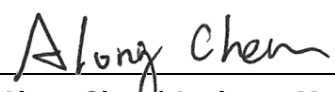


FCC Test Report

FCC ID : MXF-WLRGFM100
Equipment : IOT Femto Gateway
Model No. : WLRGFM-100
Brand Name : Gemtek
Applicant : Gemtek Technology Co., Ltd.
Address : No. 15-1 Zhonghua Road, Hsinchu Industrial
Park, Hukou, Hsinchu, Taiwan, 30352.
Standard : 47 CFR FCC Part 15.247
Received Date : Apr. 10, 2017
Tested Date : May 05 ~ May 16, 2017

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:

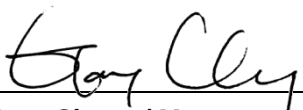

Gary Chang / Manager



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Release Record

Report No.	Version	Description	Issued Date
FR741001	Rev. 01	Initial issue	May 31, 2017

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.578MHz 35.22 (Margin -10.78dB) - AV	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 7420.00MHz 52.63 (Margin -1.37dB) - AV	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 26.40	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

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	Data Rate (bit/sec)	Spread Factor	Channel Bandwidth (kHz)
902 ~ 928	923.3 ~ 927.5	73 ~ 80 [8]	980 ~ 21900	12 ~ 7	500
Note 1: RF output power specifies that Maximum Conducted (Average) Output Power. Note 2: The device uses CSS modulation.					

1.1.2 Antenna Details

Ant. No.	Type	Connector	Gain (dBi)	Remark
1	Dipole	SMA	0.28	External antenna
2	Printed	I-PEX	-0.39	Internal antenna

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	5Vdc from adapter
-------------------	-------------------

1.1.4 Accessories

Accessories		
No.	Equipment	Description
1	AC adapter 1	Brand: PHIHONG Model: PSAF10A-050Q Power Rating: I/P: 100-240Vac, 50/60Hz, 0.28A O/P: 5Vdc, 2A MAX
2	AC adapter 2	Brand: Tenbao Model: SO10WU0500200 Power Rating: I/P: 100-240Vac, 50/60Hz, 0.4A O/P: 5Vdc, 2A MAX
3	AC adapter 3	Brand: ChenYang Model: CC10-050200U Power Rating: I/P: 100-240Vac, 50/60Hz, 0.35A O/P: 5Vdc, 2A MAX
4	USB cable (for charging use)	1.5m non-shielded without core
5	RJ45 cable	0.95m non-shielded without core

1.1.5 Channel List

Channel	Frequency(MHz)
73	923.3
74	923.9
75	924.5
76	925.1
77	925.7
78	926.3
79	926.9
80	927.5

1.1.6 Test Tool and Duty Cycle

Test Tool	Tera Term, version: 4.8	
Duty Cycle and Duty Factor	Duty Cycle (%)	Duty Factor (dB)
	100%	0

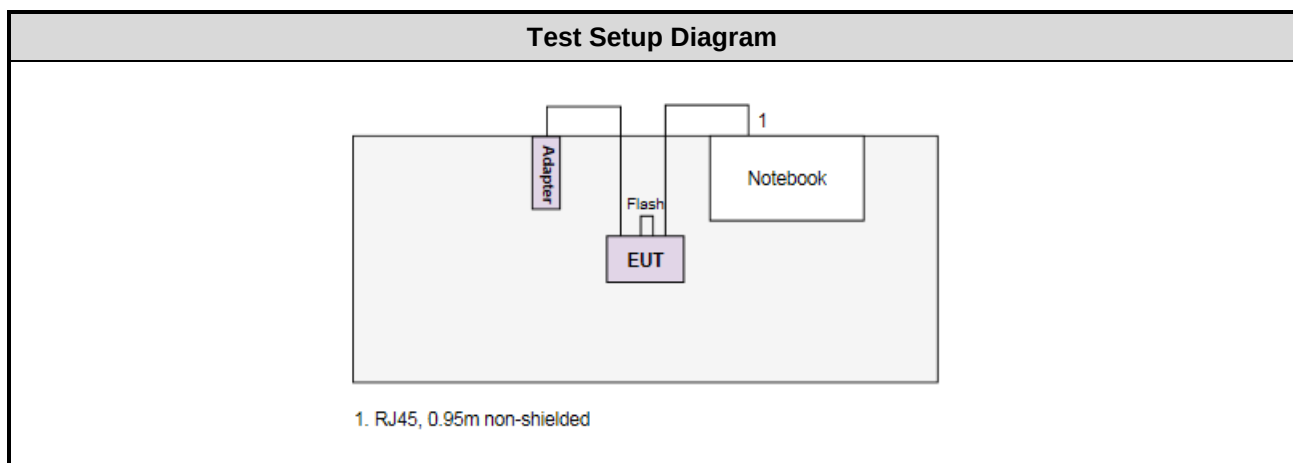
1.1.7 Power Setting

Modulation Mode	Test Frequency (MHz)	
	923.3	927.5
CSS	dig 0--mix 12--pa 3	dig 0--mix 13--pa 3

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Signal cable / Length (m)
1	Notebook	DELL	Latitude E6430	DoC	RJ45, 0.95m non-shielded.
2	USB 3.0 Flash	Kingston	DTSE9G2	---	---

1.3 Test Setup Chart



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101657	Dec. 21, 2016	Dec. 20, 2017
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 08, 2016	Nov. 07, 2017
RF Cable-CON	EMC	EMCCFD300-BM-BM-6000	50821	Dec. 20, 2016	Dec. 19, 2017
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101498	Nov. 25, 2016	Nov. 24, 2017
Receiver	R&S	ESR3	101658	Nov. 24, 2016	Nov. 23, 2017
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Aug. 04, 2016	Aug. 03, 2017
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 21, 2016	Dec. 20, 2017
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 10, 2016	Nov. 09, 2017
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Dec. 09, 2016	Dec. 08, 2017
Preamplifier	EMC	EMC02325	980225	Aug. 05, 2016	Aug. 04, 2017
Preamplifier	Agilent	83017A	MY39501308	Oct. 06, 2016	Oct. 05, 2017
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Dec. 09, 2016	Dec. 08, 2017
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Dec. 09, 2016	Dec. 08, 2017
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16139/4	Dec. 09, 2016	Dec. 08, 2017
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	16052	Dec. 09, 2016	Dec. 08, 2017
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Dec. 09, 2016	Dec. 08, 2017
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-002	Dec. 09, 2016	Dec. 08, 2017
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)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101063	Mar. 15, 2017	Mar. 14, 2018
Power Meter	Anritsu	ML2495A	1241002	Oct. 06, 2016	Oct. 05, 2017
Power Sensor	Anritsu	MA2411B	1207366	Oct. 06, 2016	Oct. 05, 2017
AC POWER SOURCE	APC	AFC-500W	F312060012	Oct. 28, 2016	Oct. 27, 2017
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.247

ANSI C63.10-2013

FCC KDB 558074 D01 DTS Meas Guidance v04

1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Measurement Uncertainty	
Parameters	Uncertainty
Bandwidth	±34.134 Hz
Conducted power	±0.808 dB
Power density	±0.463 dB
Conducted emission	±2.670 dB
AC conducted emission	±2.90 dB
Radiated emission ≤ 1GHz	±3.66 dB
Radiated emission > 1GHz	±5.63 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	22°C / 60%	Alex Tsai
Radiated Emissions	03CH01-WS	24°C / 62%	Kevin Lee Vincent Yeh
RF Conducted	TH01-WS	22°C / 64%	Brad Wu

- FCC Designation No.: TW2732
- FCC site registration No.: 181692
- IC site registration No.: 10807A-1

2.2 The Worst Test Modes and Channel Details

Test item	Test Frequency (MHz)	Channel Bandwidth (kHz)	Modulation / SF	Test Configuration
Conducted Emissions Maximum Output Power 6dB Bandwidth Power Spectral Density	923.3 / 927.5	500	CSS / 12	1
Radiated Emissions ≤1GHz Radiated Emissions >1GHz	923.3 / 927.5	500	CSS / 12	1, 2
Note: - Three adapters (PHIHONG, Tenbao and ChenYang) had been covered during the pre-test and found that PHIHONG adapter was the worst case for radiated emission and ChenYang adapter was the worst case for conducted emission test. - Two types antenna was selected to perform radiated emission test that listed as below configuration. Test Configuration 1: with external antenna Test Configuration 2: with internal antenna				

3 Transmitter Test Results

3.1 Conducted Emissions

3.1.1 Limit of Conducted Emissions

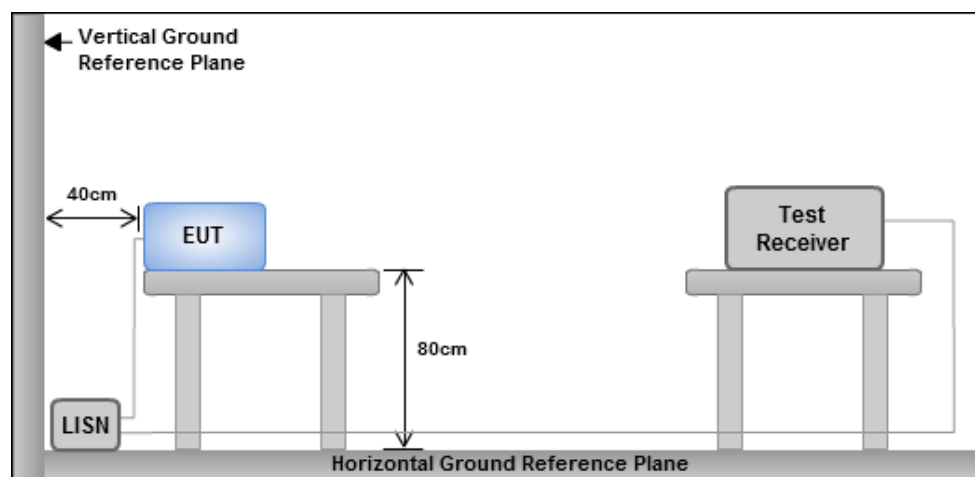
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

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 Ω 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.

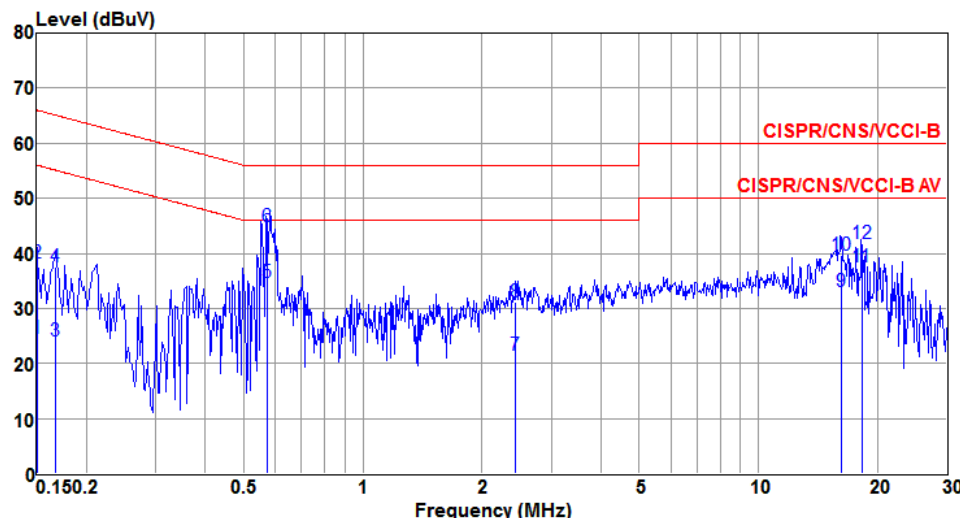
3.1.3 Test Setup



- 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

Modulation / SF	CSS / 12	Test Freq. (MHz)	923.3
Power Phase	Line		

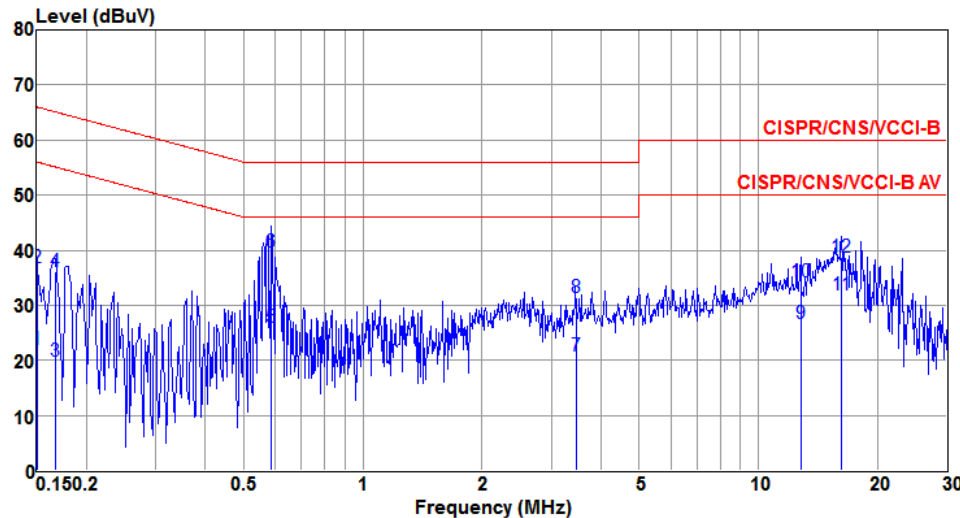


	Freq	Level	Limit	Over	Read	LISN	cable	
	MHz	dBuV	Line	Limit	Level	factor	loss	Remark
			dBuV	dB	dBuV	dB	dB	
1	0.150	24.60	56.00	-31.40	24.49	0.07	0.04	Average
2	0.150	38.17	66.00	-27.83	38.06	0.07	0.04	QP
3	0.168	24.06	55.08	-31.02	23.94	0.08	0.04	Average
4	0.168	37.60	65.08	-27.48	37.48	0.08	0.04	QP
5	0.574	34.59	46.00	-11.41	34.49	0.06	0.04	Average
6	0.574	44.87	56.00	-11.13	44.77	0.06	0.04	QP
7	2.434	21.44	46.00	-24.56	21.23	0.14	0.07	Average
8	2.434	31.19	56.00	-24.81	30.98	0.14	0.07	QP
9	16.167	33.04	50.00	-16.96	32.46	0.34	0.24	Average
10	16.167	39.68	60.00	-20.32	39.10	0.34	0.24	QP
11	18.244	37.43	50.00	-12.57	36.81	0.37	0.25	Average
12	18.244	41.70	60.00	-18.30	41.08	0.37	0.25	QP

Note 1: Level (dBUV) = Read Level (dBUV) + LISN Factor (dB) + Cable Loss (dB).

2: Over Limit (dB) = Level (dBUV) – Limit Line (dBUV).

Modulation / SF	CSS / 12	Test Freq. (MHz)	923.3
Power Phase	Neutral		



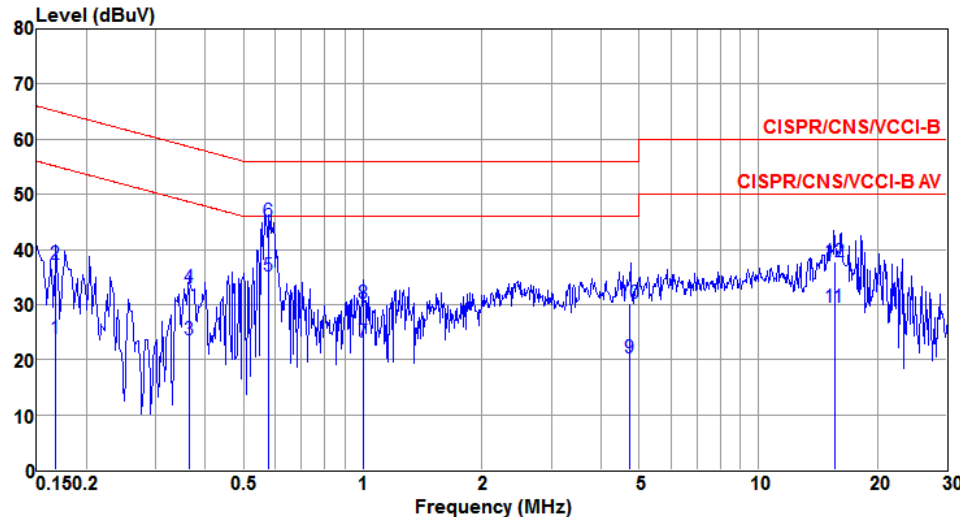
The graph displays the measured level in dBuV across a frequency range from 0.150 to 30 MHz. Two red lines represent the CISPR/CNS/VCCI-B and CISPR/CNS/VCCI-B AV limits. The blue line shows the measured signal, with several peaks labeled 1 through 12. The measured signal generally stays below the limits, with some peaks reaching up to 40 dBuV.

	Freq	Level	Limit	Over	Read	LISN	cable	Remark
	MHz	dBuV	Line	Limit	Level	factor	loss	
			dBuV	dB	dBuV	dB	dB	
1	0.150	22.03	56.00	-33.97	21.89	0.10	0.04	Average
2	0.150	36.86	66.00	-29.14	36.72	0.10	0.04	QP
3	0.168	19.87	55.08	-35.21	19.73	0.10	0.04	Average
4	0.168	36.13	65.08	-28.95	35.99	0.10	0.04	QP
5	0.587	25.88	46.00	-20.12	25.73	0.11	0.04	Average
6@	0.587	39.59	56.00	-16.41	39.44	0.11	0.04	QP
7	3.469	20.81	46.00	-25.19	20.54	0.14	0.13	Average
8	3.469	31.41	56.00	-24.59	31.14	0.14	0.13	QP
9	12.808	26.58	50.00	-23.42	26.00	0.35	0.23	Average
10	12.808	34.29	60.00	-25.71	33.71	0.35	0.23	QP
11	16.228	31.78	50.00	-18.22	31.16	0.38	0.24	Average
12	16.228	38.74	60.00	-21.26	38.12	0.38	0.24	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).

2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

Modulation / SF	CSS / 12	Test Freq. (MHz)	927.5
Power Phase	Line		

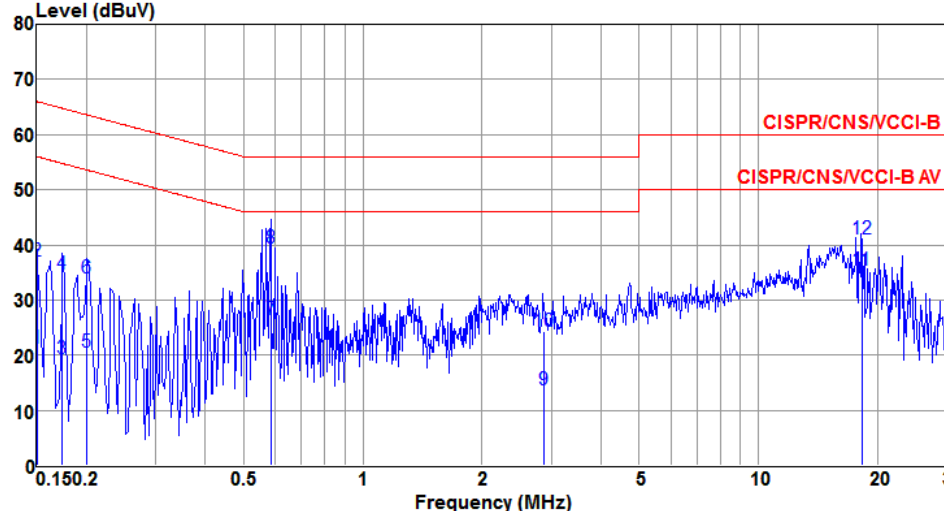


	Freq	Level	Limit	Over	Read	LISN	cable	
	MHz	dBuV	Line	Limit	Level	factor	loss	Remark
			dBuV	dB	dBuV	dB	dB	
1	0.168	23.88	55.08	-31.20	23.76	0.08	0.04	Average
2	0.168	37.21	65.08	-27.87	37.09	0.08	0.04	QP
3	0.363	23.64	48.65	-25.01	23.53	0.07	0.04	Average
4	0.363	33.00	58.65	-25.65	32.89	0.07	0.04	QP
5@	0.578	35.22	46.00	-10.78	35.12	0.06	0.04	Average
6	0.578	45.09	56.00	-10.91	44.99	0.06	0.04	QP
7	1.003	23.04	46.00	-22.96	22.93	0.07	0.04	Average
8	1.003	30.27	56.00	-25.73	30.16	0.07	0.04	QP
9	4.724	20.32	46.00	-25.68	19.97	0.18	0.17	Average
10	4.724	30.27	56.00	-25.73	29.92	0.18	0.17	QP
11	15.558	29.61	50.00	-20.39	29.05	0.33	0.23	Average
12	15.558	37.70	60.00	-22.30	37.14	0.33	0.23	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).

Note 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

Modulation / SF	CSS / 12	Test Freq. (MHz)	927.5
Power Phase	Neutral		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.150	21.16	56.00	-34.84	21.02	0.10	0.04	Average
2	0.150	37.12	66.00	-28.88	36.98	0.10	0.04	QP
3	0.174	19.45	54.77	-35.32	19.32	0.09	0.04	Average
4	0.174	34.71	64.77	-30.06	34.58	0.09	0.04	QP
5	0.201	20.64	53.58	-32.94	20.51	0.09	0.04	Average
6	0.201	34.02	63.58	-29.56	33.89	0.09	0.04	QP
7	0.585	26.46	46.00	-19.54	26.31	0.11	0.04	Average
8	0.585	39.35	56.00	-16.65	39.20	0.11	0.04	QP
9	2.875	13.62	46.00	-32.38	13.37	0.15	0.10	Average
10	2.875	24.36	56.00	-31.64	24.11	0.15	0.10	QP
11@	18.244	35.47	50.00	-14.53	34.82	0.40	0.25	Average
12	18.244	41.03	60.00	-18.97	40.38	0.40	0.25	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).

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

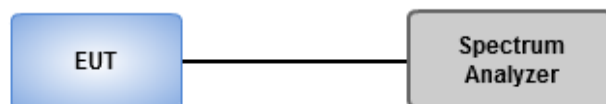
6dB Bandwidth

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

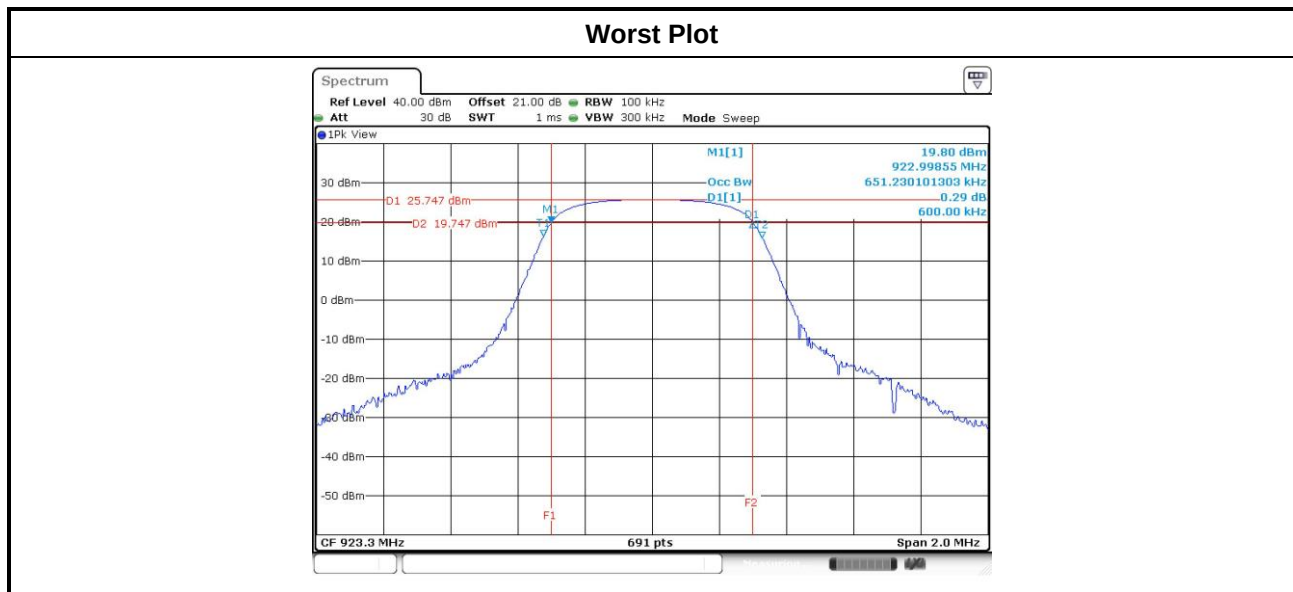
1. Set resolution bandwidth (RBW) = 10kHz, Video bandwidth = 30kHz.
2. Detector = Sample, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Use the OBW measurement function of spectrum analyzer to measure the occupied bandwidth.

3.2.3 Test Setup

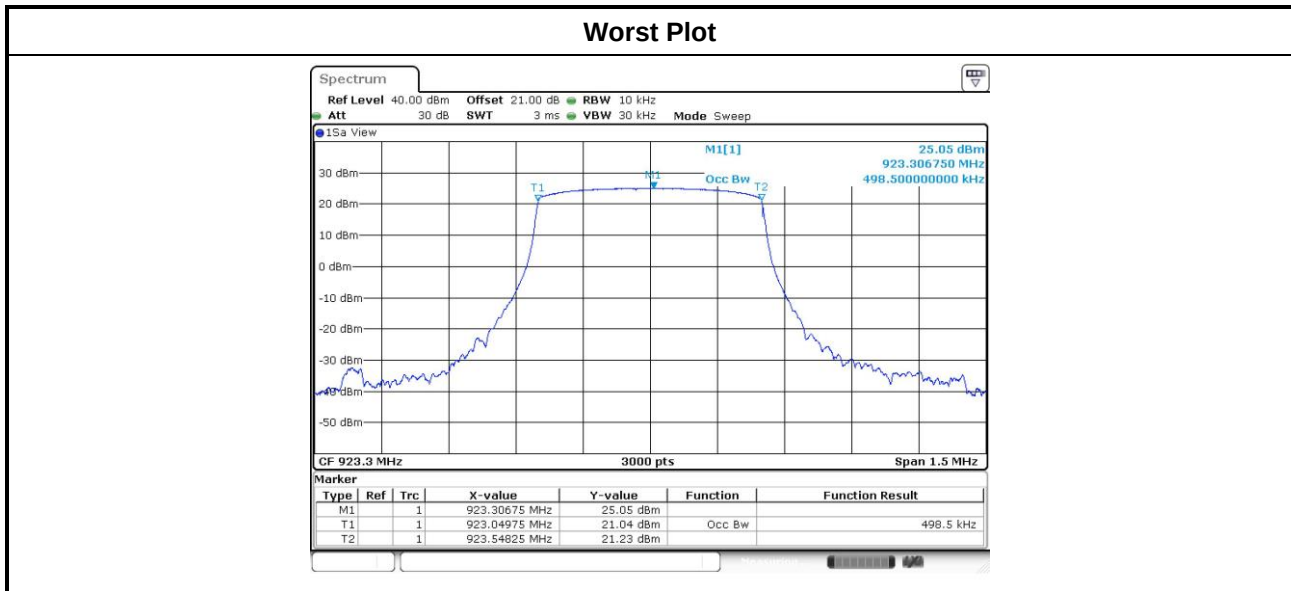


3.2.4 Test Result of 6dB and Occupied Bandwidth

Modulation / SF	Freq. (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
CSS / 12	923.3	0.600	0.5
CSS / 12	927.5	0.609	0.5



Modulation / SF	Freq. (MHz)	99% Occupied Bandwidth (MHz)
CSS / 12	923.3	0.499
CSS / 12	927.5	0.497



3.3 RF Output Power

3.3.1 Limit of RF Output Power

Conducted power shall not exceed 1Watt.

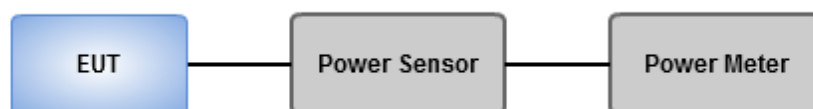
- ☒ Antenna gain $\leq 6\text{dBi}$, no any corresponding reduction is in output power limit.
- ☐ Antenna gain $> 6\text{dBi}$

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

3.3.2 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.

3.3.3 Test Setup



3.3.4 Test Result of Maximum Output Power

Modulation / SF	Freq. (MHz)	Output Power (mW)	Output Power (dBm)	Limit (dBm)
CSS / 12	923.3	411.1497	26.14	30
CSS / 12	927.5	436.5158	26.40	30

3.4 Power Spectral Density

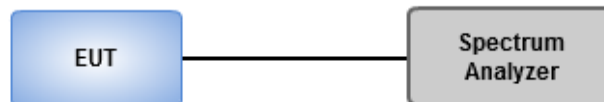
3.4.1 Limit of Power Spectral Density

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

3.4.2 Test Procedures

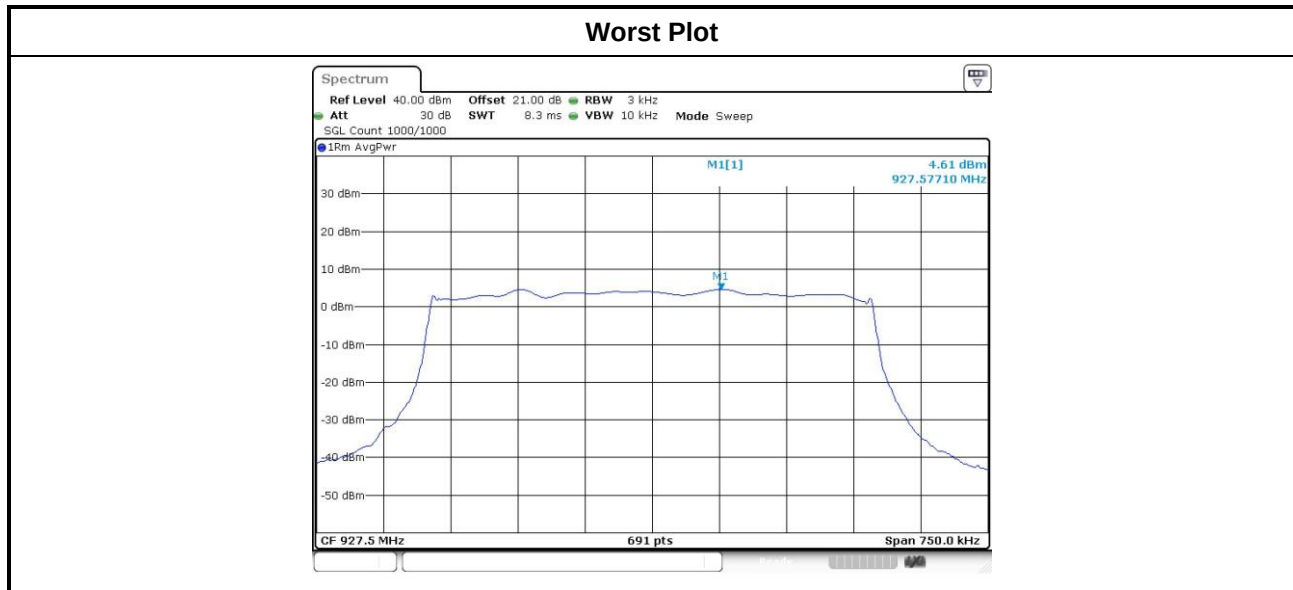
- ☐ Maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit.
 1. Set the RBW = 3kHz, VBW = 10kHz.
 2. Detector = Peak, Sweep time = auto couple.
 3. Trace mode = max hold, allow trace to fully stabilize.
 4. Use the peak marker function to determine the maximum amplitude level.
- ☒ Maximum (average) conducted output power was used to demonstrate compliance to the fundamental output power limit.
 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.

3.4.3 Test Setup



3.4.4 Test Result of Power Spectral Density

Modulation / SF	Freq. (MHz)	Total Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
CSS / 12	923.3	4.23	8.00
CSS / 12	927.5	4.61	8.00



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

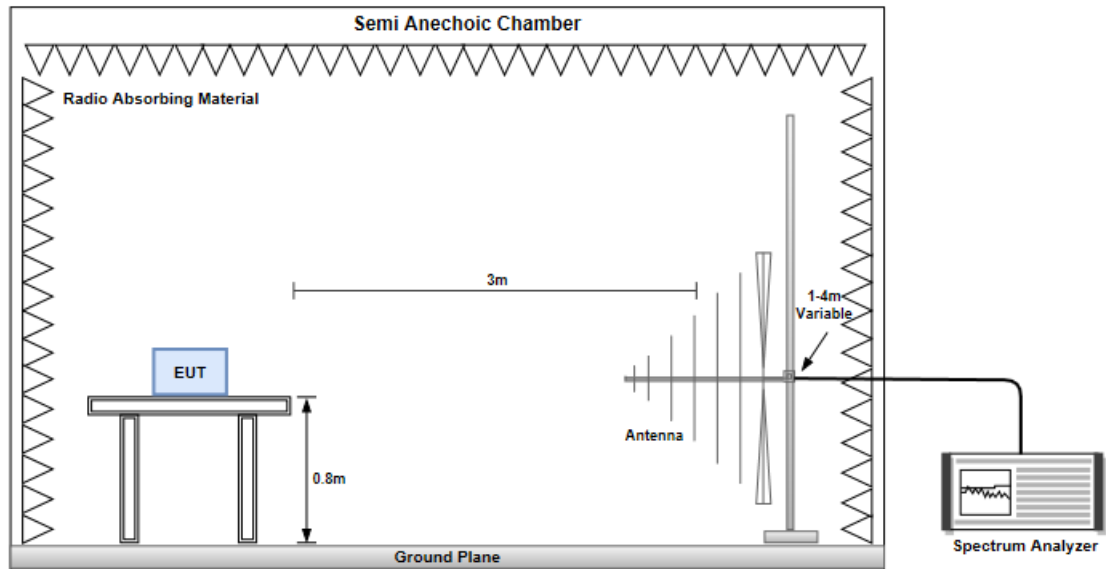
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

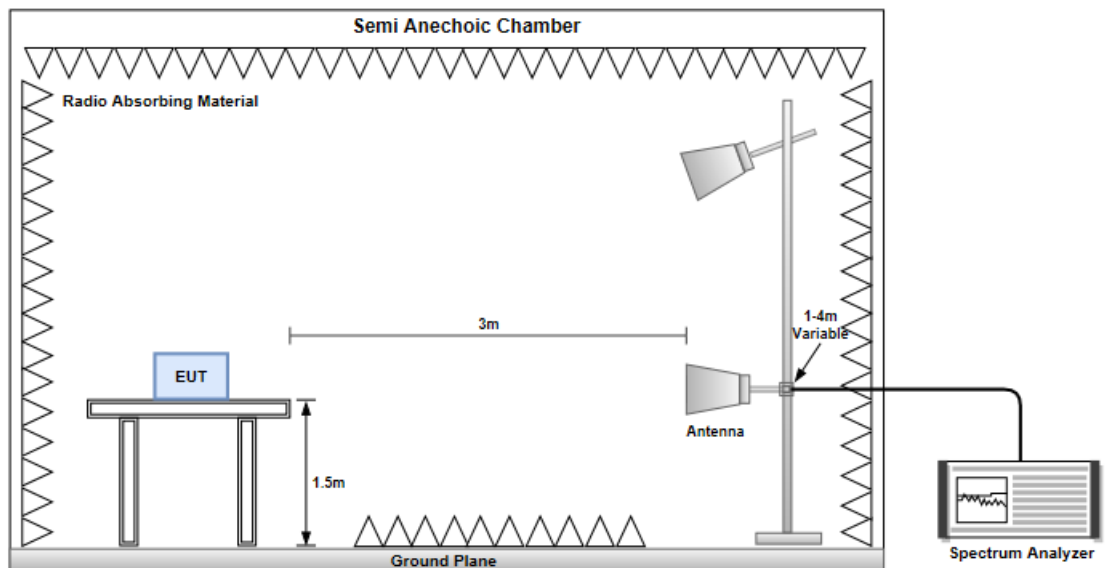
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz

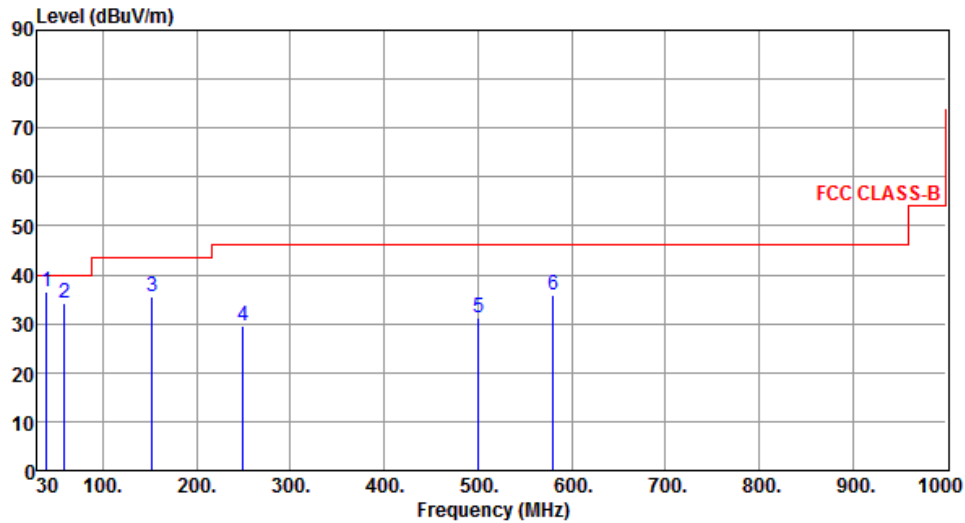


Configuration 1: with external antenna

3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation / SF	CSS / 12	Test Freq. (MHz)	923.3
Polarization	Horizontal		
Level (dBuV/m) 30 100. 200. 300. 400. 500. 600. 700. 800. 900. 1000 1 2 3 4 5 6 40 30 20 10 0 90 80 70 60 50 40 30 20 10 0 30 100. 200. 300. 400. 500. 600. 700. 800. 900. 1000 Frequency (MHz) Freq. Emission Limit Margin SA Factor Remark ANT Turn level reading MHz dBuV/m dBuV/m dB dBuV dB High Table cm deg 1 2 3 4 5 6 39.70 162.89 249.22 266.68 375.32 579.99 32.47 36.04 36.09 29.57 28.81 34.59 40.00 43.50 46.00 46.00 46.00 46.00 -7.53 -7.46 -9.91 -16.43 -17.19 -11.41 40.32 44.25 45.32 38.15 34.42 35.72 -7.85 -8.21 -9.23 -8.58 -5.61 -1.13 Peak Peak Peak Peak Peak 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	CSS / 12	Test Freq. (MHz)	923.3
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	39.70	36.39	40.00	-3.61	44.24	-7.85	Peak	---	---
2	59.10	34.35	40.00	-5.65	43.15	-8.80	QP	100	281
3	152.22	35.50	43.50	-8.00	43.67	-8.17	Peak	---	---
4	249.22	29.57	46.00	-16.43	38.80	-9.23	Peak	---	---
5	500.45	31.35	46.00	-14.65	34.15	-2.80	Peak	---	---
6	579.99	35.80	46.00	-10.20	36.93	-1.13	Peak	---	---

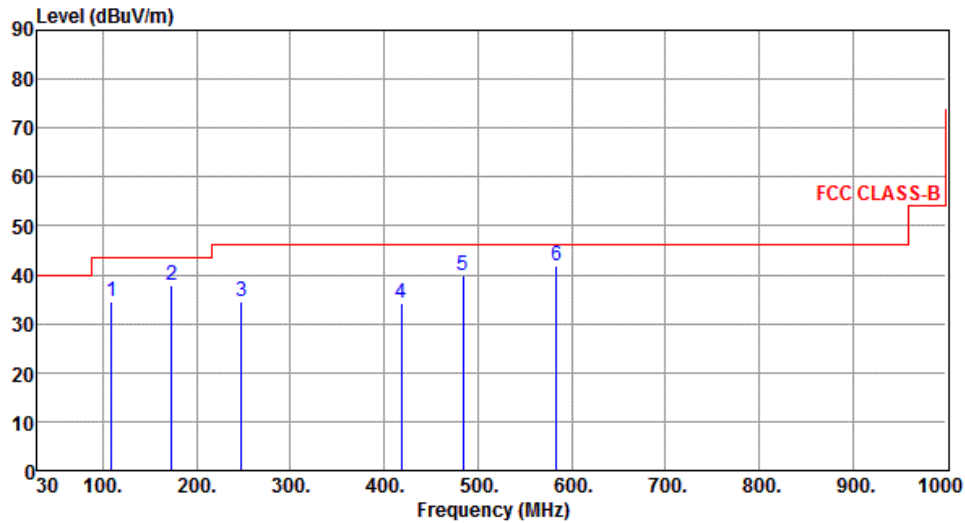
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*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	CSS / 12	Test Freq. (MHz)	927.5
Polarization	Horizontal		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	109.54	34.70	43.50	-8.80	45.94	-11.24	Peak	---	---
2	173.56	38.00	43.50	-5.50	46.98	-8.98	Peak	---	---
3	247.50	34.48	46.00	-11.52	43.75	-9.27	Peak	---	---
4	418.84	34.34	46.00	-11.66	38.86	-4.52	Peak	---	---
5	483.84	39.71	46.00	-6.29	42.82	-3.11	Peak	---	---
6	584.00	41.87	46.00	-4.13	42.91	-1.04	Peak	---	---

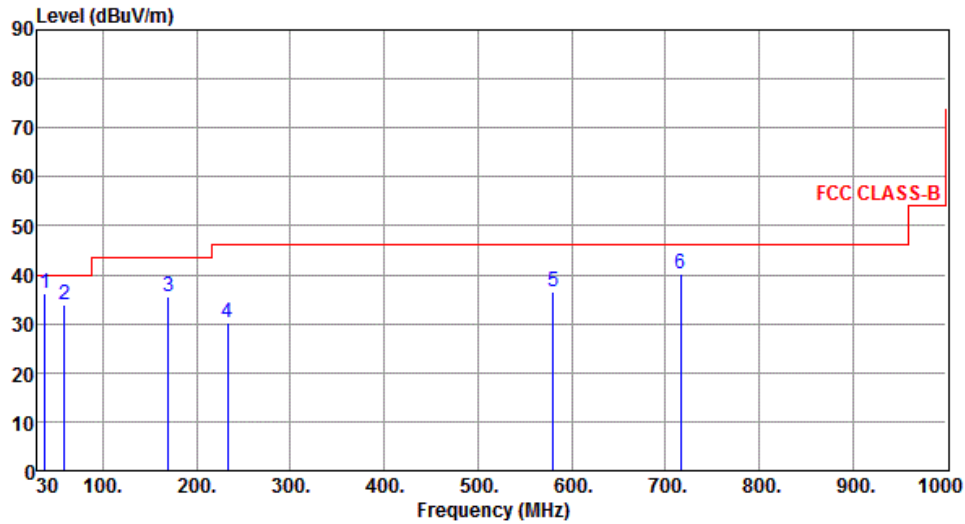
Note 1: Emission Level (dBUV/m) = SA Reading (dBUV/m) + Factor* (dB)

*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	CSS / 12	Test Freq. (MHz)	927.5
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	37.76	36.09	40.00	-3.91	44.24	-8.15	Peak	---	---
2	58.70	33.78	40.00	-6.22	42.54	-8.76	QP	100	284
3	169.68	35.55	43.50	-7.95	44.08	-8.53	Peak	---	---
4	232.80	30.06	46.00	-15.94	39.44	-9.38	Peak	---	---
5	580.80	36.53	46.00	-9.47	37.64	-1.11	Peak	---	---
6	716.80	40.21	46.00	-5.79	39.06	1.15	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.

3.5.5 Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation / SF	CSS / 12	Test Freq. (MHz)	923.3
Polarization	Horizontal		
Level (dBuV/m)			

Modulation / SF	CSS / 12	Test Freq. (MHz)	923.3
Polarization	Vertical		
Level (dBuV/m)			

Modulation / SF	CSS / 12	Test Freq. (MHz)	927.5
Polarization	Horizontal		
Level (dBuV/m)			

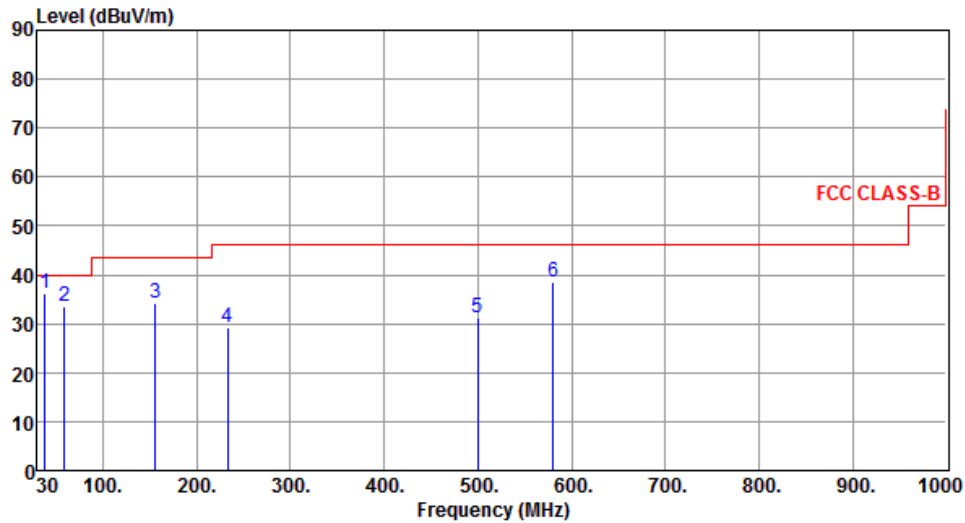
Modulation / SF	CSS / 12	Test Freq. (MHz)	927.5
Polarization	Vertical		
Level (dBuV/m)			

Configuration 2: with internal antenna

3.5.6 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation / SF	CSS / 12	Test Freq. (MHz)	923.3
Polarization	Horizontal		
Level (dBuV/m) <			

Modulation / SF	CSS / 12	Test Freq. (MHz)	923.3
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	37.76	36.31	40.00	-3.69	44.46	-8.15	Peak	---	---
2	59.10	33.68	40.00	-6.32	42.48	-8.80	QP	100	293
3	156.10	34.17	43.50	-9.33	42.29	-8.12	Peak	---	---
4	232.73	29.30	46.00	-16.70	38.68	-9.38	Peak	---	---
5	499.48	31.34	46.00	-14.66	34.16	-2.82	Peak	---	---
6	579.99	38.57	46.00	-7.43	39.70	-1.13	Peak	---	---

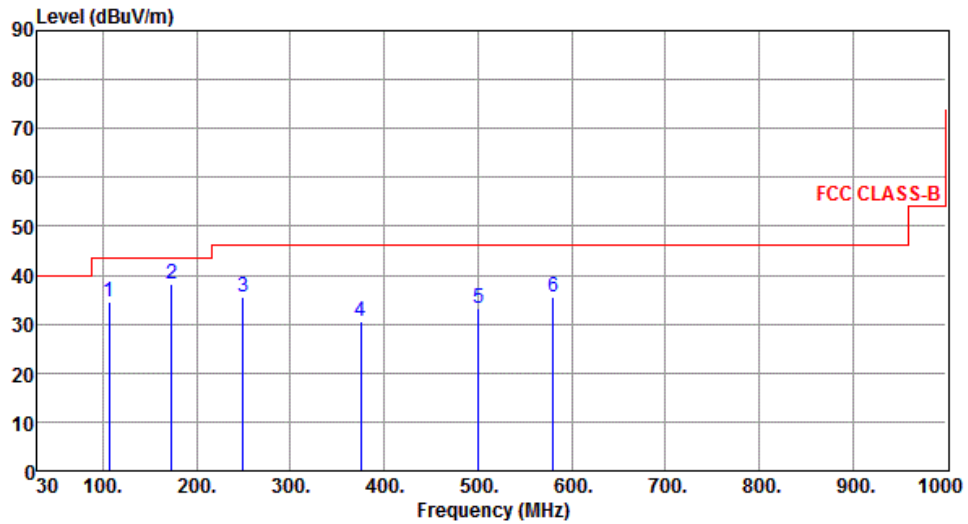
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*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	CSS / 12	Test Freq. (MHz)	927.5
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	106.63	34.47	43.50	-9.03	46.21	-11.74	Peak	---	---
2	173.56	38.05	43.50	-5.45	47.03	-8.98	Peak	---	---
3	249.22	35.44	46.00	-10.56	44.67	-9.23	Peak	---	---
4	375.32	30.45	46.00	-15.55	36.06	-5.61	Peak	---	---
5	500.45	33.12	46.00	-12.88	35.92	-2.80	Peak	---	---
6	579.99	35.65	46.00	-10.35	36.78	-1.13	Peak	---	---

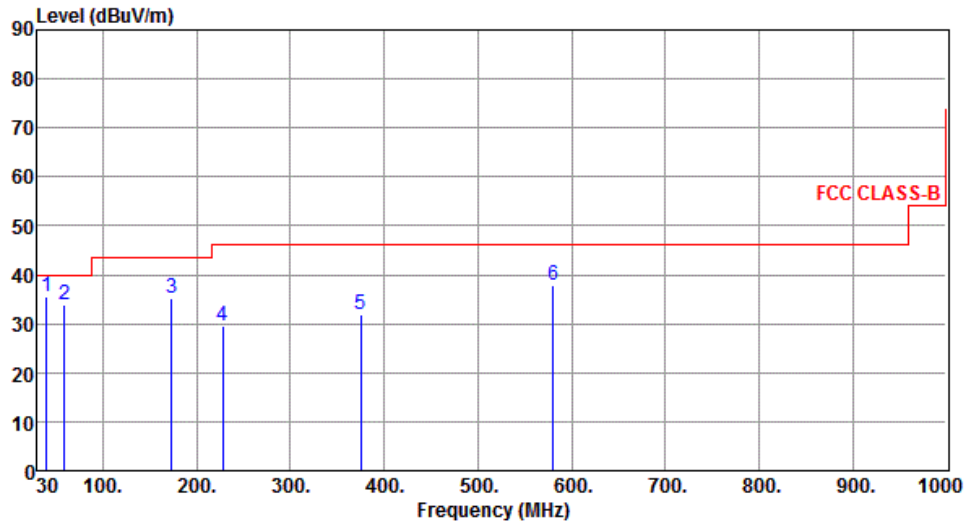
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*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	CSS / 12	Test Freq. (MHz)	927.5
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	39.70	35.70	40.00	-4.30	43.55	-7.85	Peak	---	---
2	58.70	33.90	40.00	-6.10	42.66	-8.76	QP	100	222
3	173.56	35.28	43.50	-8.22	44.26	-8.98	Peak	---	---
4	227.88	29.71	46.00	-16.29	39.36	-9.65	Peak	---	---
5	375.32	31.94	46.00	-14.06	37.55	-5.61	Peak	---	---
6	579.99	37.97	46.00	-8.03	39.10	-1.13	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.

3.5.7 Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation / SF	CSS / 12	Test Freq. (MHz)	923.3
Polarization	Horizontal		
Level (dBuV/m) <			

Modulation / SF	CSS / 12	Test Freq. (MHz)	923.3
Polarization	Vertical		
Level (dBuV/m)			

Modulation / SF	CSS / 12	Test Freq. (MHz)	927.5
Polarization	Horizontal		
Level (dBUV/m) </			

Modulation / SF	CSS / 12	Test Freq. (MHz)	927.5
Polarization	Vertical		
Level (dBUV/m) </			

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 30 dB relative to the maximum in-band peak PSD level in 100 kHz

3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

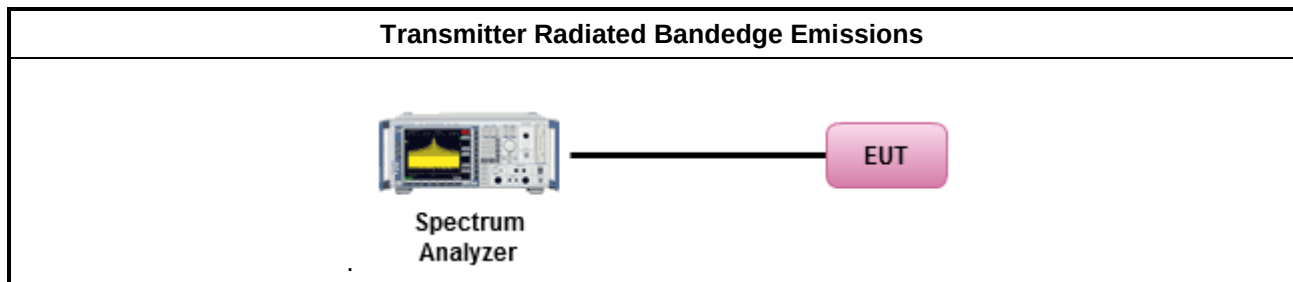
Reference level measurement

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

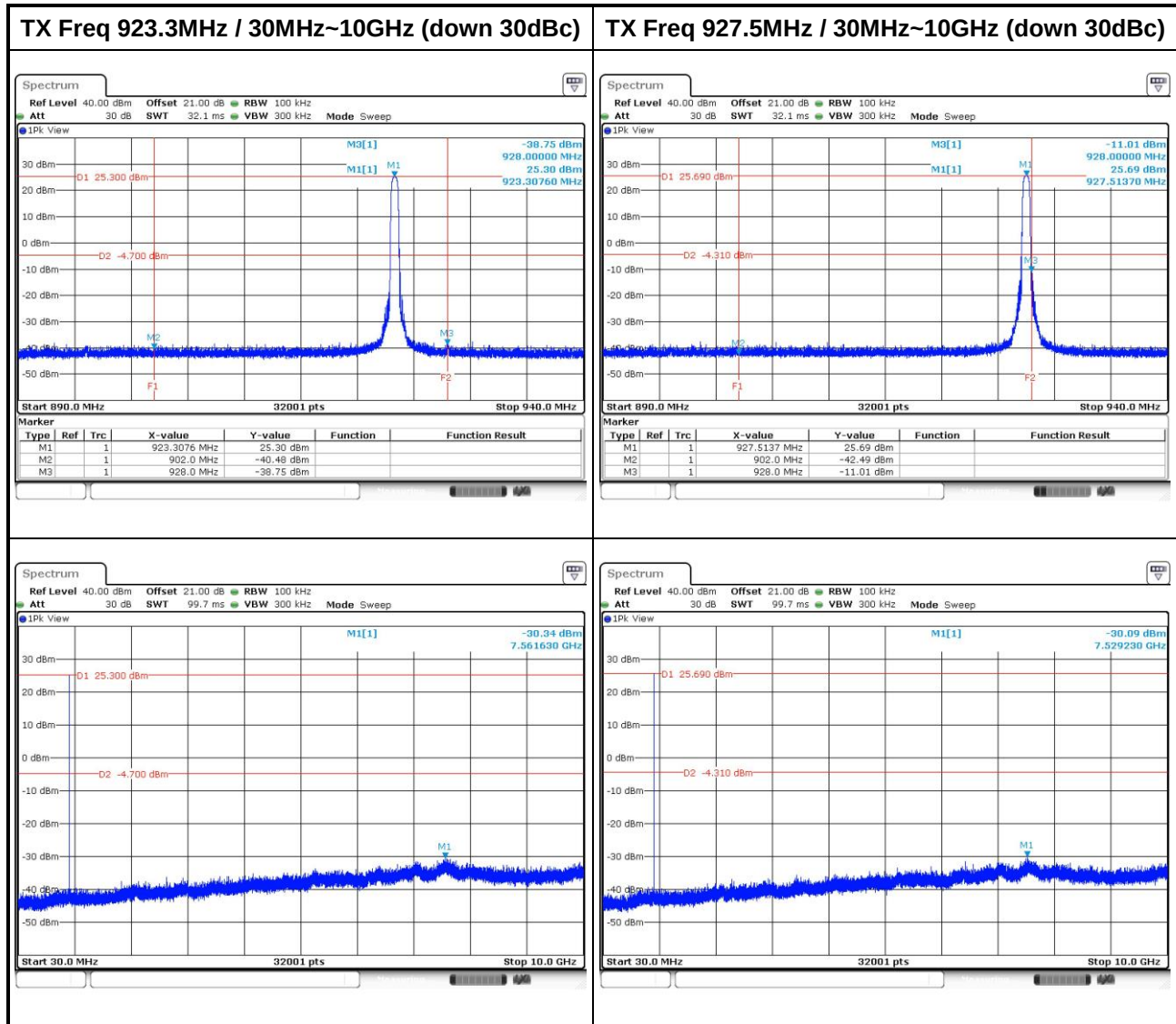
Emission level measurement

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

3.6.4 Test Setup



3.6.5 Unwanted Emissions into Non-Restricted Frequency Bands



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

No. 30-2, Ding Fwu Tsuen, Lin
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

Fax: 886-3-318-0155

Email: ICC_Service@icertifi.com.tw

==END==