = 30kHz.
2. Detector = Sample, Trace mode = max hold.
3 Sweep = auto couple, Allow the trace to stabilize.
4. Use the OBW measurement function of spectrum analyzer to measure the occupied bandwidth.

3.1.3 Test Setup

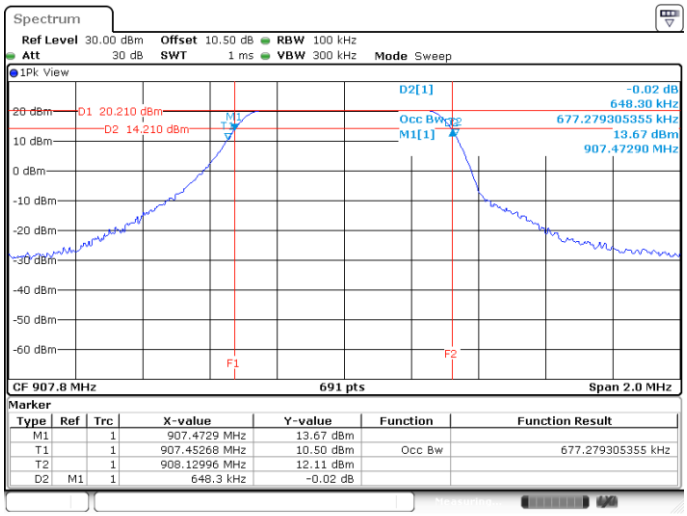


3.1.4 Test Result of 6dB and Occupied Bandwidth

Ambient Condition	22°C / 65%	Tested By	Brad Wu

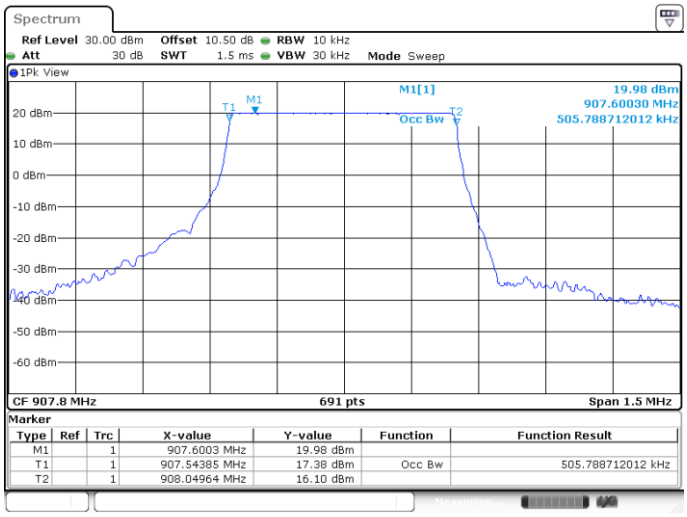
Modulation / SF	Freq. (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Lora / 8	903	0.643	0.5
Lora / 8	907.8	0.648	0.5
Lora / 8	914.2	0.648	0.5

Worst Plot



Modulation / SF	Freq. (MHz)	99% Occupied Bandwidth (MHz)
Lora / 8	903	0.504
Lora / 8	907.8	0.506
Lora / 8	914.2	0.504

Worst Plot



3.2 RF Output Power

3.2.1 Limit of RF Output Power

Conducted power shall not exceed 1Watt.

☒ Antenna gain <= 6dBi, no any corresponding reduction is in output power limit.

☐ Antenna gain > 6dBi

Transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi

3.2.2 Test Procedures

☐ Maximum Peak Conducted Output Power

☐ **Spectrum analyzer**

1. Set RBW = 1MHz, VBW = 3MHz, Detector = Peak.
2. Sweep time = auto, Trace mode = max hold, Allow trace to fully stabilize.
3. Use the spectrum analyzer channel power measurement function with the band limits set equal to the DTS bandwidth edges.

☐ **Power meter**

1. A broadband Peak RF power meter is used for output power measurement. The video bandwidth of power meter is greater than DTS bandwidth of EUT. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power.

☒ Maximum Conducted Output Power

☒ **Power meter**

1. A broadband Average RF power meter is used for output power measurement. The video bandwidth of power meter is greater than DTS bandwidth of EUT. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power.

3.2.3 Test Setup

3.2.4 Test Result of Maximum Output Power

Ambient Condition	22°C / 65%	Tested By	Brad Wu

Modulation / SF	Freq. (MHz)	Output Power (mW)	Output Power (dBm)	Limit (dBm)
Lora / 8	903	132.4342	21.22	30
Lora / 8	907.8	129.1219	21.11	30
Lora / 8	914.2	124.7384	20.96	30

3.3 Power Spectral Density

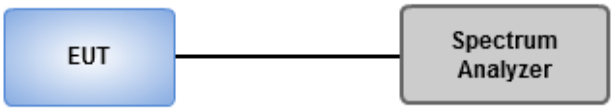
3.3.1 Limit of Power Spectral Density

Power spectral density shall not be greater than 8 dBm in any 3 kHz band.

3.3.2 Test Procedures

1. Set the RBW = 3kHz, VBW = 10 kHz.
2. Detector = RMS, Sweep time = auto couple.
3. Employ trace averaging (RMS) mode over a minimum of 100 traces
4. Use the peak marker function to determine the maximum amplitude level.

3.3.3 Test Setup

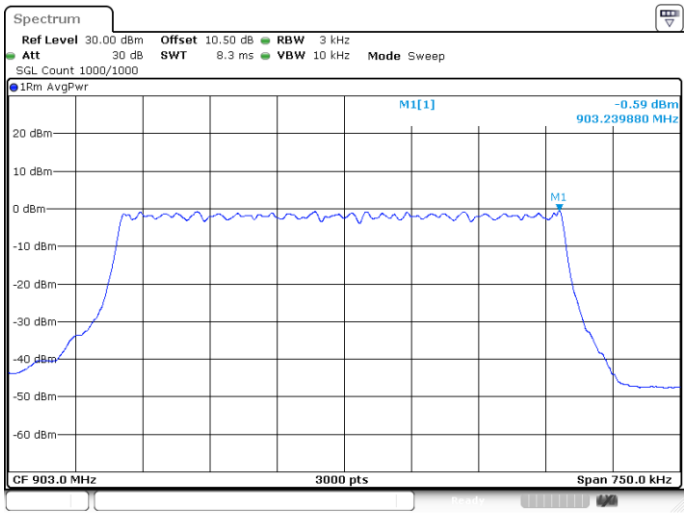


3.3.4 Test Result of Power Spectral Density

Ambient Condition	22°C / 65%	Tested By	Brad Wu

Modulation / SF	Freq. (MHz)	Total Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
Lora / 8	903	-0.59	8.00
Lora / 8	907.8	-0.81	8.00
Lora / 8	914.2	-1.30	8.00

Worst Plot



3.4 Unwanted Emissions into Restricted Frequency Bands

3.4.1 Limit of Unwanted Emissions into Restricted Frequency Bands

Restricted Band Emissions Limit			
Frequency Range (MHz)	**Field Strength (uV/m)**	**Field Strength (dBuV/m)**	**Measure Distance (m)**
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:
Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit
Note 2:
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

3.4.2 Test Procedures

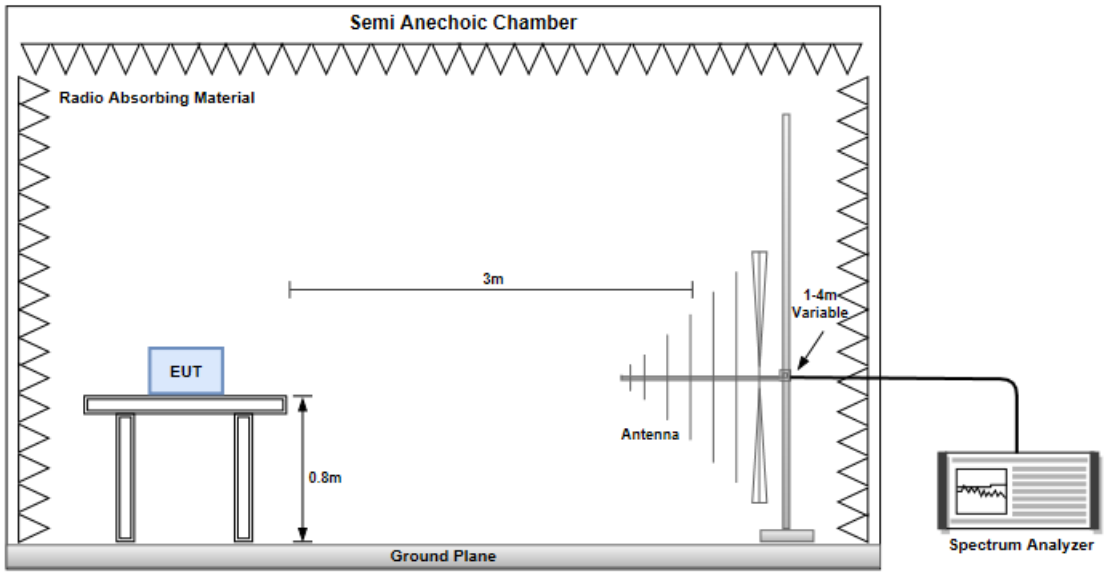
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

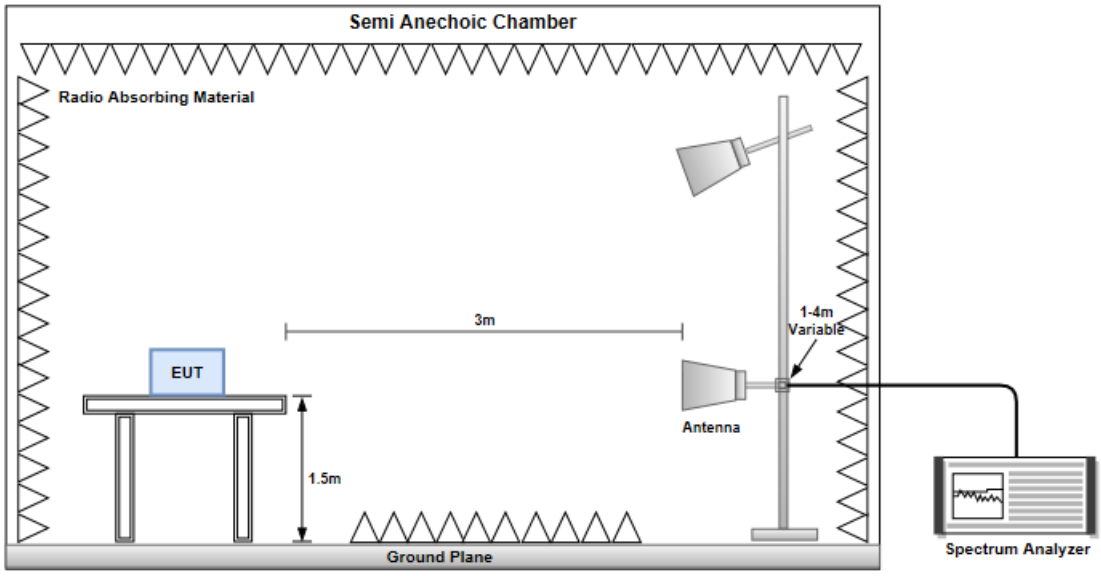
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

3.4.3 Test Setup

Radiated Emissions below 1 GHz



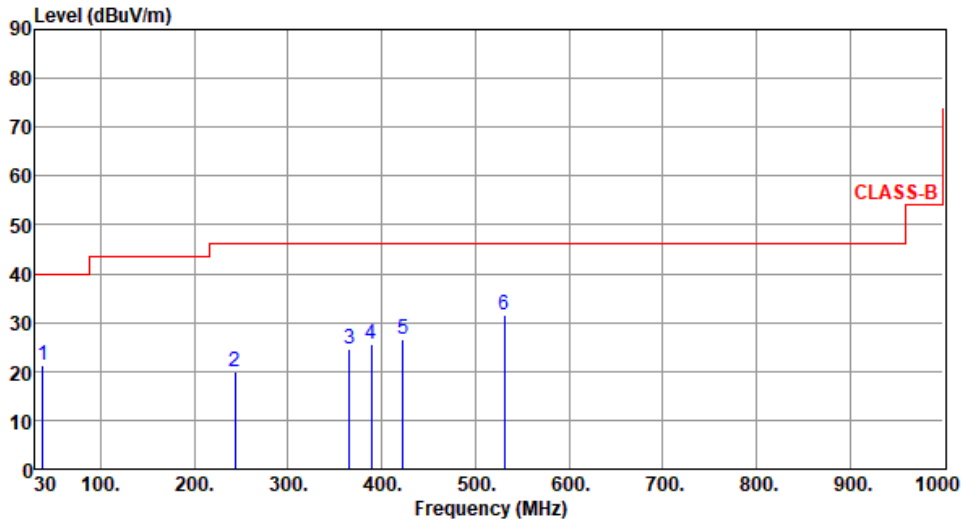
Radiated Emissions above 1 GHz



3.4.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation / SF	Lora / 8	Test Freq. (MHz)	903
Polarization	Horizontal		

Test By :BRAD WU Temperature(℃):22 Humidity(%):65

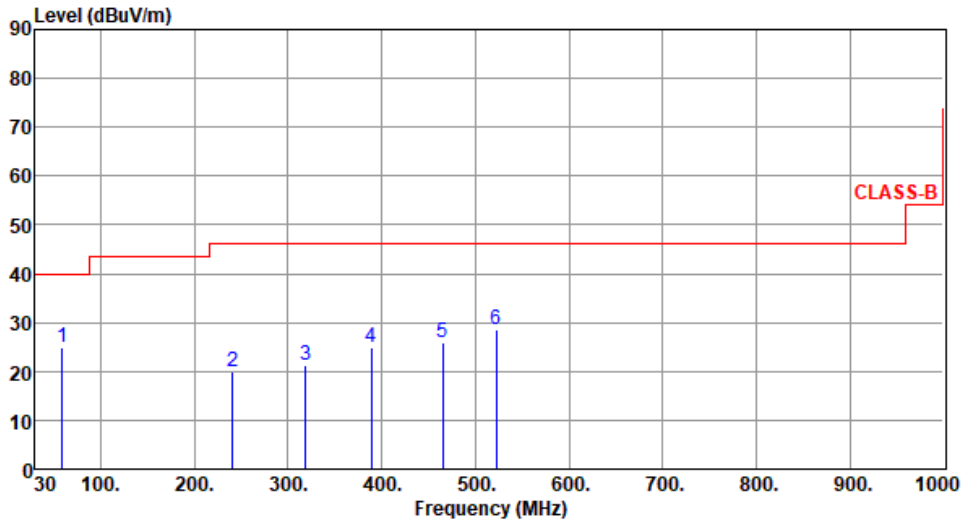


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	38.28	21.14	40.00	-18.86	30.20	-9.06	Peak	---	---
2	243.20	19.77	46.00	-26.23	30.23	-10.46	Peak	---	---
3	365.60	24.66	46.00	-21.34	31.47	-6.81	Peak	---	---
4	388.80	25.59	46.00	-20.41	31.67	-6.08	Peak	---	---
5	422.40	26.62	46.00	-19.38	31.74	-5.12	Peak	---	---
6	531.20	31.71	46.00	-14.29	34.42	-2.71	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Modulation / SF	Lora / 8	Test Freq. (MHz)	903
Polarization	Vertical		

Test By :BRAD WU Temperature(℃):22 Humidity(%):65

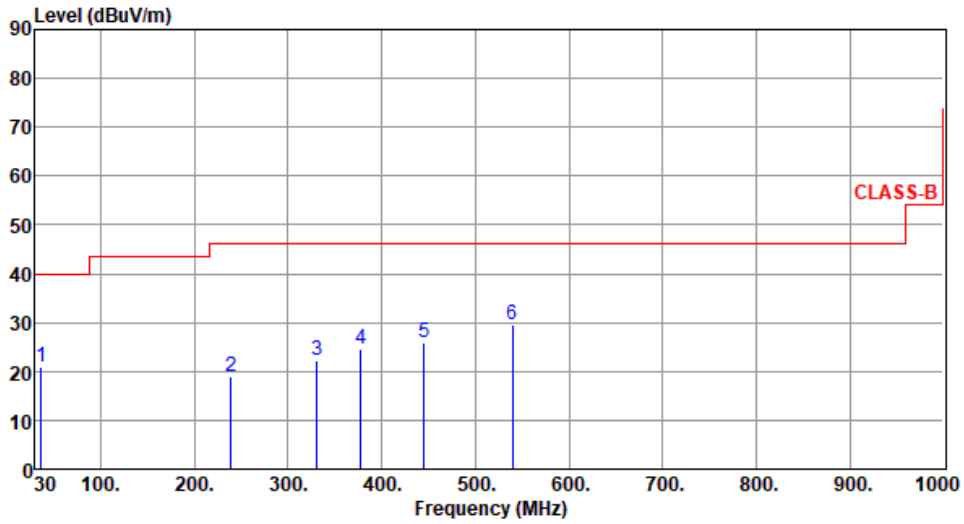


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	58.65	25.06	40.00	-14.94	34.25	-9.19	Peak	---	---
2	240.80	20.02	46.00	-25.98	30.58	-10.56	Peak	---	---
3	319.20	21.24	46.00	-24.76	29.21	-7.97	Peak	---	---
4	388.80	24.82	46.00	-21.18	30.90	-6.08	Peak	---	---
5	465.60	25.85	46.00	-20.15	29.59	-3.74	Peak	---	---
6	522.40	28.44	46.00	-17.56	31.18	-2.74	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Modulation / SF	Lora / 8	Test Freq. (MHz)	907.8
Polarization	Horizontal		

Test By :BRAD WU Temperature(℃):22 Humidity(%):65

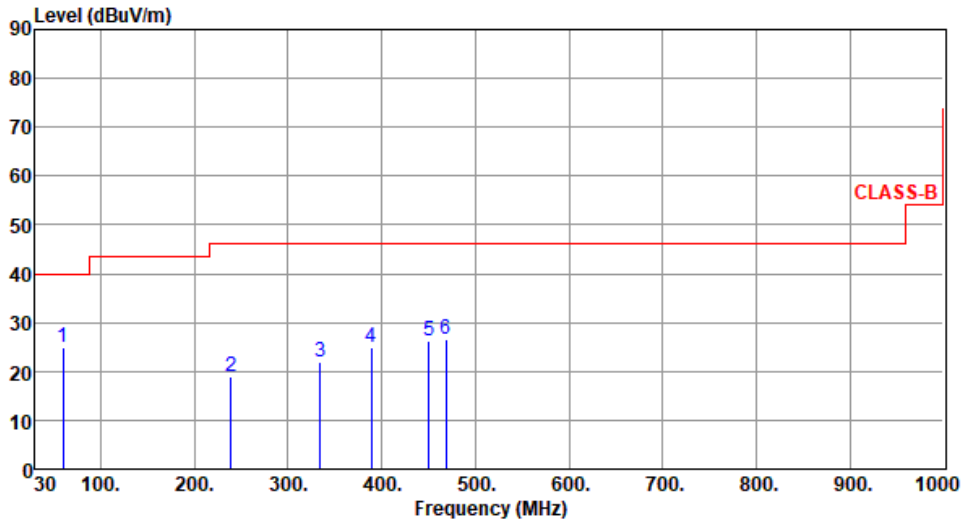


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	36.22	20.88	40.00	-19.12	30.52	-9.64	Peak	---	---
2	239.20	18.96	46.00	-27.04	29.62	-10.66	Peak	---	---
3	331.20	22.23	46.00	-23.77	29.64	-7.41	Peak	---	---
4	377.60	24.44	46.00	-21.56	30.83	-6.39	Peak	---	---
5	445.60	26.05	46.00	-19.95	29.99	-3.94	Peak	---	---
6	540.00	29.71	46.00	-16.29	32.43	-2.72	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Modulation / SF	Lora / 8	Test Freq. (MHz)	907.8
Polarization	Vertical		

Test By :BRAD WU Temperature(℃):22 Humidity(%):65

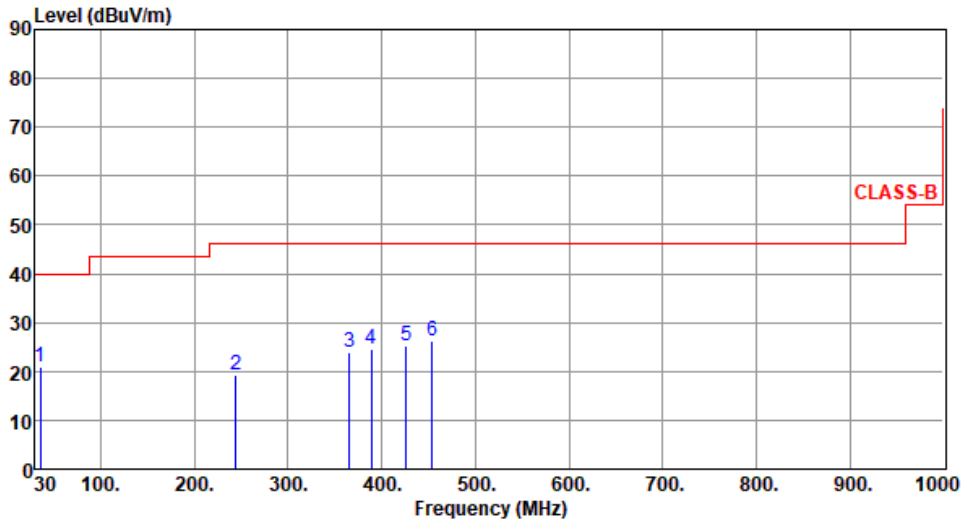


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	59.46	24.98	40.00	-15.02	34.17	-9.19	Peak	---	---
2	239.20	18.93	46.00	-27.07	29.59	-10.66	Peak	---	---
3	334.40	21.94	46.00	-24.06	29.26	-7.32	Peak	---	---
4	388.80	24.91	46.00	-21.09	30.99	-6.08	Peak	---	---
5	450.40	26.21	46.00	-19.79	30.29	-4.08	Peak	---	---
6	468.80	26.52	46.00	-19.48	30.19	-3.67	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Modulation / SF	Lora / 8	Test Freq. (MHz)	914.2
Polarization	Horizontal		

Test By :BRAD WU Temperature(℃):22 Humidity(%):65

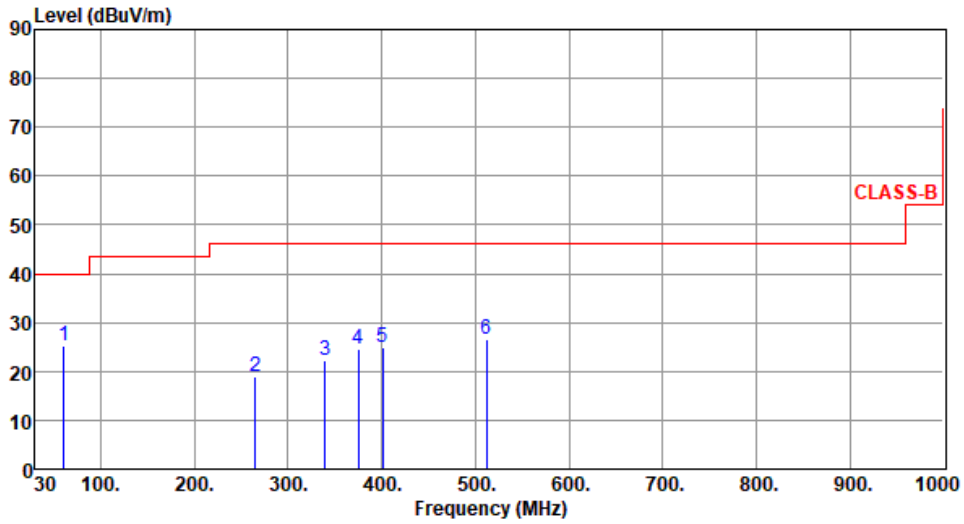


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	35.92	20.94	40.00	-19.06	30.55	-9.61	Peak	---	---
2	244.00	19.36	46.00	-26.64	29.79	-10.43	Peak	---	---
3	365.60	23.94	46.00	-22.06	30.75	-6.81	Peak	---	---
4	388.80	24.58	46.00	-21.42	30.66	-6.08	Peak	---	---
5	426.40	25.13	46.00	-20.87	30.11	-4.98	Peak	---	---
6	453.60	26.25	46.00	-19.75	30.27	-4.02	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Modulation / SF	Lora / 8	Test Freq. (MHz)	914.2
Polarization	Vertical		

Test By :BRAD WU Temperature(℃):22 Humidity(%):65



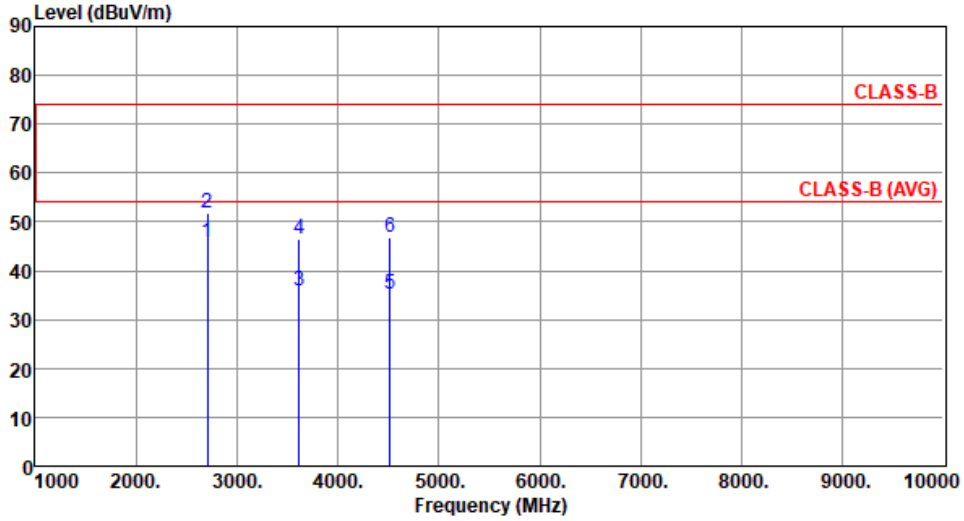
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	60.28	25.35	40.00	-14.65	34.62	-9.27	Peak	---	---
2	264.80	19.06	46.00	-26.94	28.82	-9.76	Peak	---	---
3	339.20	22.10	46.00	-23.90	29.37	-7.27	Peak	---	---
4	375.20	24.53	46.00	-21.47	31.02	-6.49	Peak	---	---
5	400.80	25.05	46.00	-20.95	30.77	-5.72	Peak	---	---
6	512.00	26.54	46.00	-19.46	29.46	-2.92	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

3.4.5 Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation / SF	Lora / 8	Test Freq. (MHz)	903
Polarization	Horizontal		

Test By :BRAD WU Temperature(℃):22 Humidity(%):65

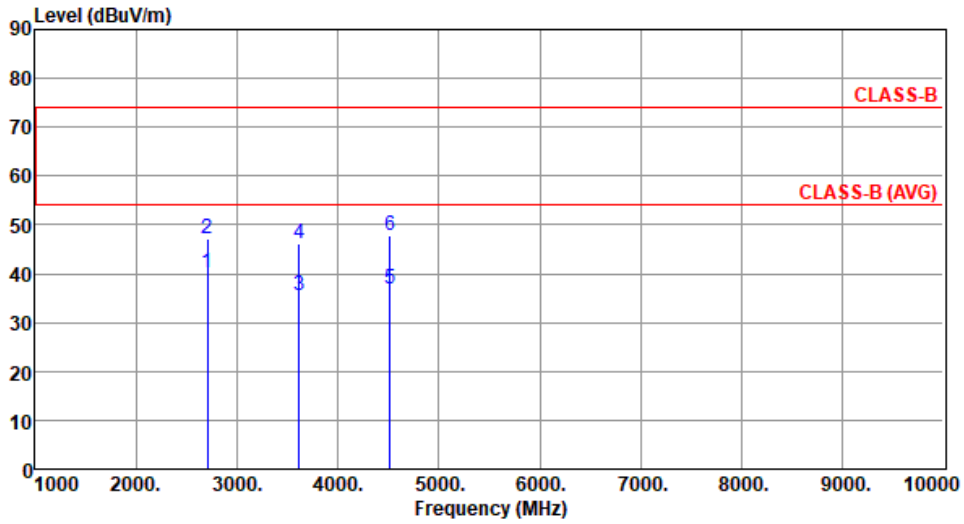


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2709.00	45.93	54.00	-8.07	47.08	-1.15	Average	126	234
2	2709.00	51.89	74.00	-22.11	53.04	-1.15	Peak	126	234
3	3612.00	35.93	54.00	-18.07	34.26	1.67	Average	128	243
4	3612.00	46.39	74.00	-27.61	44.72	1.67	Peak	128	243
5	4515.00	35.31	54.00	-18.69	31.05	4.26	Average	100	236
6	4515.00	46.88	74.00	-27.12	42.62	4.26	Peak	100	236

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation / SF	Lora / 8	Test Freq. (MHz)	903
Polarization	Vertical		

Test By :BRAD WU Temperature(℃):22 Humidity(%):65

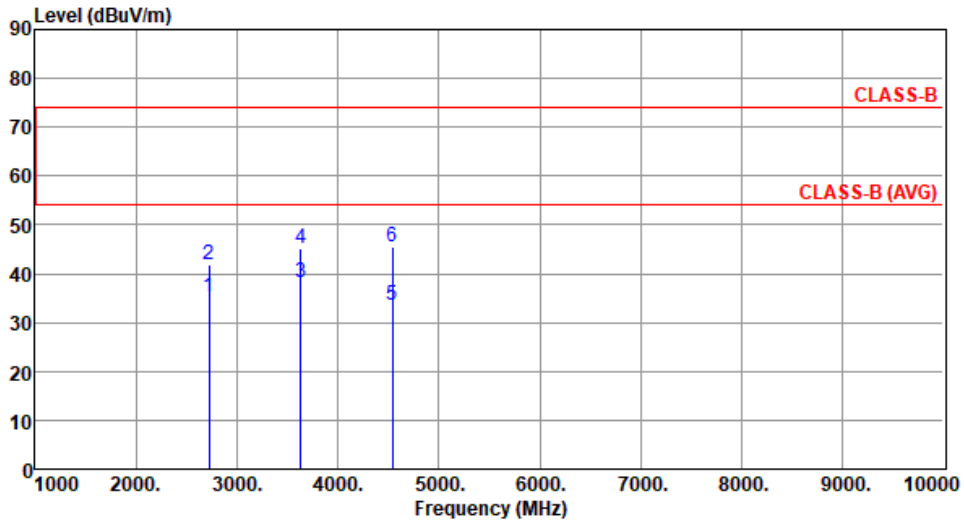


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2709.00	40.13	54.00	-13.87	41.28	-1.15	Average	153	320
2	2709.00	47.26	74.00	-26.74	48.41	-1.15	Peak	153	320
3	3612.00	35.68	54.00	-18.32	34.01	1.67	Average	181	46
4	3612.00	46.12	74.00	-27.88	44.45	1.67	Peak	181	46
5	4515.00	36.83	54.00	-17.17	32.57	4.26	Average	100	163
6	4515.00	47.71	74.00	-26.29	43.45	4.26	Peak	100	163

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation / SF	Lora / 8	Test Freq. (MHz)	907.8
Polarization	Horizontal		

Test By :BRAD WU Temperature(℃):22 Humidity(%):65

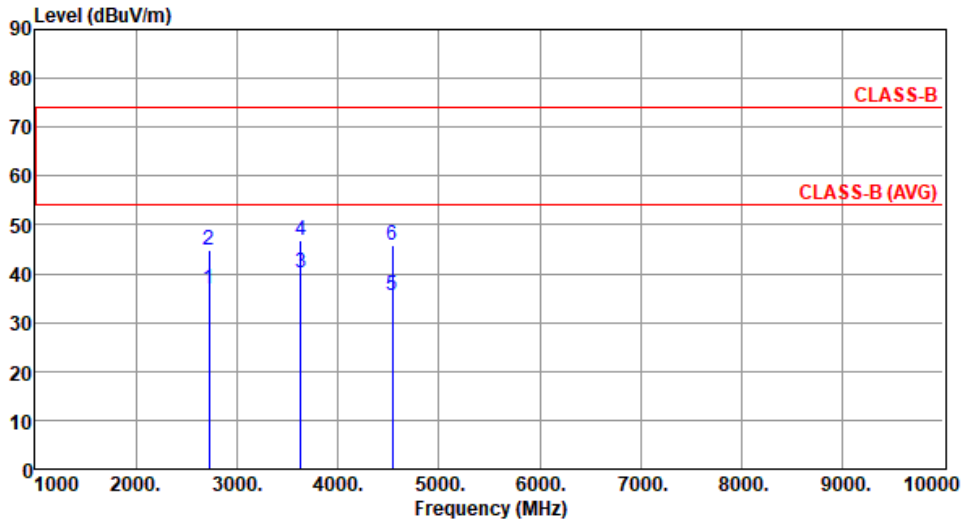


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2723.40	35.26	54.00	-18.74	36.38	-1.12	Average	135	276
2	2723.40	41.86	74.00	-32.14	42.98	-1.12	Peak	135	276
3	3631.20	38.04	54.00	-15.96	36.34	1.70	Average	214	236
4	3631.20	45.19	74.00	-28.81	43.49	1.70	Peak	214	236
5	4539.00	33.41	54.00	-20.59	29.03	4.38	Average	100	64
6	4539.00	45.35	74.00	-28.65	40.97	4.38	Peak	100	64

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation / SF	Lora / 8	Test Freq. (MHz)	907.8
Polarization	Vertical		

Test By :BRAD WU Temperature(℃):22 Humidity(%):65

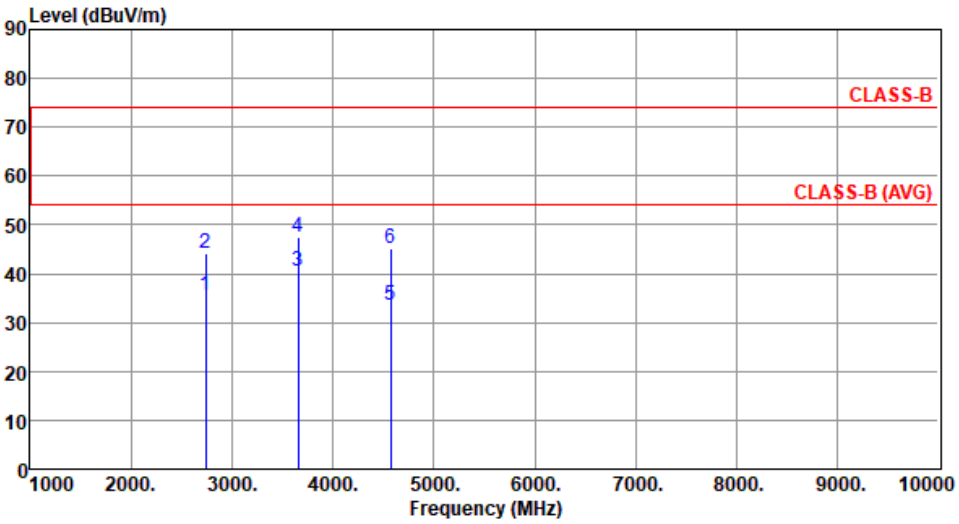


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2723.40	36.92	54.00	-17.08	38.04	-1.12	Average	126	301
2	2723.40	44.89	74.00	-29.11	46.01	-1.12	Peak	126	301
3	3631.20	40.24	54.00	-13.76	38.54	1.70	Average	279	165
4	3631.20	46.69	74.00	-27.31	44.99	1.70	Peak	279	165
5	4539.00	35.68	54.00	-18.32	31.30	4.38	Average	115	162
6	4539.00	45.86	74.00	-28.14	41.48	4.38	Peak	115	162

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation / SF	Lora / 8	Test Freq. (MHz)	914.2
Polarization	Horizontal		

Test By :BRAD WU Temperature(℃):22 Humidity(%):65

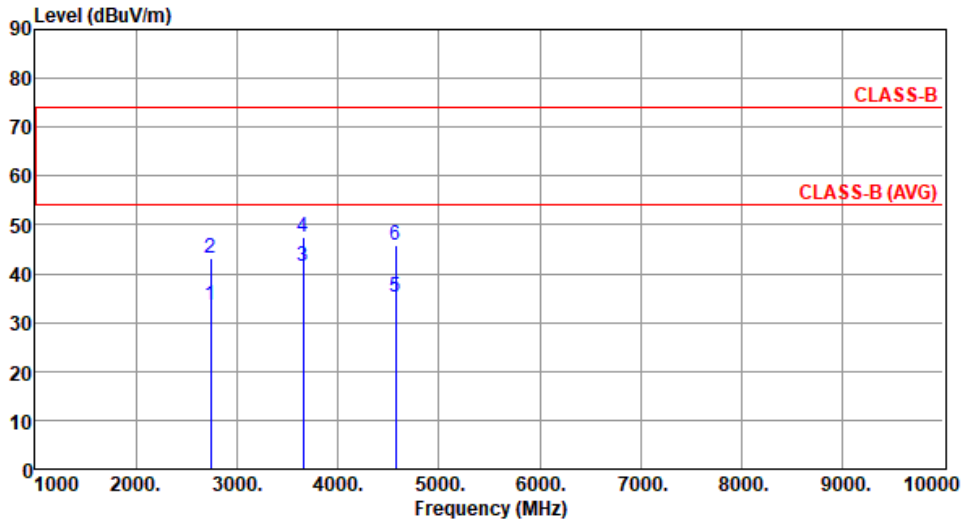


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2742.60	35.62	54.00	-18.38	36.71	-1.09	Average	125	233
2	2742.60	44.23	74.00	-29.77	45.32	-1.09	Peak	125	233
3	3656.80	40.66	54.00	-13.34	38.91	1.75	Average	115	236
4	3656.80	47.54	74.00	-26.46	45.79	1.75	Peak	115	236
5	4571.00	33.41	54.00	-20.59	28.92	4.49	Average	100	38
6	4571.00	45.03	74.00	-28.97	40.54	4.49	Peak	100	38

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation / SF	Lora / 8	Test Freq. (MHz)	914.2
Polarization	Vertical		

Test By :BRAD WU Temperature(℃):22 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2742.60	33.44	54.00	-20.56	34.53	-1.09	Average	154	288
2	2742.60	43.28	74.00	-30.72	44.37	-1.09	Peak	154	288
3	3656.80	41.54	54.00	-12.46	39.79	1.75	Average	231	168
4	3656.80	47.42	74.00	-26.58	45.67	1.75	Peak	231	168
5	4571.00	35.26	54.00	-18.74	30.77	4.49	Average	100	162
6	4571.00	45.84	74.00	-28.16	41.35	4.49	Peak	100	162

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

3.5 Emissions in Non-Restricted Frequency Bands

3.5.1 Emissions in Non-Restricted Frequency Bands Limit

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

3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

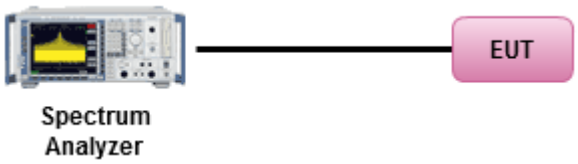
Reference level measurement

1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Use the peak marker function to determine the maximum PSD level

Emission level measurement

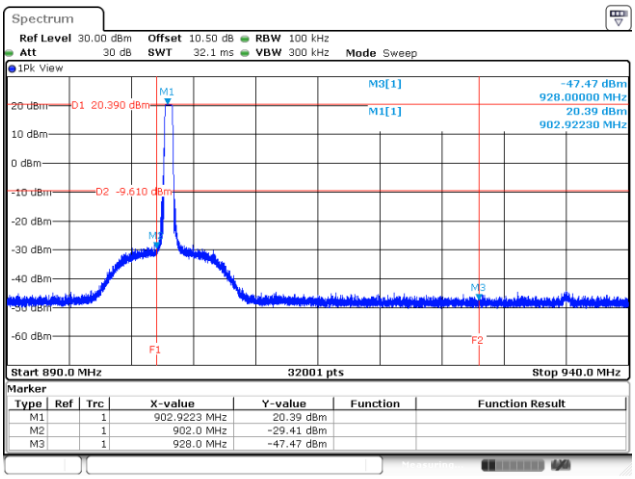
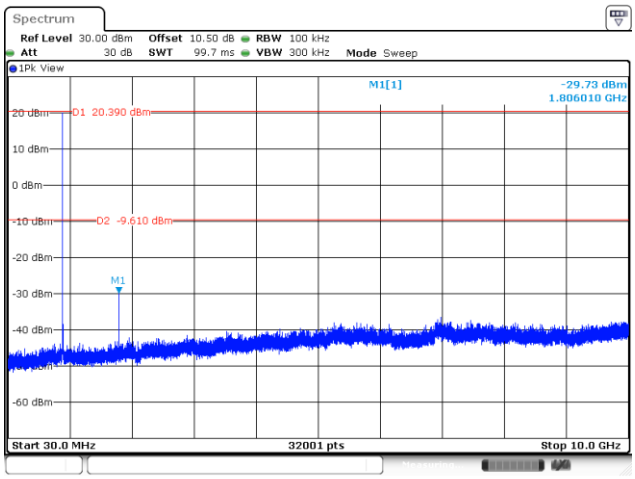
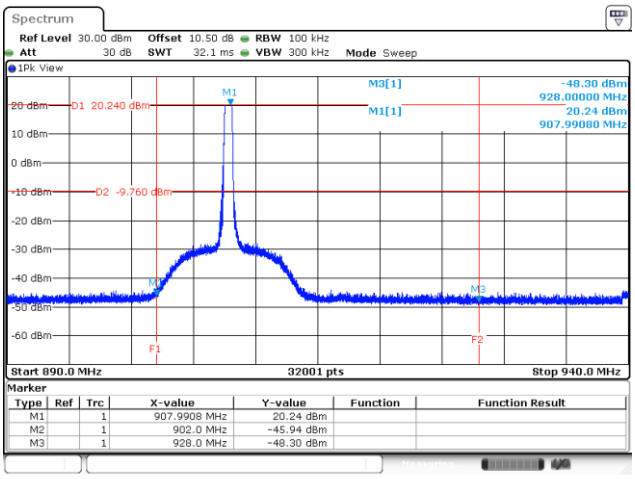
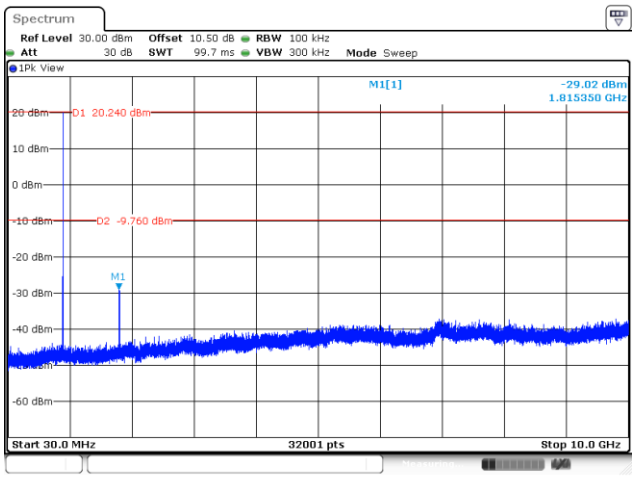
1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Scan Frequency range is up to 10GHz
4. Use the peak marker function to determine the maximum amplitude level

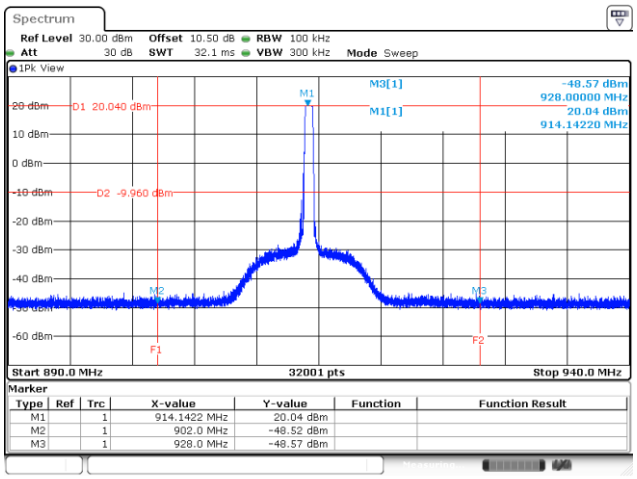
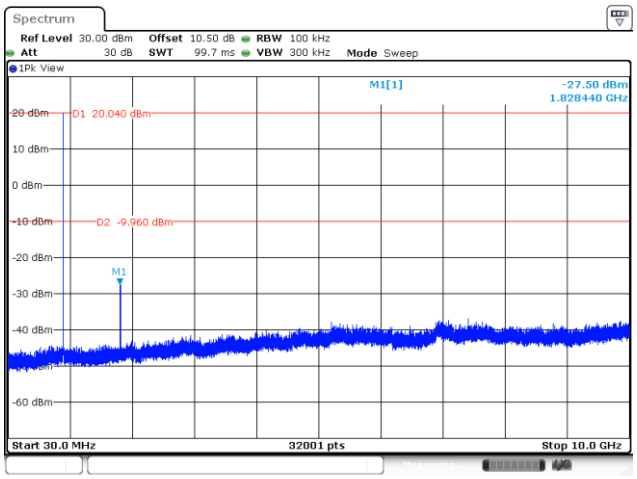
3.5.4 Test Setup

Transmitter Radiated Bandedge Emissions


3.5.5 Unwanted Emissions into Non-Restricted Frequency Bands

Ambient Condition	22°C / 65%	Tested By	Brad Wu

TX Freq 903MHz / 30MHz~10GHz (down 30dBc)	TX Freq 907.8MHz / 30MHz~10GHz (down 30dBc)
	
	

TX Freq 914.2MHz / 30MHz~10GHz (down 30dBc)	---
	---
	---

4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corporation (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website http://www.icertifi.com.tw.

Linkou	**Kwei Shan**	**Kwei Shan Site II**
Tel: 886-2-2601-1640	Tel: 886-3-271-8666	Tel: 886-3-271-8640
No.30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan (R.O.C.)	No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)	No.14-1, Lane 19, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 333, Taiwan (R.O.C.)

If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666
Fax: 886-3-318-0155
Email: ICC_Service@icertifi.com.tw

==END==