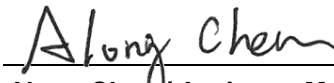


# FCC Test Report

**FCC ID** : 2ACOA-ID2  
**Equipment** : IoT gateway  
**Model No.** : 915id PoE ; 915id  
**Brand Name** : ZENNER USA  
**Applicant** : Zenner USA, Inc.  
**Address** : 15280 Addison Rd., Suite 240, Addison, TX  
75001  
**Standard** : 47 CFR FCC Part 15.247  
**Received Date** : Dec. 08, 2020  
**Tested Date** : Dec. 11, 2020 ~ Jan. 26, 2021

We, International Certification Corp., 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:

  
\_\_\_\_\_  
Along Chen / Assistant Manager

Approved by:

  
\_\_\_\_\_  
Gary Chang / Manager



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## Release Record

Report No.	Version	Description	Issued Date
FR080603	Rev. 01	Initial issue	Mar. 05, 2021

## Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.339MHz 44.86 (Margin -4.36dB) - AV	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 750.04MHz 45.80 (Margin -0.20dB) - QP	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 26.99	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

### 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 Product Details

The following models are provided to this EUT.

Model Name	Description	Remark
915id PoE	Power from POE or Adapter	PCB of both models are identical but components of POE function are removed for model 915id.
915id	Power from 12V Adapter	

### 1.1.2 Specification of the Equipment under Test (EUT)

RF General Information					
Frequency Range (MHz)	Ch. Frequency (MHz)	Channel Number	Physical bit rate (bit/sec)	Spread Factor	Channel Spacing (kHz)
902 ~ 928	923.3 ~ 927.5	1 ~ 8 [8]	980 ~ 21900	7 ~ 12	500
Note 1: RF output power specifies that Maximum Conducted (Average) Output Power.					
Note 2: The device uses LoRa modulation.					

### 1.1.3 Antenna Details

Ant. No.	Type	Connector	Gain (dBi)	P/N
1	PIFA	UFL	1.7	1004826
2	PIFA	UFL	1.5	1004829

### 1.1.4 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	12Vdc from Adapter 48Vdc from PoE
-------------------	--------------------------------------

### 1.1.5 Accessories

Accessories		
No.	Equipment	Description
1	AC adapter	Brand: UE electronic Model: UES24WU-120200SPA I/P: 100-240Vac, 50/60Hz, 0.8A O/P: 12Vdc, 2.0A Power Line: 1.9m non-shielded without core
2	PoE	Brand: UE electronic Model: POE 35-48A I/P: 100-240Vac, 50/60Hz, 1.0A O/P: 48Vdc, 0.65A Power Line: 1.45m non-shielded without core
3	Core	Brand: KING CORE Model: KCF-130-B

### 1.1.6 Channel List

Frequency Band (MHz)		902 ~928	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	923.3	5	925.7
2	923.9	6	926.3
3	924.5	7	926.9
4	925.1	8	927.5

### 1.1.7 Test Tool and Duty Cycle

Test Tool	Putty command, V0.6	
Duty Cycle and Duty Factor	Duty Cycle (%)	Duty Factor (dB)
	100.00%	0.00

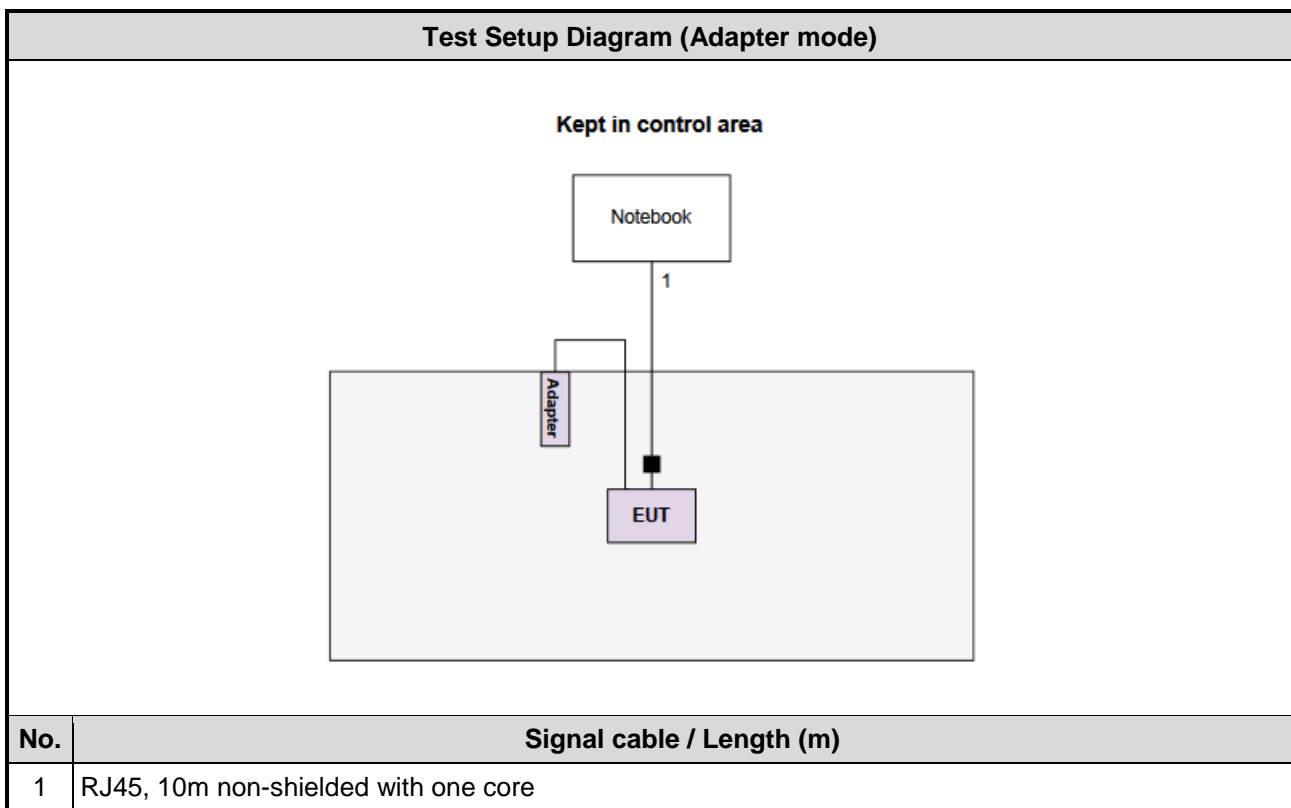
### 1.1.8 Power Index of Test Tool

Test Frequency (MHz)	Power Index
923.3	dig 0 --mix 15 --pa 3
927.5	dig 0 --mix 15 --pa 3

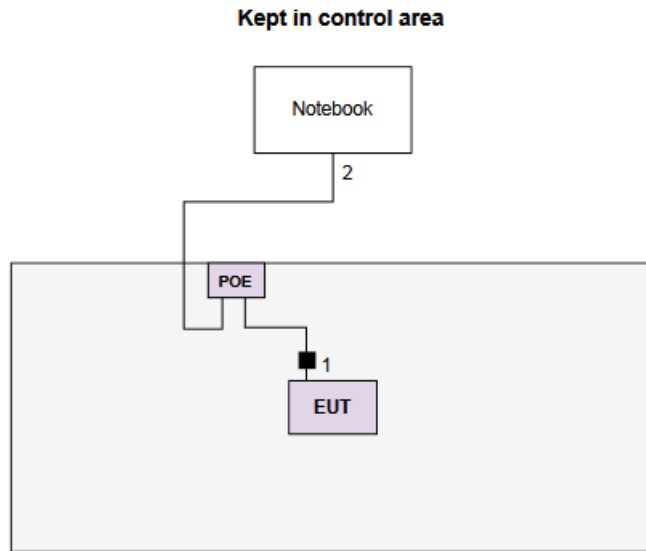
## 1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Remarks
1	Notebook	DELL	Latitude E5400	DoC	---

## 1.3 Test Setup Chart



**Test Setup Diagram (POE mode)**



No.	Signal cable / Length (m)
1	RJ45, 1m non-shielded with one core
1	RJ45, 10m non-shielded with one core



## 1.4 The Equipment List

<b>Test Item</b>	Conducted Emission				
<b>Test Site</b>	Conduction room 1 / (CO01-WS)				
<b>Tested Date</b>	Jan. 26, 2021				
<b>Instrument</b>	<b>Brand</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Calibration Date</b>	<b>Calibration Until</b>
Receiver	R&S	ESR3	101657	Feb. 14, 2020	Feb. 13, 2021
LISN	R&S	ENV216	101579	Mar. 12, 2020	Mar. 11, 2021
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 21, 2020	Oct. 20, 2021
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

<b>Test Item</b>	Radiated Emission				
<b>Test Site</b>	966 chamber 3 / (03CH03-WS)				
<b>Tested Date</b>	Dec. 11 ~ Dec. 25, 2020				
<b>Instrument</b>	<b>Brand</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Calibration Date</b>	<b>Calibration Until</b>
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 1206	Dec. 27, 2019	Dec. 26, 2020
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.					

<b>Test Item</b>	RF Conducted				
<b>Test Site</b>	(TH01-WS)				
<b>Tested Date</b>	Dec. 29, 2020				
<b>Instrument</b>	<b>Brand</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Calibration Date</b>	<b>Calibration Until</b>
Spectrum Analyzer	R&S	FSV40	101063	Apr. 30, 2020	Apr. 29, 2021
Power Meter	Anritsu	ML2495A	1241002	Nov. 04, 2020	Nov. 03, 2021
Power Sensor	Anritsu	MA2411B	1207366	Nov. 04, 2020	Nov. 03, 2021
DC POWER SOURCE	GW INSTEK	GPC-6030D	GES855395	Nov. 09, 2020	Nov. 08, 2021
AC POWER SOURCE	APC	AFC-500W	F312060012	Dec. 04, 2020	Dec. 03, 2021
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	$\pm 34.130$ Hz
Conducted power	$\pm 0.808$ dB
Power density	$\pm 0.583$ dB
Conducted emission	$\pm 2.715$ dB
AC conducted emission	$\pm 2.92$ dB
Radiated emission $\leq 1$ GHz	$\pm 3.96$ dB
Radiated emission $> 1$ GHz	$\pm 4.51$ dB

## 2 Test Configuration

### 2.1 Testing Facility

<b>Test Laboratory</b>	International Certification Corp.
<b>Test Site</b>	CO01-WS, TH01-WS
<b>Address of Test Site</b>	No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.
<b>Test Site</b>	03CH03-WS
<b>Address of Test Site</b>	No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan District, 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	P/N	Test Frequency (MHz)	Separating Factor	Test Configuration
Conducted Emissions	1004826	923.3 / 927.5	SF12	1, 2, 3
Radiated Emissions ≤1GHz	1004829	923.3 / 927.5	SF12	1, 2, 3
Radiated Emissions >1GHz	1004829	923.3 / 927.5	SF12	1
Maximum Output Power 6dB bandwidth Power spectral density	1004826	923.3 / 927.5	SF12	1

**NOTE:**

1. The EUT can be powered by **AC adapter** or **POE**. Each power supply was selected for final testing as below configuration.

Test configurations are listed as below:

- 1) Configuration 1: Model 915id, adapter mode
- 2) Configuration 2: Model 915id PoE, adapter mode
- 3) Configuration 3: Model 915id PoE, POE mode

## 3 Transmitter Test Results

### 3.1 Conducted Emissions

#### 3.1.1 Limit of Conducted Emissions

Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: \* Decreases with the logarithm of the frequency.

#### 3.1.2 Test Procedures

1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50  $\Omega$  LISN port.
3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
4. This measurement was performed with AC 120V / 60Hz.

#### 3.1.3 Test Setup

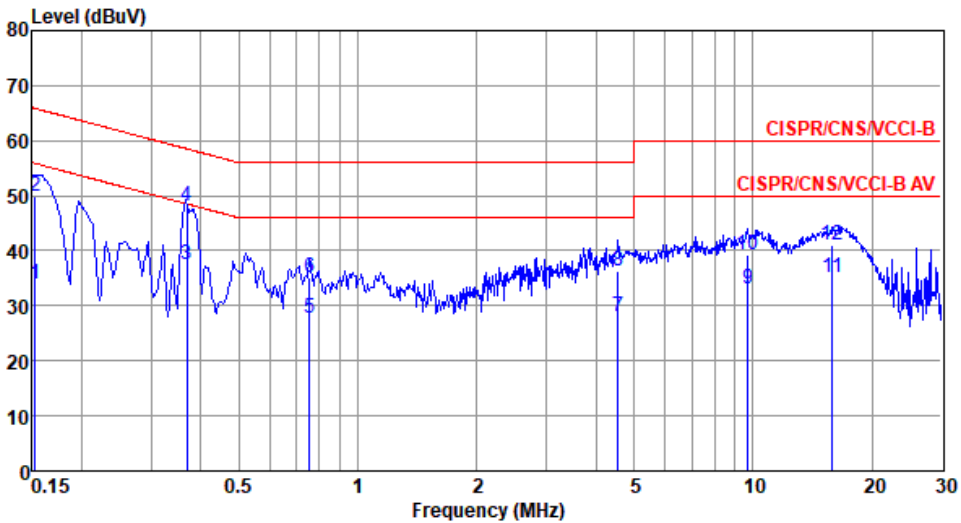


- Note: 1. Support units were connected to second LISN.  
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

### 3.1.4 Test Result of Conducted Emissions

Power Phase	Line	Test Freq. (MHz)	923.3
Test Configuration	1		

Test by : Alex Tsai      Temperature: 22°C      Humidity: 65%

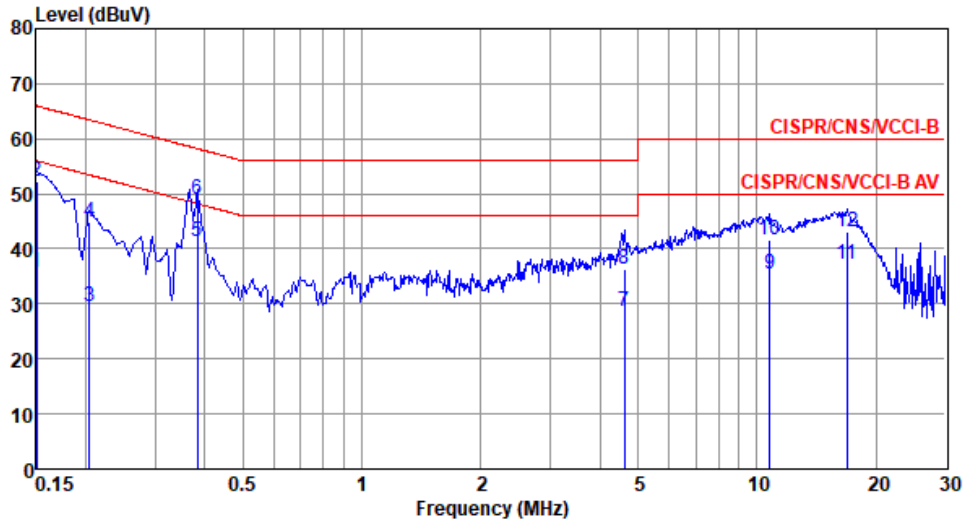


	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Remark
1	0.152	33.93	55.87	-21.94	24.07	9.81	0.05	Average
2	0.152	49.92	65.87	-15.95	40.06	9.81	0.05	QP
3	0.369	37.41	48.52	-11.11	27.46	9.87	0.08	Average
4*	0.369	48.14	58.52	-10.38	38.19	9.87	0.08	QP
5	0.755	27.89	46.00	-18.11	17.84	9.94	0.11	Average
6	0.755	35.09	56.00	-20.91	25.04	9.94	0.11	QP
7	4.549	28.06	46.00	-17.94	17.72	10.03	0.31	Average
8	4.549	36.38	56.00	-19.62	26.04	10.03	0.31	QP
9	9.705	32.93	50.00	-17.07	22.44	10.09	0.40	Average
10	9.705	39.23	60.00	-20.77	28.74	10.09	0.40	QP
11	15.885	35.24	50.00	-14.76	24.42	10.21	0.61	Average
12	15.885	40.96	60.00	-19.04	30.14	10.21	0.61	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).  
 Note 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

<b>Power Phase</b>	Neutral	<b>Test Freq. (MHz)</b>	923.3
<b>Test Configuration</b>	1		

Test by : Alex Tsai      Temperature: 22°C      Humidity: 65%

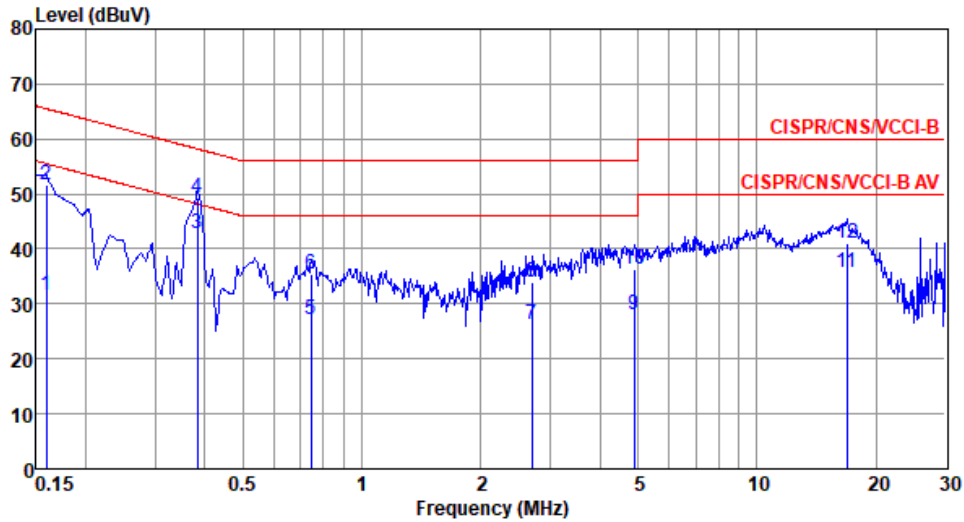


	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Remark
1	0.150	35.82	56.00	-20.18	25.98	9.79	0.05	Average
2	0.150	52.30	66.00	-13.70	42.46	9.79	0.05	QP
3	0.204	29.53	53.45	-23.92	19.67	9.80	0.06	Average
4	0.204	45.02	63.45	-18.43	35.16	9.80	0.06	QP
5*	0.383	41.25	48.21	-6.96	31.34	9.83	0.08	Average
6	0.383	48.95	58.21	-9.26	39.04	9.83	0.08	QP
7	4.622	28.50	46.00	-17.50	18.24	9.95	0.31	Average
8	4.622	36.23	56.00	-19.77	25.97	9.95	0.31	QP
9	10.790	35.50	50.00	-14.50	24.98	10.08	0.44	Average
10	10.790	41.65	60.00	-18.35	31.13	10.08	0.44	QP
11	16.928	37.28	50.00	-12.72	26.42	10.23	0.63	Average
12	16.928	42.98	60.00	-17.02	32.12	10.23	0.63	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).  
 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

<b>Power Phase</b>	Line	<b>Test Freq. (MHz)</b>	927.5
<b>Test Configuration</b>	1		

Test by : Alex Tsai      Temperature: 22°C      Humidity: 65%

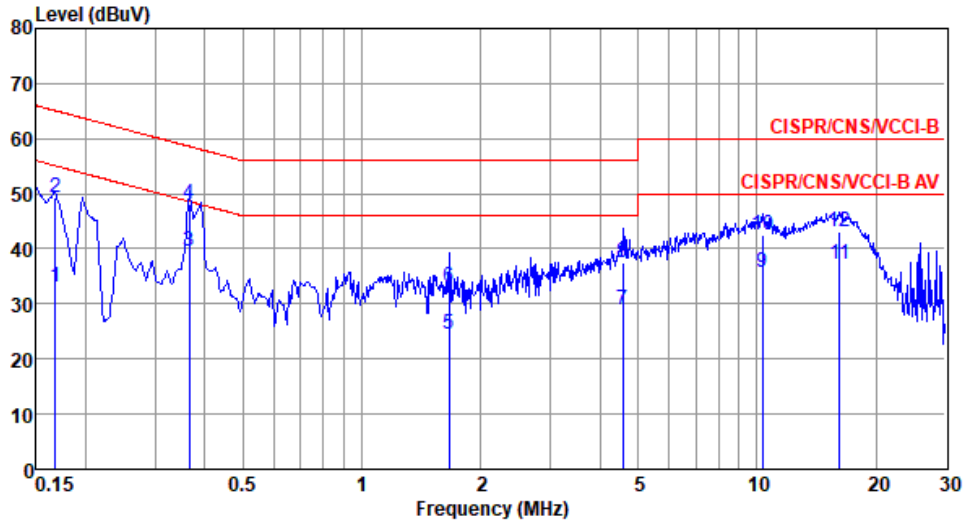


	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Remark
1	0.159	31.58	55.52	-23.94	21.72	9.81	0.05	Average
2	0.159	51.72	65.52	-13.80	41.86	9.81	0.05	QP
3*	0.383	42.67	48.21	-5.54	32.71	9.88	0.08	Average
4	0.383	49.31	58.21	-8.90	39.35	9.88	0.08	QP
5	0.743	27.28	46.00	-18.72	17.23	9.94	0.11	Average
6	0.743	35.35	56.00	-20.65	25.30	9.94	0.11	QP
7	2.692	26.31	46.00	-19.69	16.08	10.00	0.23	Average
8	2.692	34.01	56.00	-21.99	23.78	10.00	0.23	QP
9	4.900	27.99	46.00	-18.01	17.64	10.04	0.31	Average
10	4.900	36.26	56.00	-19.74	25.91	10.04	0.31	QP
11	16.928	35.60	50.00	-14.40	24.73	10.24	0.63	Average
12	16.928	41.13	60.00	-18.87	30.26	10.24	0.63	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).  
 Note 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

<b>Power Phase</b>	Neutral	<b>Test Freq. (MHz)</b>	927.5
<b>Test Configuration</b>	1		

Test by : Alex Tsai      Temperature: 22°C      Humidity: 65%



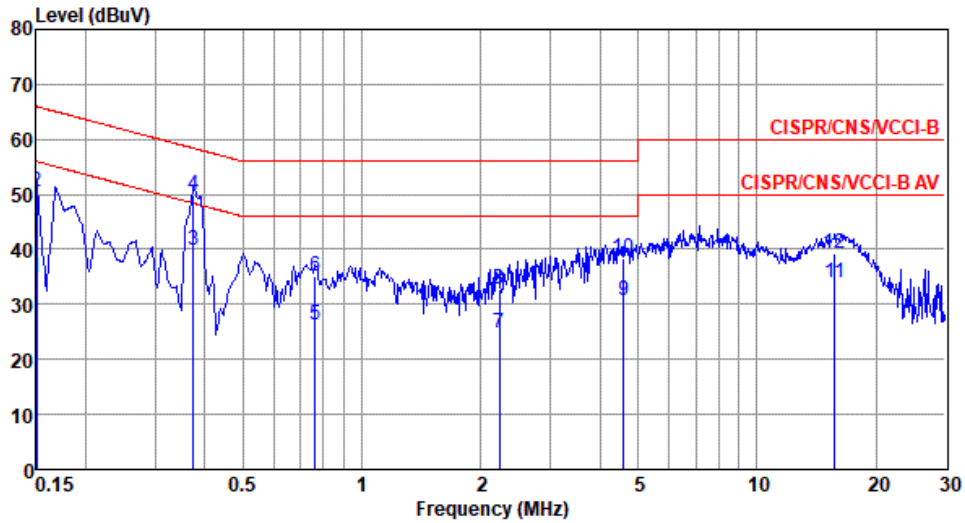
	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Remark
1	0.168	32.95	55.08	-22.13	23.11	9.79	0.05	Average
2	0.168	49.27	65.08	-15.81	39.43	9.79	0.05	QP
3*	0.365	39.47	48.61	-9.14	29.56	9.83	0.08	Average
4	0.365	48.06	58.61	-10.55	38.15	9.83	0.08	QP
5	1.662	24.38	46.00	-21.62	14.32	9.90	0.16	Average
6	1.662	32.97	56.00	-23.03	22.91	9.90	0.16	QP
7	4.574	29.01	46.00	-16.99	18.75	9.95	0.31	Average
8	4.574	37.62	56.00	-18.38	27.36	9.95	0.31	QP
9	10.342	35.76	50.00	-14.24	25.27	10.07	0.42	Average
10	10.342	42.42	60.00	-17.58	31.93	10.07	0.42	QP
11	16.226	37.33	50.00	-12.67	26.51	10.20	0.62	Average
12	16.226	43.20	60.00	-16.80	32.38	10.20	0.62	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).  
 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).



<b>Power Phase</b>	Line	<b>Test Freq. (MHz)</b>	923.3
<b>Test Configuration</b>	2		

Test by : Alex Tsai      Temperature: 22°C      Humidity: 65%

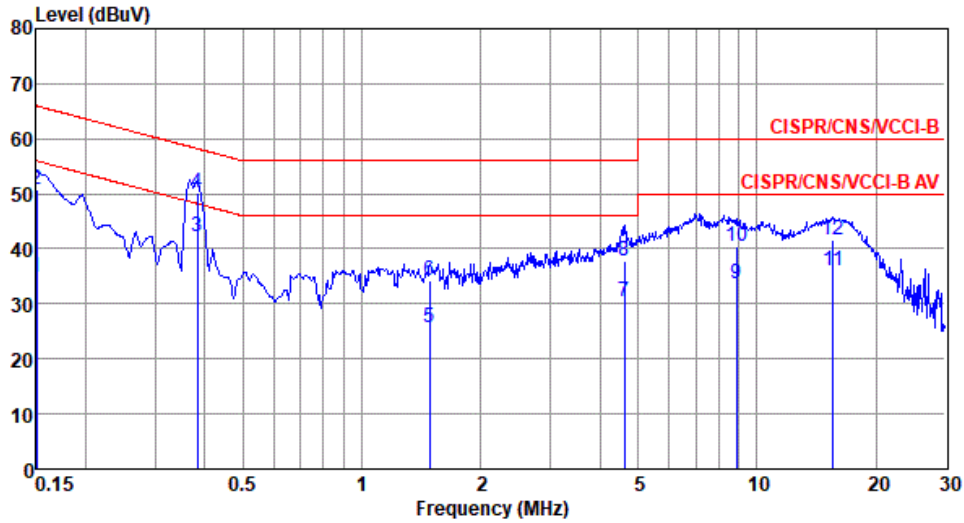


	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Remark
1	0.150	34.93	56.00	-21.07	25.24	9.64	0.05	Average
2	0.150	50.47	66.00	-15.53	40.78	9.64	0.05	QP
3	0.375	39.75	48.39	-8.64	30.04	9.63	0.08	Average
4*	0.375	49.91	58.39	-8.48	40.20	9.63	0.08	QP
5	0.763	26.14	46.00	-19.86	16.40	9.63	0.11	Average
6	0.763	35.07	56.00	-20.93	25.33	9.63	0.11	QP
7	2.225	24.73	46.00	-21.27	14.89	9.64	0.20	Average
8	2.225	32.79	56.00	-23.21	22.95	9.64	0.20	QP
9	4.598	30.60	46.00	-15.40	20.63	9.66	0.31	Average
10	4.598	38.46	56.00	-17.54	28.49	9.66	0.31	QP
11	15.718	33.80	50.00	-16.20	23.48	9.71	0.61	Average
12	15.718	39.22	60.00	-20.78	28.90	9.71	0.61	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).  
 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

<b>Power Phase</b>	Neutral	<b>Test Freq. (MHz)</b>	923.3
<b>Test Configuration</b>	2		

Test by : Alex Tsai      Temperature: 22°C      Humidity: 65%

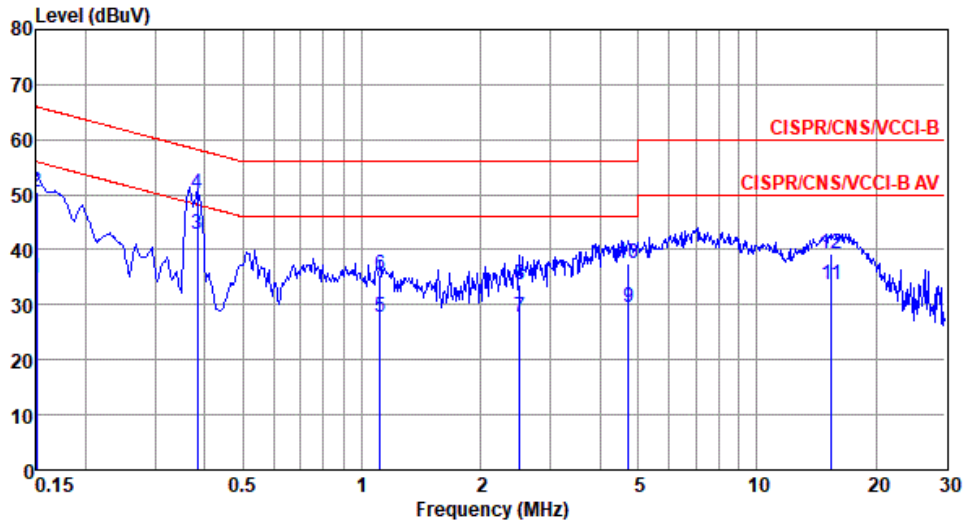


	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Remark
1	0.150	34.83	56.00	-21.17	25.12	9.66	0.05	Average
2	0.150	50.69	66.00	-15.31	40.98	9.66	0.05	QP
3*	0.383	42.35	48.21	-5.86	32.62	9.65	0.08	Average
4	0.383	50.26	58.21	-7.95	40.53	9.65	0.08	QP
5	1.487	25.76	46.00	-20.24	15.95	9.66	0.15	Average
6	1.487	34.16	56.00	-21.84	24.35	9.66	0.15	QP
7	4.622	30.55	46.00	-15.45	20.56	9.68	0.31	Average
8	4.622	37.69	56.00	-18.31	27.70	9.68	0.31	QP
9	8.869	33.64	50.00	-16.36	23.53	9.72	0.39	Average
10	8.869	40.54	60.00	-19.46	30.43	9.72	0.39	QP
11	15.552	36.07	50.00	-13.93	25.66	9.80	0.61	Average
12	15.552	41.68	60.00	-18.32	31.27	9.80	0.61	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).  
 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

<b>Power Phase</b>	Line	<b>Test Freq. (MHz)</b>	927.5
<b>Test Configuration</b>	2		

Test by : Alex Tsai      Temperature: 22°C      Humidity: 65%

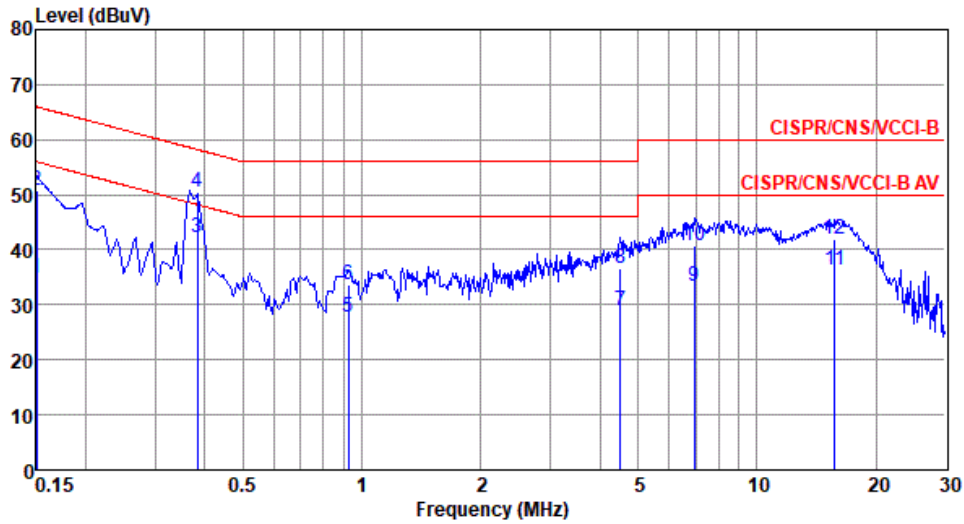


	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Remark
1	0.150	34.84	56.00	-21.16	25.15	9.64	0.05	Average
2	0.150	50.57	66.00	-15.43	40.88	9.64	0.05	QP
3*	0.383	42.85	48.21	-5.36	33.14	9.63	0.08	Average
4	0.383	50.06	58.21	-8.15	40.35	9.63	0.08	QP
5	1.111	27.72	46.00	-18.28	17.96	9.63	0.13	Average
6	1.111	35.55	56.00	-20.45	25.79	9.63	0.13	QP
7	2.513	27.79	46.00	-18.21	17.93	9.64	0.22	Average
8	2.513	33.71	56.00	-22.29	23.85	9.64	0.22	QP
9	4.721	29.38	46.00	-16.62	19.41	9.66	0.31	Average
10	4.721	37.35	56.00	-18.65	27.38	9.66	0.31	QP
11	15.470	33.76	50.00	-16.24	23.44	9.71	0.61	Average
12	15.470	39.11	60.00	-20.89	28.79	9.71	0.61	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).  
 Note 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

<b>Power Phase</b>	Neutral	<b>Test Freq. (MHz)</b>	927.5
<b>Test Configuration</b>	2		

Test by : Alex Tsai      Temperature: 22°C      Humidity: 65%

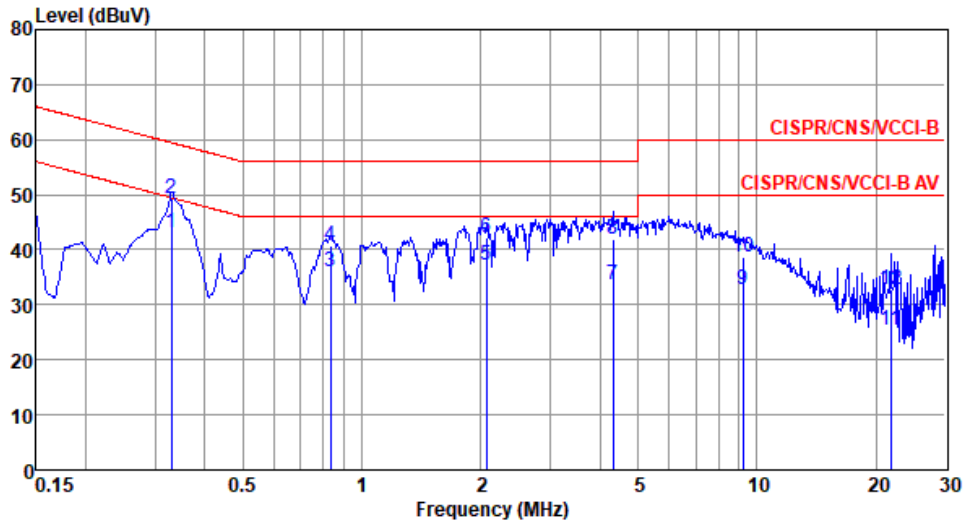


	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Remark
1	0.150	34.85	56.00	-21.15	25.14	9.66	0.05	Average
2	0.150	50.73	66.00	-15.27	41.02	9.66	0.05	QP
3*	0.383	42.32	48.21	-5.89	32.59	9.65	0.08	Average
4	0.383	50.36	58.21	-7.85	40.63	9.65	0.08	QP
5	0.923	27.62	46.00	-18.38	17.85	9.65	0.12	Average
6	0.923	33.73	56.00	-22.27	23.96	9.65	0.12	QP
7	4.501	28.98	46.00	-17.02	19.00	9.68	0.30	Average
8	4.501	36.51	56.00	-19.49	26.53	9.68	0.30	QP
9	6.951	33.48	50.00	-16.52	23.41	9.71	0.36	Average
10	6.951	40.81	60.00	-19.19	30.74	9.71	0.36	QP
11	15.718	36.26	50.00	-13.74	25.85	9.80	0.61	Average
12	15.718	41.78	60.00	-18.22	31.37	9.80	0.61	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).  
 Note 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

<b>Power Phase</b>	Line	<b>Test Freq. (MHz)</b>	923.3
<b>Test Configuration</b>	3		

Test by : Alex Tsai      Temperature: 22°C      Humidity: 65%

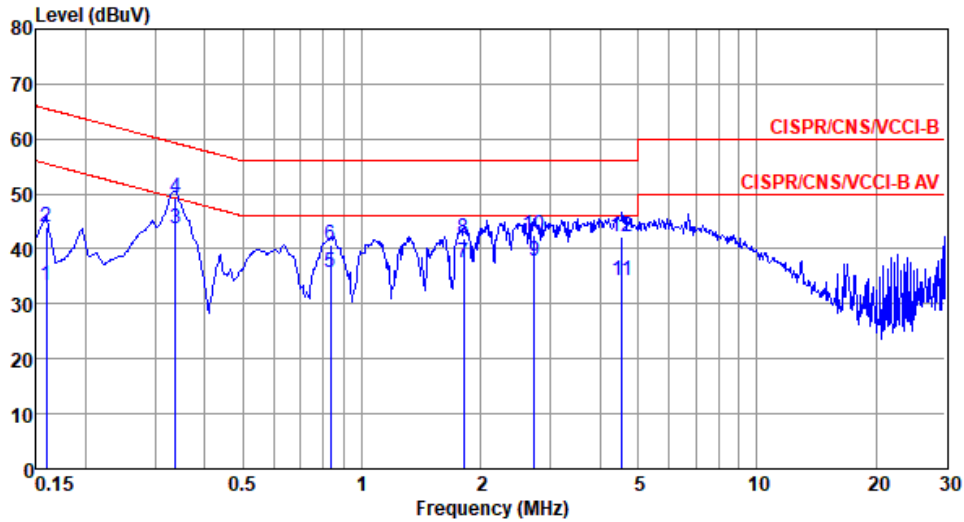


	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Remark
1*	0.330	43.04	49.44	-6.40	33.34	9.63	0.07	Average
2	0.330	49.26	59.44	-10.18	39.56	9.63	0.07	QP
3	0.835	35.91	46.00	-10.09	26.17	9.63	0.11	Average
4	0.835	40.84	56.00	-15.16	31.10	9.63	0.11	QP
5	2.066	37.31	46.00	-8.69	27.48	9.64	0.19	Average
6	2.066	42.12	56.00	-13.88	32.29	9.64	0.19	QP
7	4.315	33.54	46.00	-12.46	23.59	9.65	0.30	Average
8	4.315	41.92	56.00	-14.08	31.97	9.65	0.30	QP
9	9.204	32.74	50.00	-17.26	22.66	9.69	0.39	Average
10	9.204	38.72	60.00	-21.28	28.64	9.69	0.39	QP
11	21.830	25.46	50.00	-24.54	15.08	9.70	0.68	Average
12	21.830	32.86	60.00	-27.14	22.48	9.70	0.68	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).  
 Note 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

<b>Power Phase</b>	Neutral	<b>Test Freq. (MHz)</b>	923.3
<b>Test Configuration</b>	3		

Test by : Alex Tsai      Temperature: 22°C      Humidity: 65%

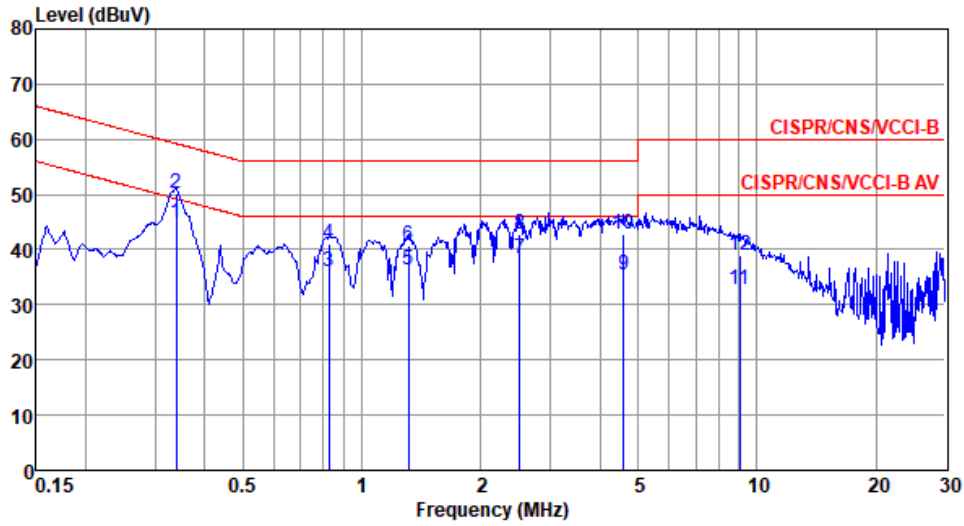


	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Remark
1	0.159	33.44	55.52	-22.08	23.73	9.66	0.05	Average
2	0.159	44.05	65.52	-21.47	34.34	9.66	0.05	QP
3*	0.337	43.78	49.27	-5.49	34.05	9.65	0.08	Average
4	0.337	49.44	59.27	-9.83	39.71	9.65	0.08	QP
5	0.835	35.71	46.00	-10.29	25.95	9.65	0.11	Average
6	0.835	40.64	56.00	-15.36	30.88	9.65	0.11	QP
7	1.810	37.63	46.00	-8.37	27.80	9.66	0.17	Average
8	1.810	41.89	56.00	-14.11	32.06	9.66	0.17	QP
9	2.736	37.78	46.00	-8.22	27.89	9.66	0.23	Average
10	2.736	42.56	56.00	-13.44	32.67	9.66	0.23	QP
11	4.549	34.26	46.00	-11.74	24.27	9.68	0.31	Average
12	4.549	42.16	56.00	-13.84	32.17	9.68	0.31	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).  
 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

<b>Power Phase</b>	Line	<b>Test Freq. (MHz)</b>	927.5
<b>Test Configuration</b>	3		

Test by : Alex Tsai      Temperature: 22°C      Humidity: 65%

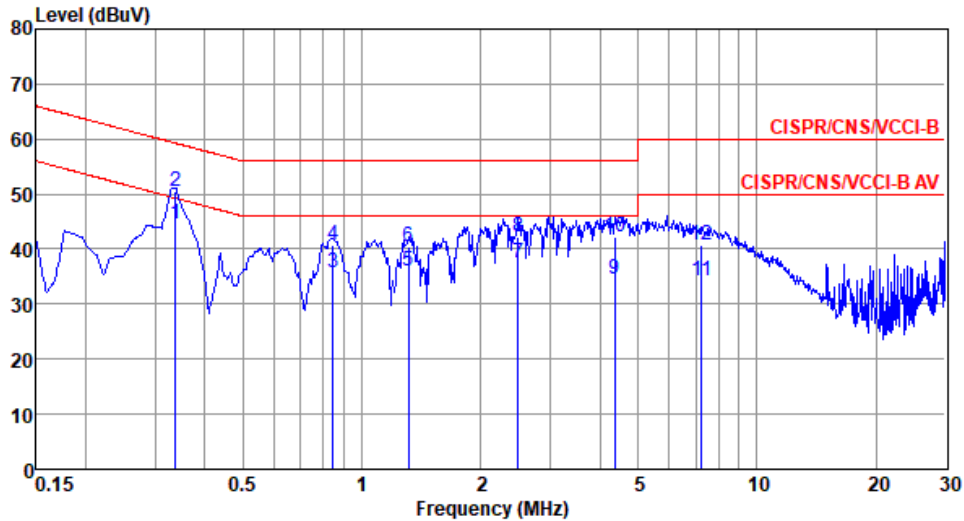


	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Remark
1*	0.339	44.86	49.22	-4.36	35.15	9.63	0.08	Average
2	0.339	50.31	59.22	-8.91	40.60	9.63	0.08	QP
3	0.826	36.07	46.00	-9.93	26.33	9.63	0.11	Average
4	0.826	40.90	56.00	-15.10	31.16	9.63	0.11	QP
5	1.310	36.24	46.00	-9.76	26.47	9.63	0.14	Average
6	1.310	40.61	56.00	-15.39	30.84	9.63	0.14	QP
7	2.513	38.31	46.00	-7.69	28.45	9.64	0.22	Average
8	2.513	42.88	56.00	-13.12	33.02	9.64	0.22	QP
9	4.598	35.52	46.00	-10.48	25.55	9.66	0.31	Average
10	4.598	42.69	56.00	-13.31	32.72	9.66	0.31	QP
11	9.059	32.89	50.00	-17.11	22.81	9.69	0.39	Average
12	9.059	38.92	60.00	-21.08	28.84	9.69	0.39	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).  
 Note 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

<b>Power Phase</b>	Neutral	<b>Test Freq. (MHz)</b>	927.5
<b>Test Configuration</b>	3		

Test by : Alex Tsai      Temperature: 22°C      Humidity: 65%



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Remark
1*	0.337	44.52	49.27	-4.75	34.79	9.65	0.08	Average
2	0.337	50.34	59.27	-8.93	40.61	9.65	0.08	QP
3	0.844	35.84	46.00	-10.16	26.08	9.65	0.11	Average
4	0.844	40.62	56.00	-15.38	30.86	9.65	0.11	QP
5	1.310	36.01	46.00	-9.99	26.22	9.65	0.14	Average
6	1.310	40.36	56.00	-15.64	30.57	9.65	0.14	QP
7	2.487	37.37	46.00	-8.63	27.50	9.66	0.21	Average
8	2.487	42.28	56.00	-13.72	32.41	9.66	0.21	QP
9	4.361	34.55	46.00	-11.45	24.57	9.68	0.30	Average
10	4.361	42.32	56.00	-13.68	32.34	9.68	0.30	QP
11	7.252	34.15	50.00	-15.85	24.08	9.71	0.36	Average
12	7.252	40.79	60.00	-19.21	30.72	9.71	0.36	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).  
 Note 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).



## 3.2 6dB and Occupied Bandwidth

### 3.2.1 Limit of 6dB Bandwidth

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

### 3.2.2 Test Procedures

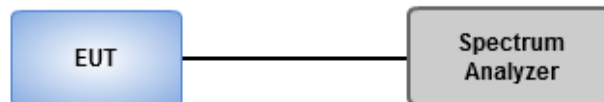
#### 6dB Bandwidth

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) = 1% ~ 5 % of OBW, Video bandwidth = 3 x RBW
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.

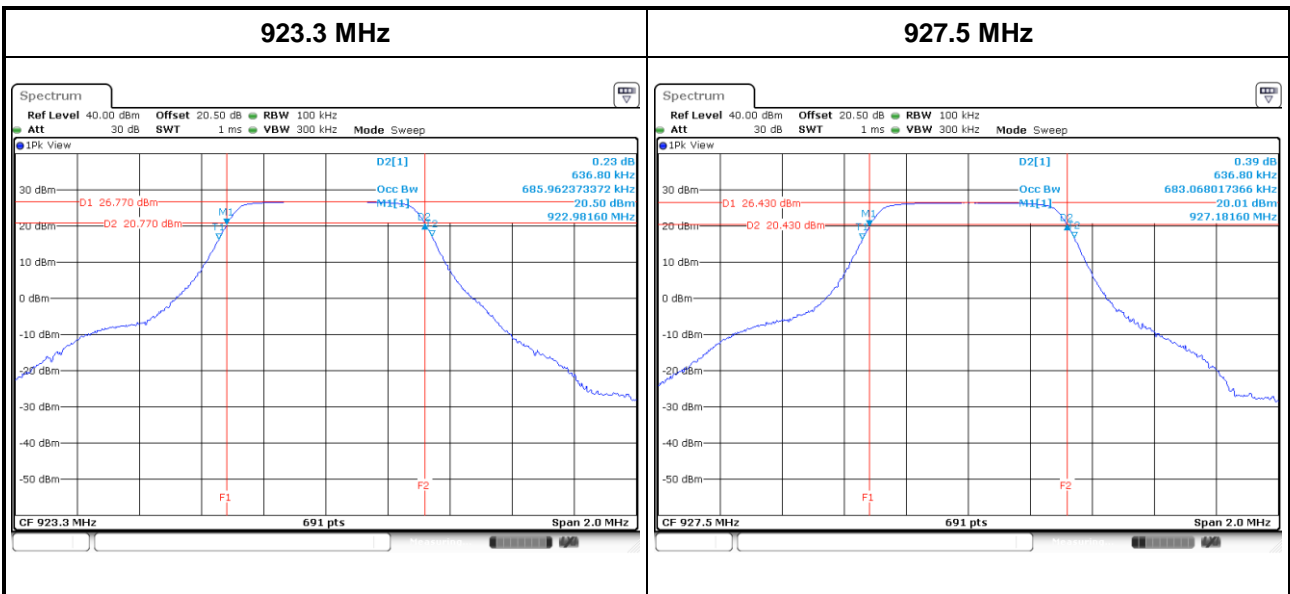
### 3.2.3 Test Setup



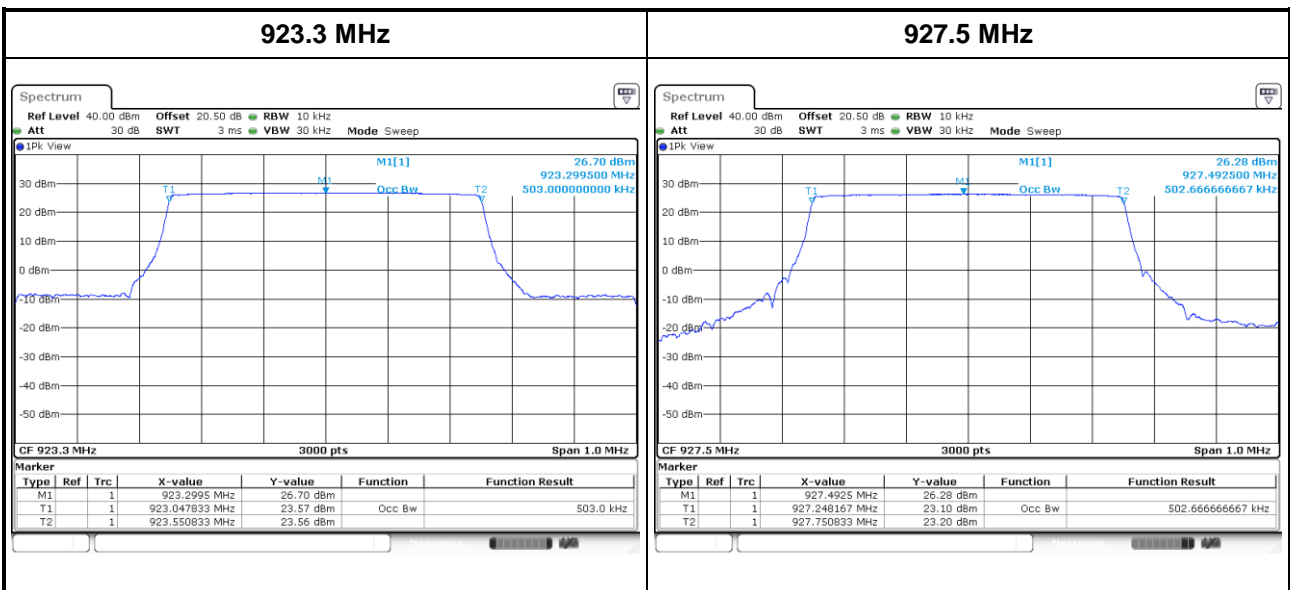
### 3.2.4 Test Result of 6dB and Occupied Bandwidth

<b>Ambient Condition</b>	22°C / 64%	<b>Tested By</b>	Brad Wu
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Mode	Freq. (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
SF12	923.3	0.637	0.5
SF12	927.5	0.637	0.5



Mode	Freq. (MHz)	Occupied Bandwidth (MHz)
SF12	923.3	0.503
SF12	927.5	0.503



### 3.3 RF Output Power

#### 3.3.1 Limit of RF Output Power

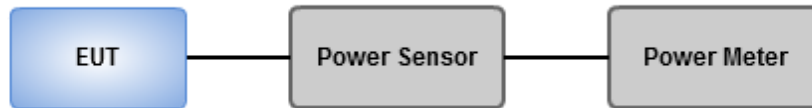
Conducted power shall not exceed 1Watt.

Antenna gain  $\leq 6\text{dBi}$ , no any corresponding reduction is in output power limit.

#### 3.3.2 Test Procedures

A broadband 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.

#### 3.3.3 Test Setup



#### 3.3.4 Test Result of Maximum Output Power

<b>Ambient Condition</b>	22°C / 64%	<b>Tested By</b>	Brad Wu
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Mode	Freq. (MHz)	AV Power (mW)	AV Power (dBm)	Limit (dBm)
SF12	923.3	500.0345	26.99	30
SF12	927.5	462.381	26.65	30

## 3.4 Power Spectral Density

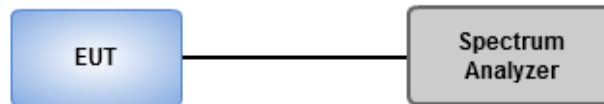
### 3.4.1 Limit of Power Spectral Density

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

### 3.4.2 Test Procedures

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

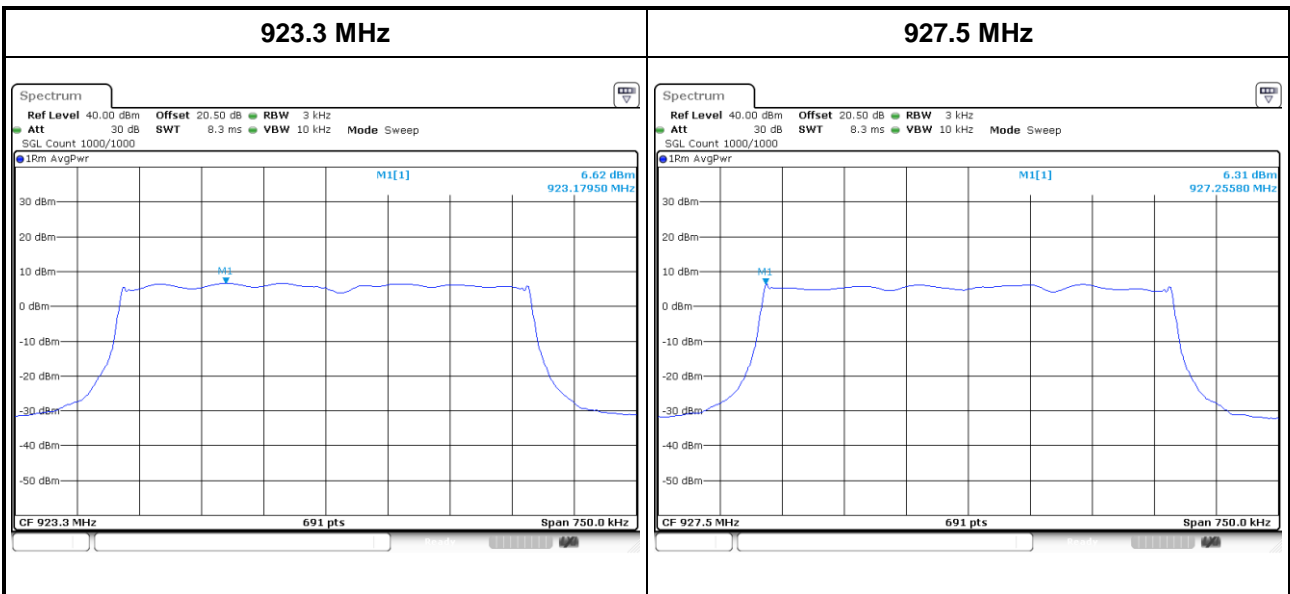
### 3.4.3 Test Setup



### 3.4.4 Test Result of Power Spectral Density

<b>Ambient Condition</b>	22°C / 64%	<b>Tested By</b>	Brad Wu
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Mode	Freq. (MHz)	PSD (mW)	PSD (dBm)	Limit (dBm)
SF12	923.3	4.6	6.62	8
SF12	927.5	4.3	6.31	8



## 3.5 Unwanted Emissions into Restricted Frequency Bands

### 3.5.1 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:**  
Quasi-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.

### 3.5.2 Test Procedures

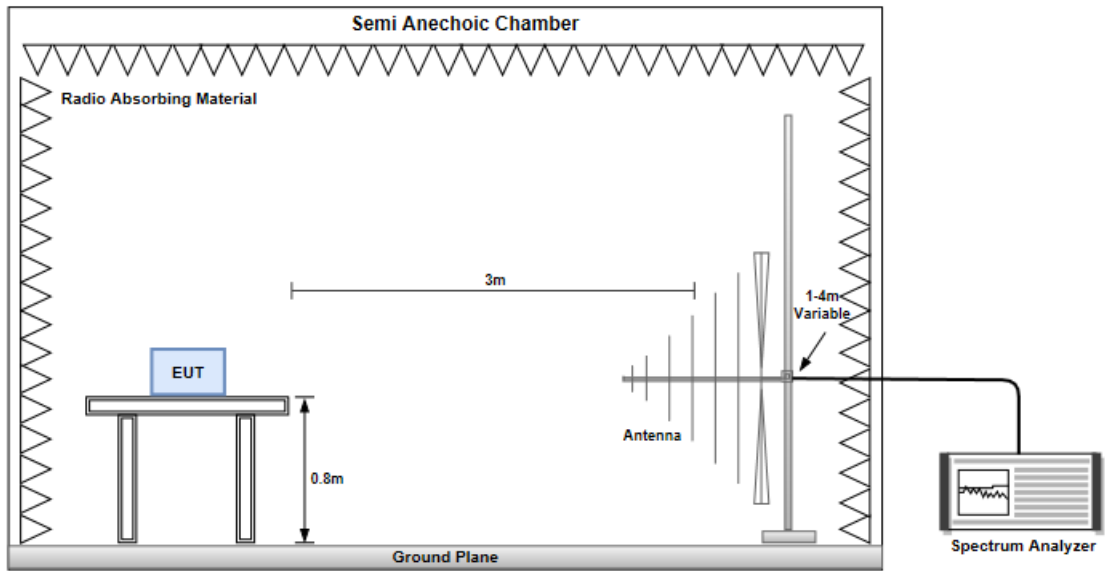
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission 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:

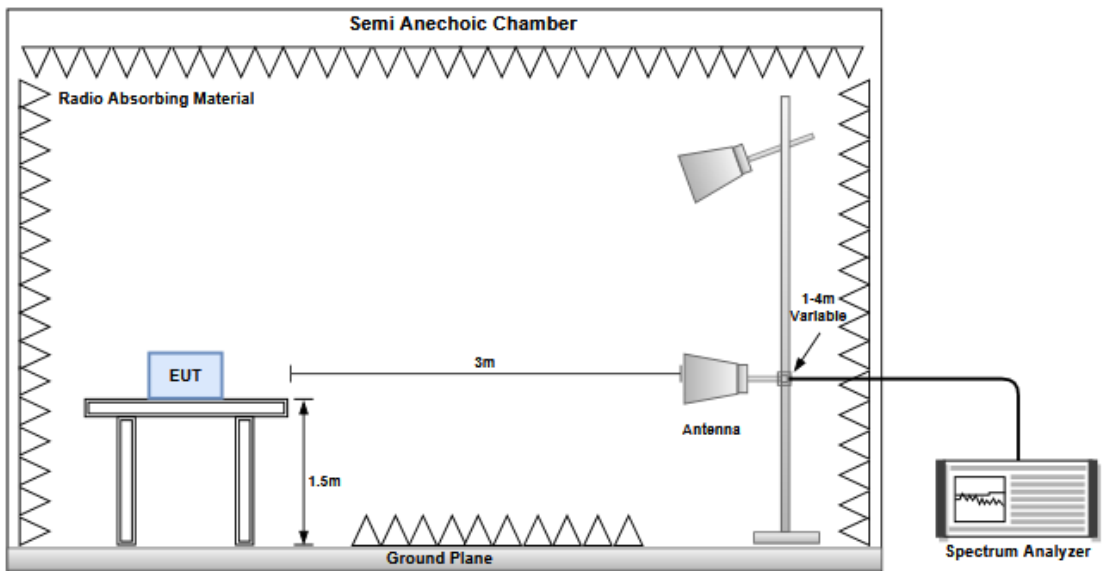
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

### 3.5.3 Test Setup

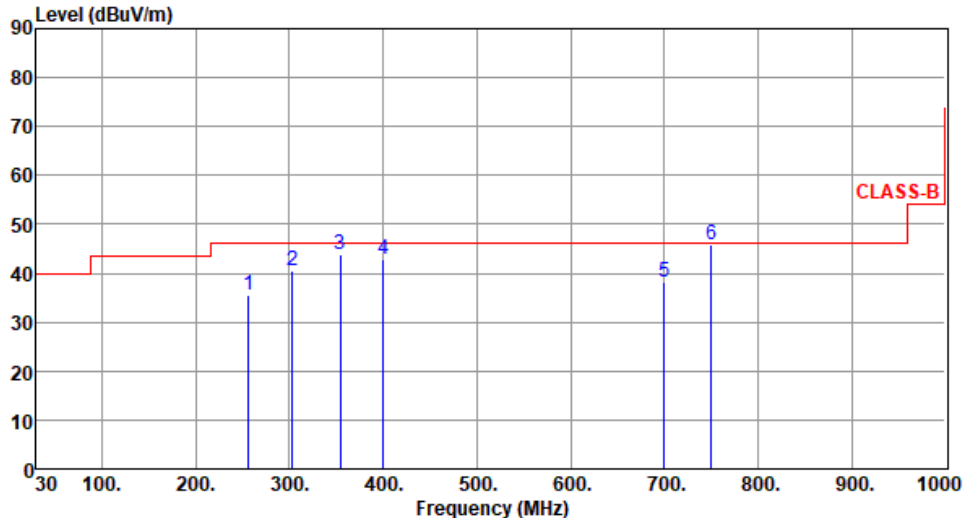
#### Radiated Emissions below 1 GHz



#### Radiated Emissions above 1 GHz



### 3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

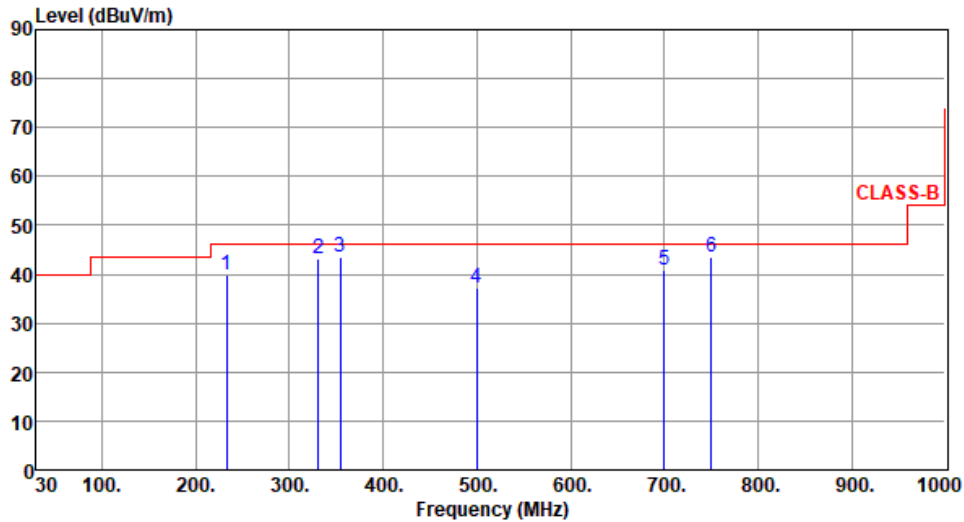
<b>Polarization</b>	Horizontal		<b>Test Freq. (MHz)</b>	923.3					
<b>Test Configuration</b>	1								
Test By :BRAD WU      Temperature(°C):23      Humidity(%):64									
									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	256.00	35.61	46.00	-10.39	45.65	-10.04	Peak	---	---
2	303.20	40.55	46.00	-5.45	49.07	-8.52	QP	100	239
3	354.18	43.86	46.00	-2.14	51.04	-7.18	QP	100	245
4	400.01	42.87	46.00	-3.13	48.59	-5.72	QP	100	205
5	700.00	38.34	46.00	-7.66	37.17	1.17	Peak	---	---
6	750.04	45.80	46.00	-0.20	43.09	2.71	QP	100	355

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.



<b>Polarization</b>	Vertical	<b>Test Freq. (MHz)</b>	923.3
<b>Test Configuration</b>	1		

Test By :BRAD WU      Temperature(°C):23      Humidity(%):64



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	232.80	39.75	46.00	-6.25	51.07	-11.32	Peak	---	---
2	331.20	43.14	46.00	-2.86	50.55	-7.41	QP	100	192
3	354.61	43.48	46.00	-2.52	50.65	-7.17	QP	100	198
4	500.00	37.05	46.00	-8.95	40.32	-3.27	Peak	---	---
5	700.00	41.00	46.00	-5.00	39.83	1.17	Peak	---	---
6	750.04	43.43	46.00	-2.57	40.72	2.71	QP	115	14

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

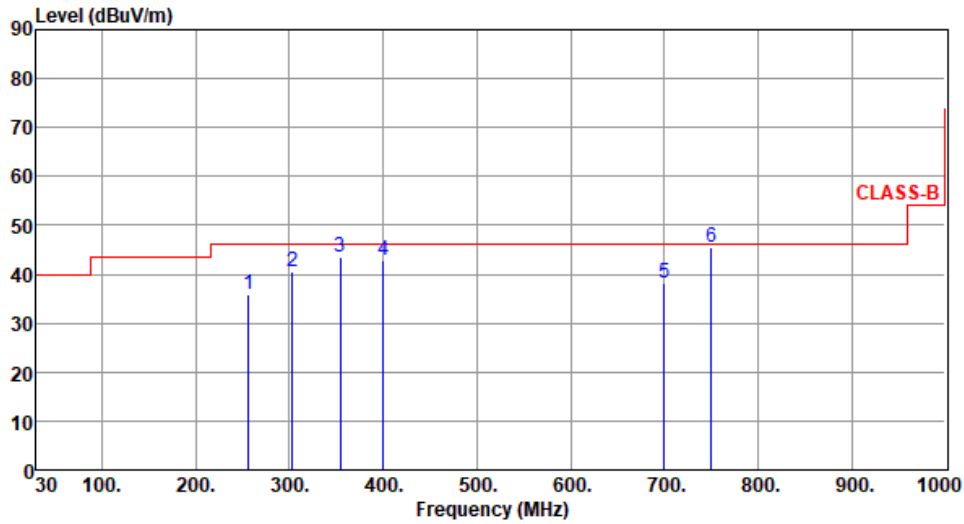
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

<b>Polarization</b>	Horizontal	<b>Test Freq. (MHz)</b>	927.5
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<b>Test Configuration</b>	1
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Test By :BRAD WU      Temperature(°C):23      Humidity(%) :64



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	256.06	35.82	46.00	-10.18	45.86	-10.04	Peak	---	---
2	303.46	40.36	46.00	-5.64	48.87	-8.51	QP	100	244
3	354.29	43.66	46.00	-2.34	50.83	-7.17	QP	100	238
4	400.15	42.74	46.00	-3.26	48.46	-5.72	QP	100	211
5	700.12	38.33	46.00	-7.67	37.16	1.17	Peak	---	---
6	750.06	45.54	46.00	-0.46	42.83	2.71	QP	100	351

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

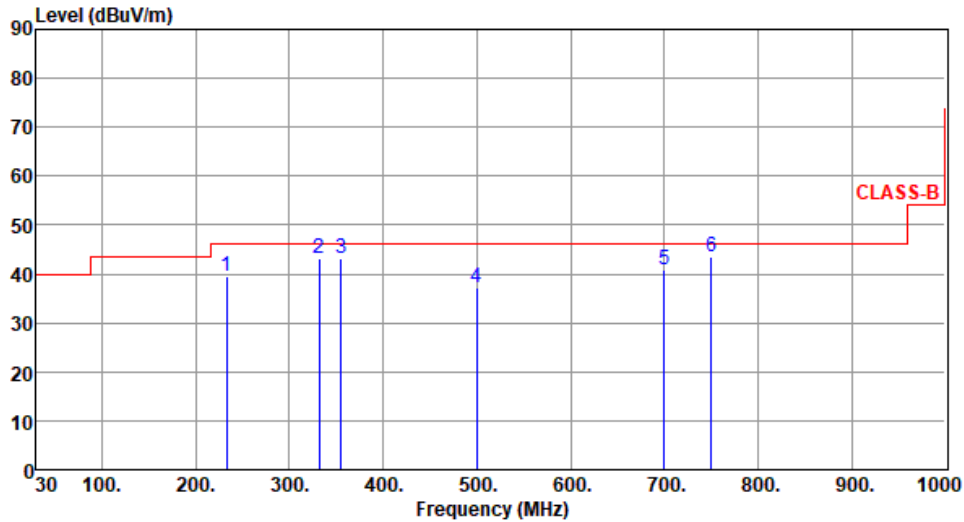
\*Factor includes antenna factor , cable loss and amplifier gain

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.

<b>Polarization</b>	Vertical	<b>Test Freq. (MHz)</b>	927.5
<b>Test Configuration</b>	1		

Test By :BRAD WU      Temperature(°C):23      Humidity(%):64



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	233.04	39.62	46.00	-6.38	50.90	-11.28	Peak	---	---
2	331.36	43.22	46.00	-2.78	50.62	-7.40	QP	100	198
3	354.75	43.24	46.00	-2.76	50.40	-7.16	QP	100	192
4	500.04	37.19	46.00	-8.81	40.46	-3.27	Peak	---	---
5	700.11	40.85	46.00	-5.15	39.68	1.17	Peak	---	---
6	750.05	43.39	46.00	-2.61	40.68	2.71	QP	110	22

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

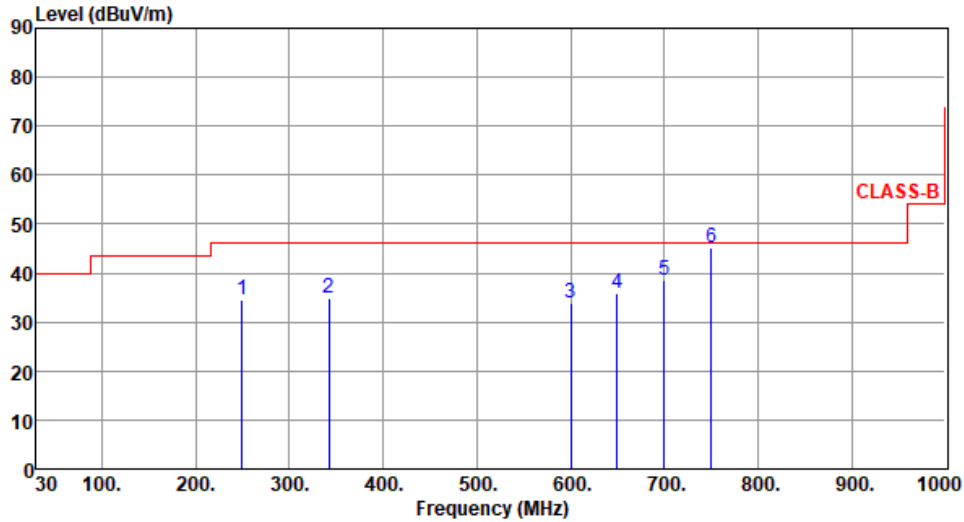
\*Factor includes antenna factor , cable loss and amplifier gain

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.

<b>Polarization</b>	Horizontal	<b>Test Freq. (MHz)</b>	923.3
<b>Test Configuration</b>	2		

Test By :BRAD WU      Temperature(°C):23      Humidity(%) :64



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	249.56	34.58	46.00	-11.42	44.76	-10.18	Peak	---	---
2	342.31	34.85	46.00	-11.15	42.14	-7.29	Peak	---	---
3	600.02	33.75	46.00	-12.25	34.44	-0.69	Peak	---	---
4	649.52	36.03	46.00	-9.97	35.41	0.62	Peak	---	---
5	700.01	38.65	46.00	-7.35	37.48	1.17	Peak	---	---
6	750.03	45.15	46.00	-0.85	42.44	2.71	QP	100	338

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

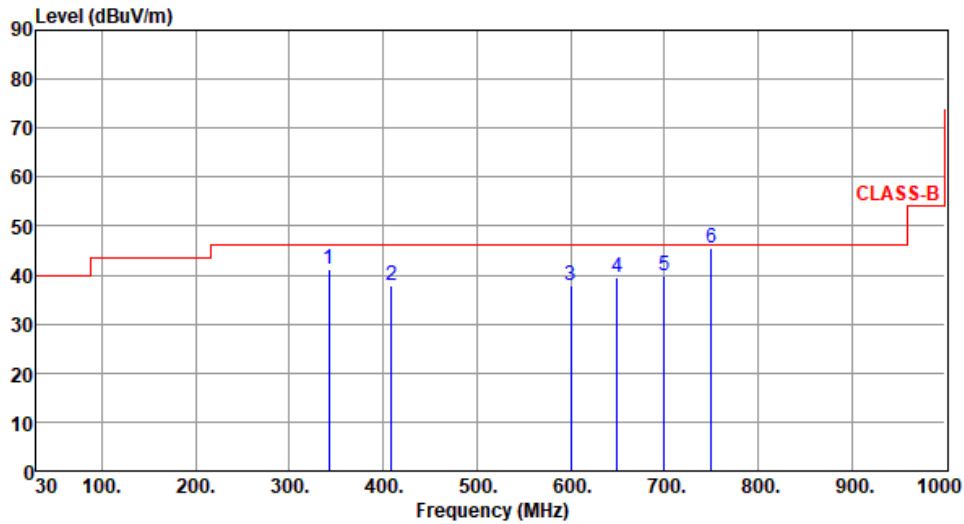
\*Factor includes antenna factor , cable loss and amplifier gain

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.

<b>Polarization</b>	Vertical	<b>Test Freq. (MHz)</b>	923.3
<b>Test Configuration</b>	2		

Test By :BRAD WU      Temperature(°C):23      Humidity(%):64



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	342.26	41.05	46.00	-4.95	48.34	-7.29	Peak	---	---
2	408.76	38.02	46.00	-7.98	43.60	-5.58	Peak	---	---
3	600.00	37.85	46.00	-8.15	38.54	-0.69	Peak	---	---
4	649.56	39.65	46.00	-6.35	39.03	0.62	Peak	---	---
5	700.01	39.88	46.00	-6.12	38.71	1.17	Peak	---	---
6	750.21	45.38	46.00	-0.62	42.67	2.71	QP	134	353

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

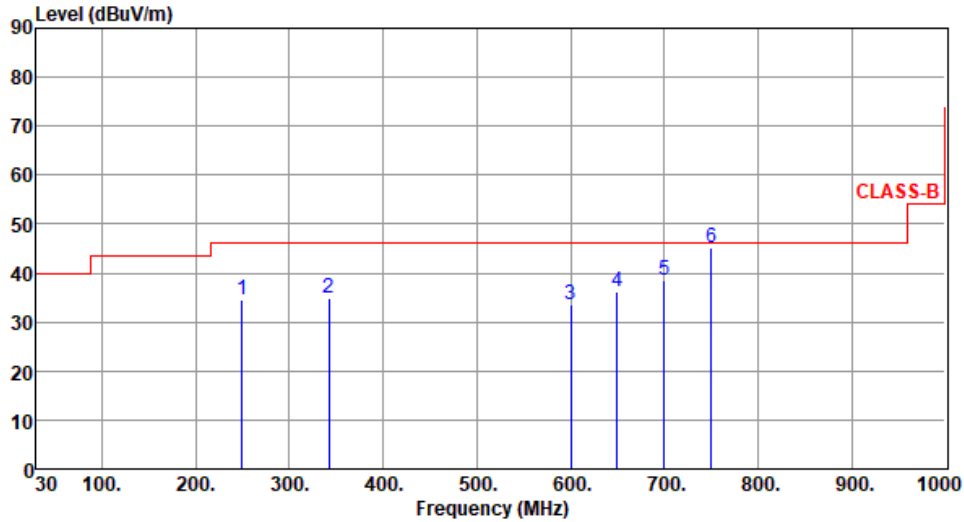
\*Factor includes antenna factor , cable loss and amplifier gain

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.

<b>Polarization</b>	Horizontal	<b>Test Freq. (MHz)</b>	927.5
<b>Test Configuration</b>	2		

Test By :BRAD WU      Temperature(°C):23      Humidity(%) :64



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	249.77	34.56	46.00	-11.44	44.73	-10.17	Peak	---	---
2	342.38	35.01	46.00	-10.99	42.30	-7.29	Peak	---	---
3	600.11	33.48	46.00	-12.52	34.16	-0.68	Peak	---	---
4	649.75	36.25	46.00	-9.75	35.63	0.62	Peak	---	---
5	700.05	38.44	46.00	-7.56	37.27	1.17	Peak	---	---
6	750.27	45.05	46.00	-0.95	42.34	2.71	QP	100	338

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

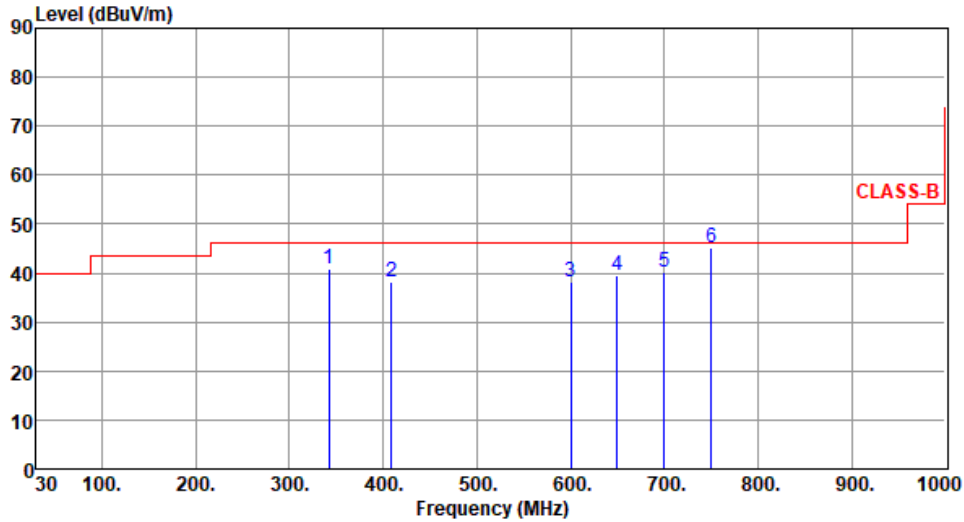
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

<b>Polarization</b>	Vertical	<b>Test Freq. (MHz)</b>	927.5
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<b>Test Configuration</b>	2
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Test By :BRAD WU      Temperature(°C):23      Humidity(%) :64



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	342.43	40.86	46.00	-5.14	48.15	-7.29	Peak	---	---
2	408.65	38.15	46.00	-7.85	43.75	-5.60	Peak	---	---
3	600.27	38.11	46.00	-7.89	38.78	-0.67	Peak	---	---
4	649.52	39.52	46.00	-6.48	38.90	0.62	Peak	---	---
5	700.12	40.08	46.00	-5.92	38.91	1.17	Peak	---	---
6	750.22	45.13	46.00	-0.87	42.42	2.71	QP	125	351

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

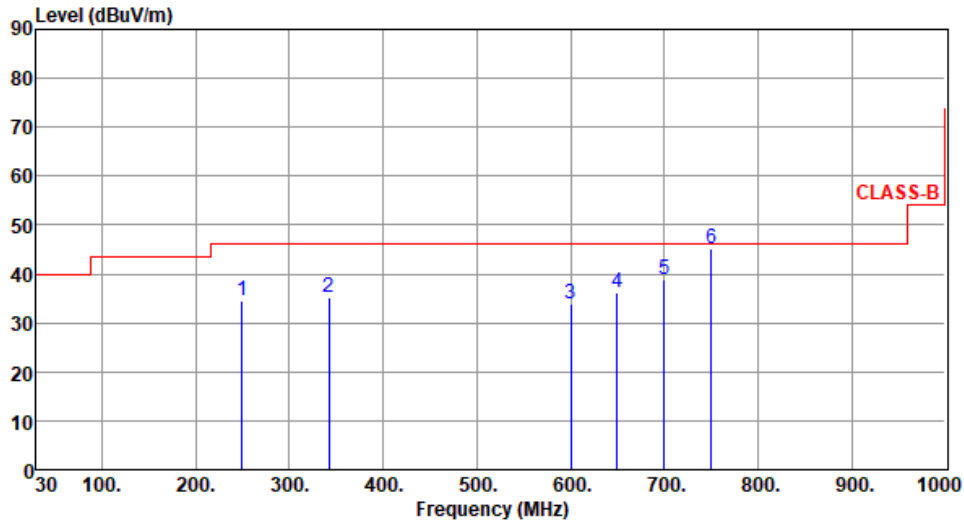
\*Factor includes antenna factor , cable loss and amplifier gain

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.

<b>Polarization</b>	Horizontal	<b>Test Freq. (MHz)</b>	923.3
<b>Test Configuration</b>	3		

Test By :BRAD WU      Temperature(°C):23      Humidity(%) :64



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	249.60	34.62	46.00	-11.38	44.80	-10.18	Peak	---	---
2	342.40	35.07	46.00	-10.93	42.36	-7.29	Peak	---	---
3	600.00	33.82	46.00	-12.18	34.51	-0.69	Peak	---	---
4	649.60	36.18	46.00	-9.82	35.56	0.62	Peak	---	---
5	700.00	38.85	46.00	-7.15	37.68	1.17	Peak	---	---
6	750.02	45.24	46.00	-0.76	42.53	2.71	QP	100	341

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

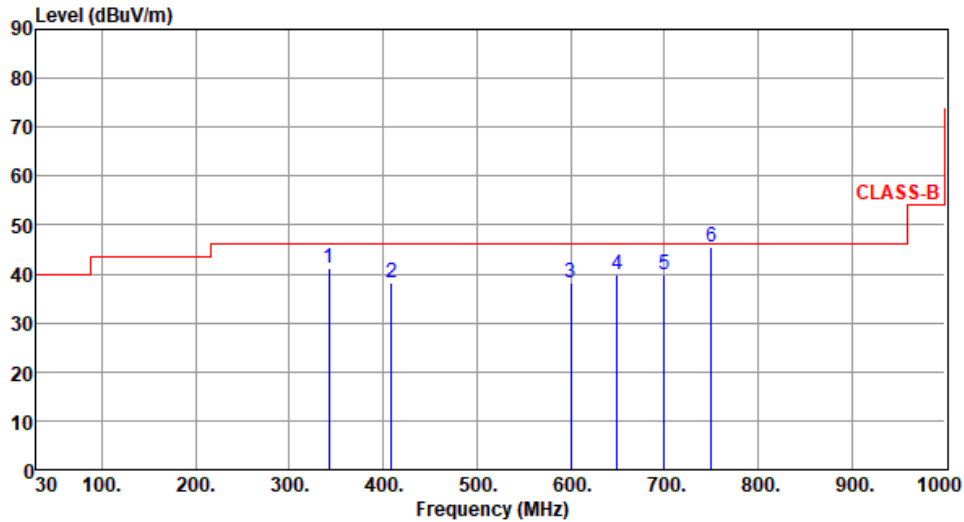
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.



<b>Polarization</b>	Vertical	<b>Test Freq. (MHz)</b>	923.3
<b>Test Configuration</b>	3		

Test By :BRAD WU      Temperature(°C):23      Humidity(%):64



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	342.40	41.18	46.00	-4.82	48.47	-7.29	Peak	---	---
2	408.80	38.33	46.00	-7.67	43.91	-5.58	Peak	---	---
3	600.00	38.16	46.00	-7.84	38.85	-0.69	Peak	---	---
4	649.60	39.79	46.00	-6.21	39.17	0.62	Peak	---	---
5	700.00	40.02	46.00	-5.98	38.85	1.17	Peak	---	---
6	750.04	45.42	46.00	-0.58	42.71	2.71	QP	134	353

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

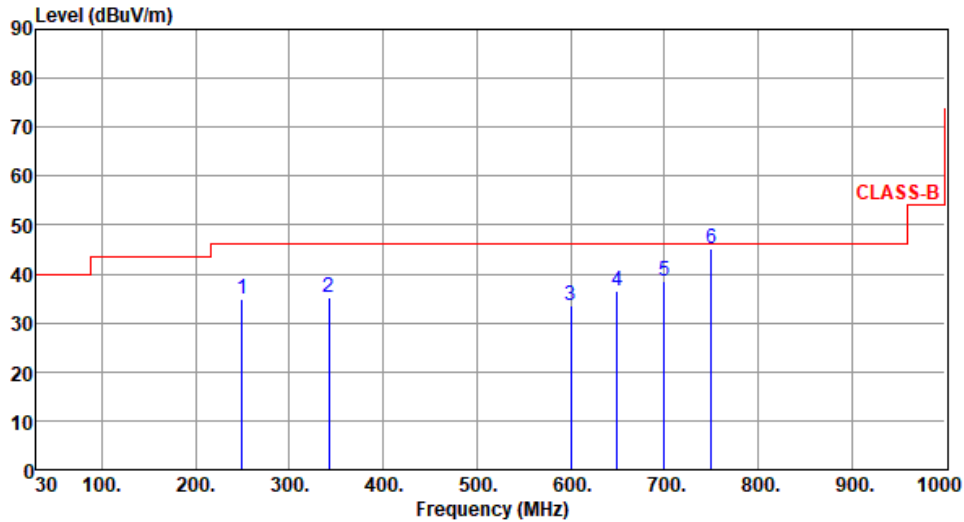
\*Factor includes antenna factor , cable loss and amplifier gain

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.

<b>Polarization</b>	Horizontal	<b>Test Freq. (MHz)</b>	927.5
<b>Test Configuration</b>	3		

Test By :BRAD WU      Temperature(°C):23      Humidity(%):64



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	249.85	34.76	46.00	-11.24	44.93	-10.17	Peak	---	---
2	342.52	35.15	46.00	-10.85	42.44	-7.29	Peak	---	---
3	600.02	33.68	46.00	-12.32	34.37	-0.69	Peak	---	---
4	649.89	36.44	46.00	-9.56	35.82	0.62	Peak	---	---
5	700.16	38.69	46.00	-7.31	37.52	1.17	Peak	---	---
6	750.05	45.16	46.00	-0.84	42.45	2.71	QP	100	344

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

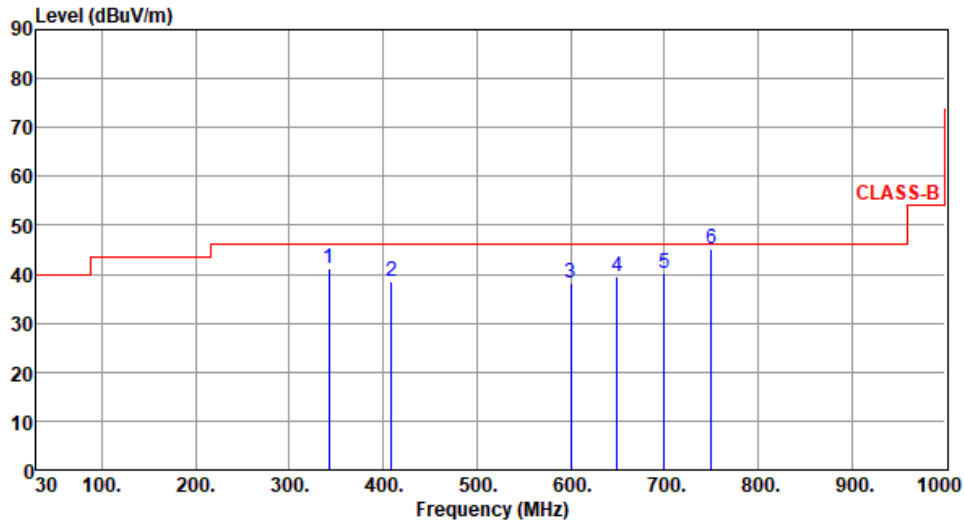
\*Factor includes antenna factor , cable loss and amplifier gain

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.

<b>Polarization</b>	Vertical	<b>Test Freq. (MHz)</b>	927.5
<b>Test Configuration</b>	3		

Test By :BRAD WU      Temperature(°C):23      Humidity(%):64



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	342.58	41.22	46.00	-4.78	48.51	-7.29	Peak	---	---
2	408.96	38.44	46.00	-7.56	44.02	-5.58	Peak	---	---
3	600.06	38.28	46.00	-7.72	38.97	-0.69	Peak	---	---
4	649.45	39.65	46.00	-6.35	39.03	0.62	Peak	---	---
5	700.06	40.28	46.00	-5.72	39.11	1.17	Peak	---	---
6	750.04	45.32	46.00	-0.68	42.61	2.71	QP	131	356

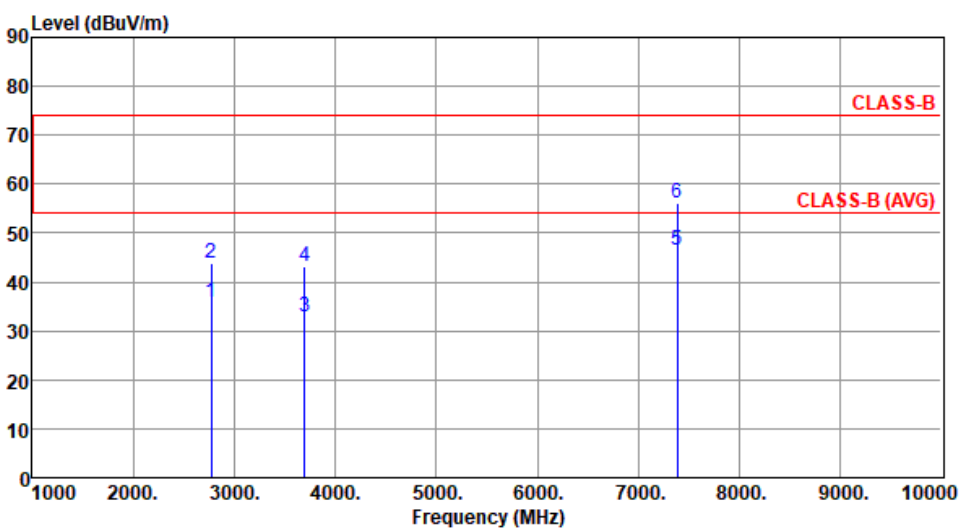
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

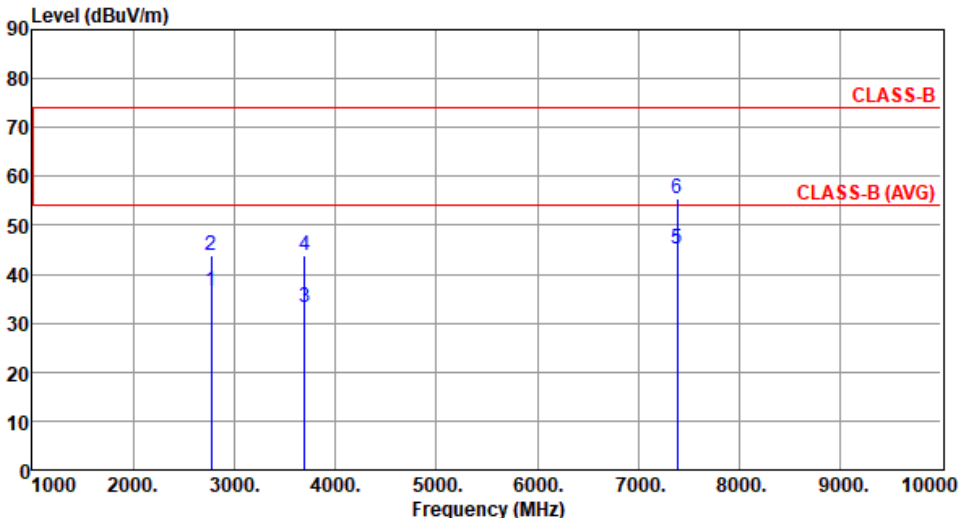
\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

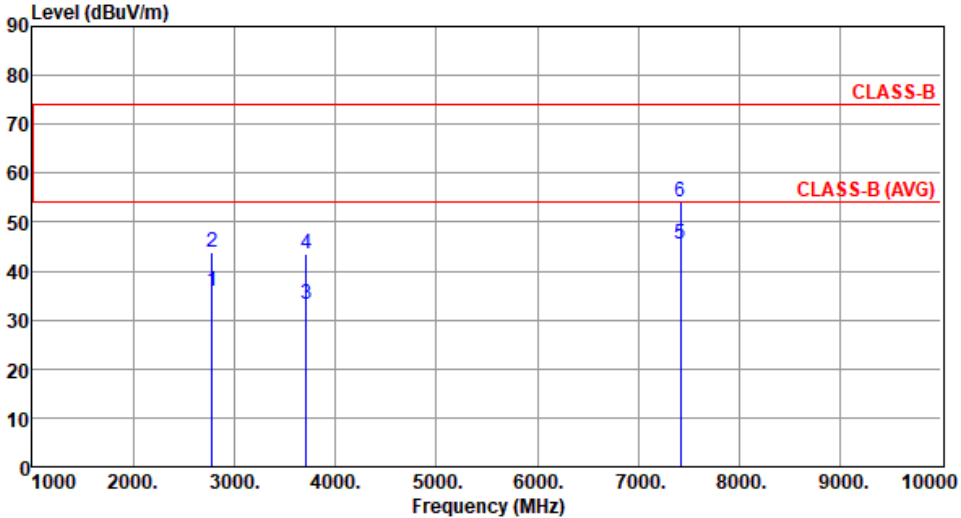
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

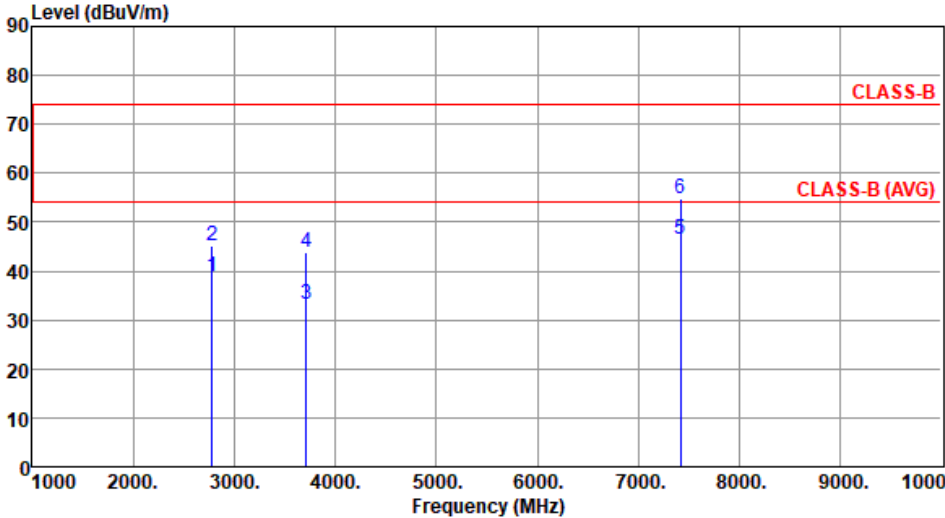
### 3.5.5 Transmitter Radiated Unwanted Emissions (Above 1GHz)

<b>Polarization</b>	Horizontal		<b>Test Freq. (MHz)</b>	923.3					
<b>Test Configuration</b>	1								
Test By : BRAD WU		Temperature(°C): 24		Humidity(%): 64					
									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2769.90	35.86	54.00	-18.14	36.77	-0.91	Average	164	272
2	2769.90	43.80	74.00	-30.20	44.71	-0.91	Peak	164	272
3	3693.20	32.95	54.00	-21.05	31.14	1.81	Average	275	263
4	3693.20	43.23	74.00	-30.77	41.42	1.81	Peak	275	263
5	7386.40	46.43	54.00	-7.57	36.16	10.27	Average	199	321
6	7386.40	56.04	74.00	-17.96	45.77	10.27	Peak	199	321
<p>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).</p>									

<b>Polarization</b>	Vertical	<b>Test Freq. (MHz)</b>	923.3						
<b>Test Configuration</b>	1								
Test By :BRAD WU      Temperature(°C):24      Humidity(%):64									
									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2769.90	36.64	54.00	-17.36	37.55	-0.91	Average	206	18
2	2769.90	43.89	74.00	-30.11	44.80	-0.91	Peak	206	18
3	3693.20	33.29	54.00	-20.71	31.48	1.81	Average	249	303
4	3693.20	43.77	74.00	-30.23	41.96	1.81	Peak	249	303
5	7386.40	45.29	54.00	-8.71	35.02	10.27	Average	189	318
6	7386.40	55.54	74.00	-18.46	45.27	10.27	Peak	189	318

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).

<b>Polarization</b>	Horizontal		<b>Test Freq. (MHz)</b>	927.5					
<b>Test Configuration</b>	1								
Test By	:BRAD WU		Temperature(°C):	24					
			Humidity(%):	64					
									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2782.50	35.94	54.00	-18.06	36.76	-0.82	Average	165	268
2	2782.50	43.92	74.00	-30.08	44.74	-0.82	Peak	165	268
3	3710.00	33.16	54.00	-20.84	31.30	1.86	Average	268	265
4	3710.00	43.45	74.00	-30.55	41.59	1.86	Peak	268	265
5	7420.00	45.39	54.00	-8.61	35.16	10.23	Average	256	163
6	7420.00	54.21	74.00	-19.79	43.98	10.23	Peak	256	163
<p>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).</p>									

<b>Polarization</b>	Vertical	<b>Test Freq. (MHz)</b>	927.5						
<b>Test Configuration</b>	1								
Test By :BRAD WU		Temperature(°C):24			Humidity(%):64				
									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2782.50	38.76	54.00	-15.24	39.58	-0.82	Average	218	2
2	2782.50	45.22	74.00	-28.78	46.04	-0.82	Peak	218	2
3	3710.00	33.35	54.00	-20.65	31.49	1.86	Average	245	301
4	3710.00	43.96	74.00	-30.04	42.10	1.86	Peak	245	301
5	7420.00	46.54	54.00	-7.46	36.31	10.23	Average	210	325
6	7420.00	54.94	74.00	-19.06	44.71	10.23	Peak	210	325
<p>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).</p>									

## 3.6 Emissions in Non-Restricted Frequency Bands

### 3.6.1 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 20 dB relative to the maximum in-band peak PSD level in 100 kHz.

### 3.6.2 Test Procedures

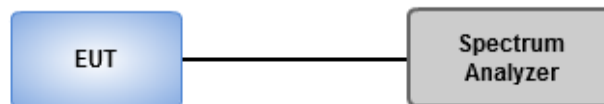
#### Reference level measurement

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 25GHz
4. Use the peak marker function to determine the maximum amplitude level

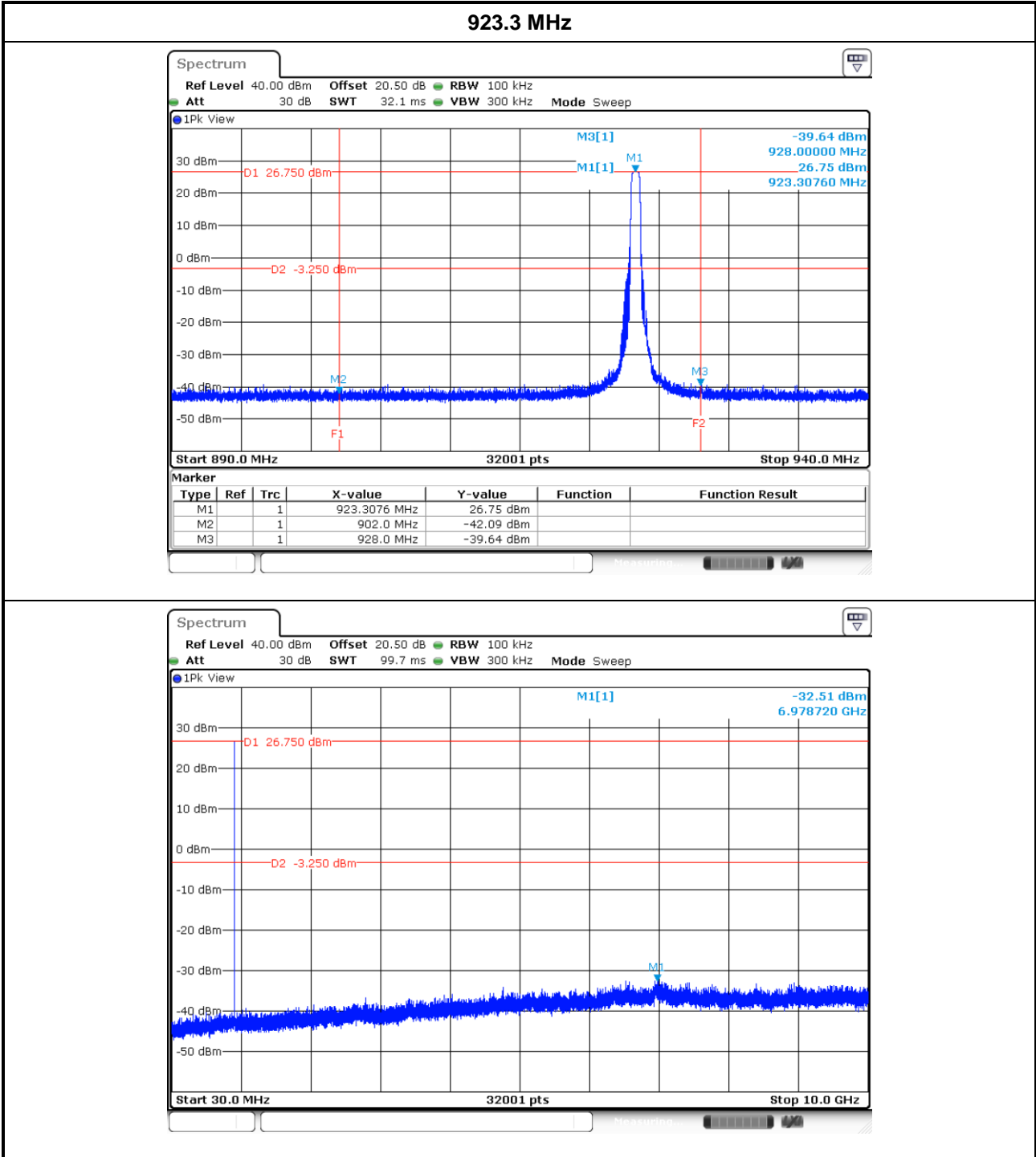
### 3.6.3 Test Setup



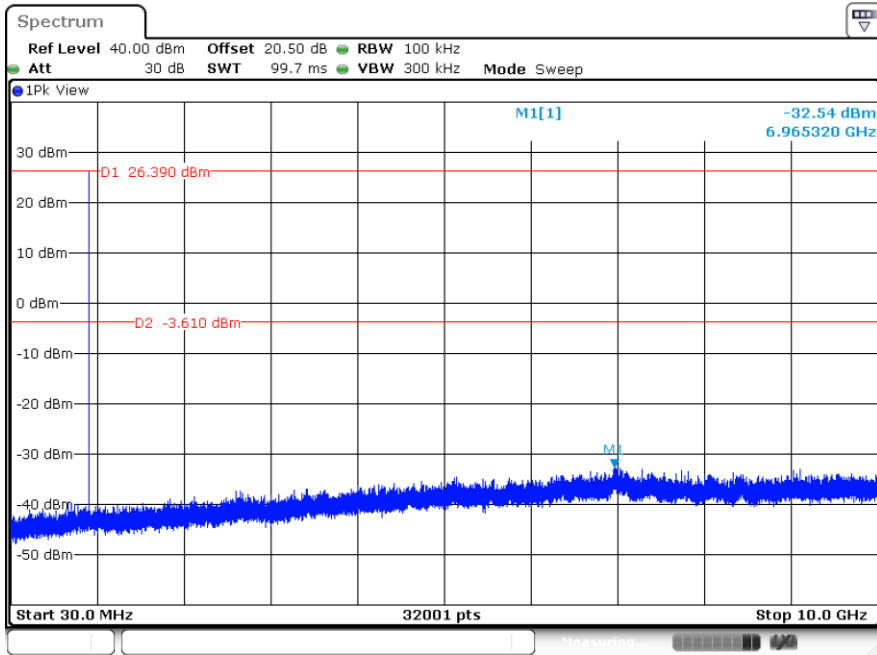
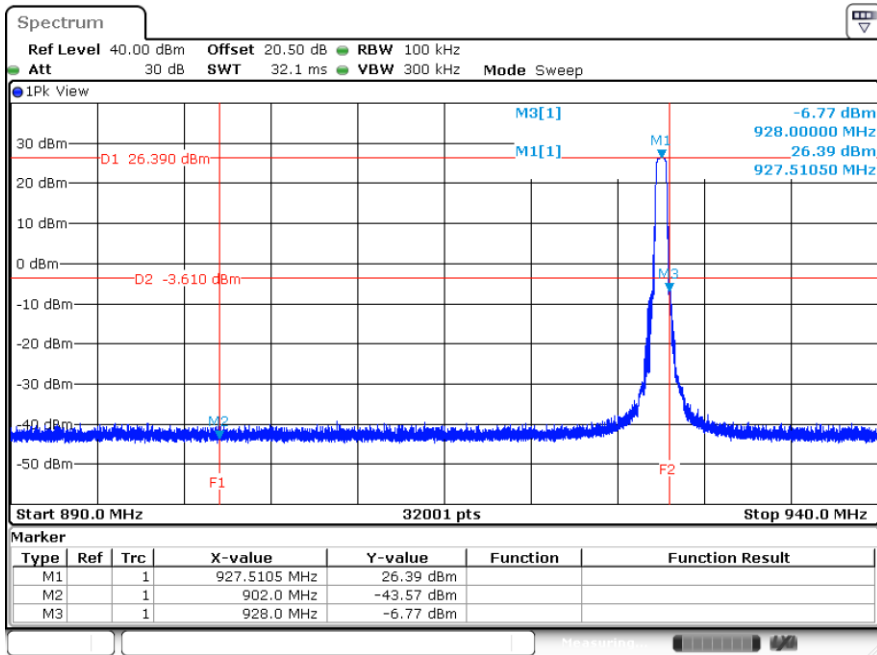


### 3.6.4 Unwanted Emissions into Non-Restricted Frequency Bands

Ambient Condition	22°C / 64%	Tested By	Brad Wu
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### 927.5 MHz



## 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 Corp (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**

Tel: 886-2-2601-1640

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Kou District, New Taipei City,  
Taiwan, R.O.C.

### **Kwei Shan**

Tel: 886-3-271-8666

No. 3-1, Lane 6, Wen San 3rd St.,  
Kwei Shan District, Tao Yuan City  
333, Taiwan, R.O.C.

### **Kwei Shan Site II**

Tel: 886-3-271-8640

No. 14-1, Lane 19, Wen San 3rd  
St., Kwei Shan District, 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

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Email: ICC\_Service@icertifi.com.tw

==END==