

FCC Co-Location Test Report

FCC ID : MCLGPE810U

Equipment : LoRa Express Gateway

Model No. : GPE810U

Brand Name : ufiSpace

Applicant : HON HAI PRECISION IND.CO., LTD.

Address : 5F-1, 5 Hsin-An Road, Hsinchu, Science

Industrial Park, Taiwan, R.O.C.

Standard : 47 CFR FCC Part 15.247

Received Date : Mar. 28, 2017
Tested Date : Apr. 24, 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: Approved by:

Along Chen Assistant Manager Gary Chang / Manager

Testing Laboratory 2732

Report No.: FR732802CO Page: 1 of 14



Table of Contents

1	GENERAL DESCRIPTION	5
1.1	Information	5
1.2	The Equipment List	6
1.3	Test Standards	6
1.4	Measurement Uncertainty	6
2	TEST CONFIGURATION	7
2.1	Testing Condition	7
2.2	The Worst Test Modes and Channel Details	7
3	TRANSMITTER TEST RESULTS	8
3.1	Unwanted Emissions into Restricted Frequency Bands	8
4	TEST LABORATORY INFORMATION	14



Release Record

Report No.	Version	Description	Issued Date
FR732802CO	Rev. 01	Initial issue	May 10, 2017

Report No.: FR732802CO Page: 3 of 14



Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.247(d)	Radiated Emissions	[dBuV/m at 3m]: 57.16MHz	Paga
15.209	Radiated Emissions	33.23 (Margin -6.77dB) - PK	Pass

Report No.: FR732802CO Page: 4 of 14



1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

LoRa				
Operating Frequency	923.3 MHz ~ 927.5 MHz			
Modulaton Type	CSS			
Antenna Type	helix antenna			
WLAN				
Operating Frequency	802.11b/g/n: 2412 MHz ~ 2462 MHz			
Modulaton Type	802.11b: DSSS (DBPSK / DQPSK / CCK) 802.11g/n: OFDM (BPSK / QPSK / 16QAM / 64QAM)			
Antenna Type	Dipole antenna			

1.1.2 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	12Vdc from adapter

Report No.: FR732802CO Page: 5 of 14



1.2 The Equipment List

Test Item	Radiated Emission							
Test Site	966 chamber1 / (03CH01-WS)							
Instrument	Manufacturer Model No. Serial No. Calibration Date Calibration Un							
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 Inter	Note: Calibration Interval of instruments listed above is one year.							

1.3 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

1.4 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			
Radiated emission ≤ 1GHz	±3.66 dB			
Radiated emission > 1GHz	±5.63 dB			

Report No.: FR732802CO Page: 6 of 14



2 Test Configuration

2.1 Testing Condition

Test Item Test Site		Ambient Condition	Tested By		
Radiated Emissions	03CH01-WS	24°C / 62%	Kevin Lee		

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	Mode				
Radiated Emissions	WIFI 2.4G 11g CH6 + LoRa 923.3MHz				
NOTE: The selected channel is the maximum power channel of Wi-Fi and LoRa mode					

Report No.: FR732802CO Page: 7 of 14



3 Transmitter Test Results

3.1 Unwanted Emissions into Restricted Frequency Bands

3.1.1 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.

3.1.2 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.

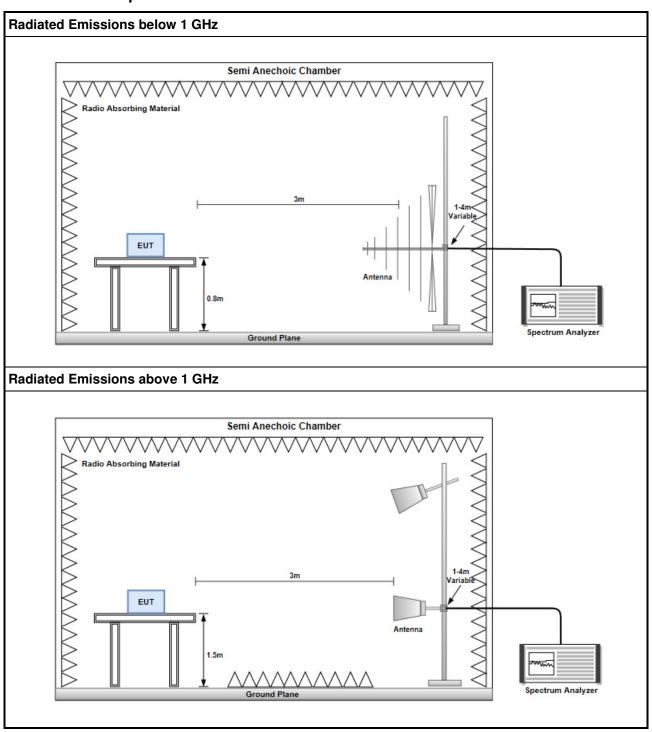
Note:

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

Report No.: FR732802CO Page: 8 of 14



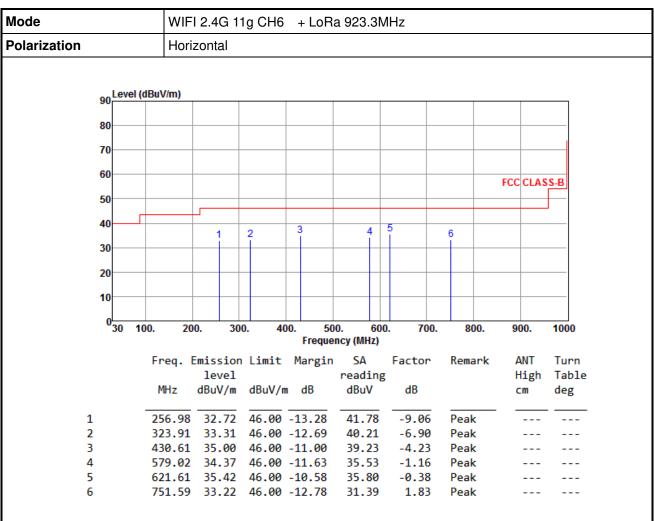
3.1.3 Test Setup



Report No.: FR732802CO Page: 9 of 14



3.1.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)



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

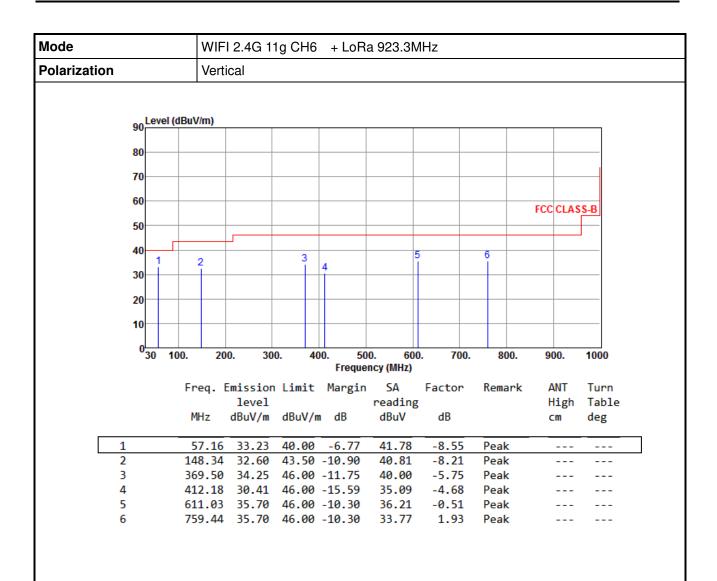
*Factor includes antenna factor, cable loss and amplifier gain

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.

Report No.: FR732802CO Page: 10 of 14





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

*Factor includes antenna factor, cable loss and amplifier gain

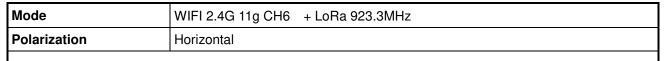
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

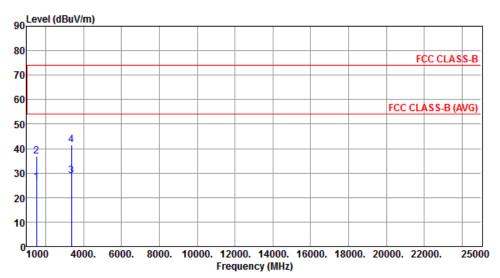
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Report No.: FR732802CO Page: 11 of 14



3.1.5 Transmitter Radiated Unwanted Emissions (Above 1GHz)





	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	1514.00	26.29	54.00	-27.71	32.85	-6.56	Average	125	231
2	1514.00	36.97	74.00	-37.03	43.53	-6.56	Peak	125	231
3	3360.30	28.85	54.00	-25.15	29.16	-0.31	Average	275	114
4	3360.30	41.36	74.00	-32.64	41.67	-0.31	Peak	275	114

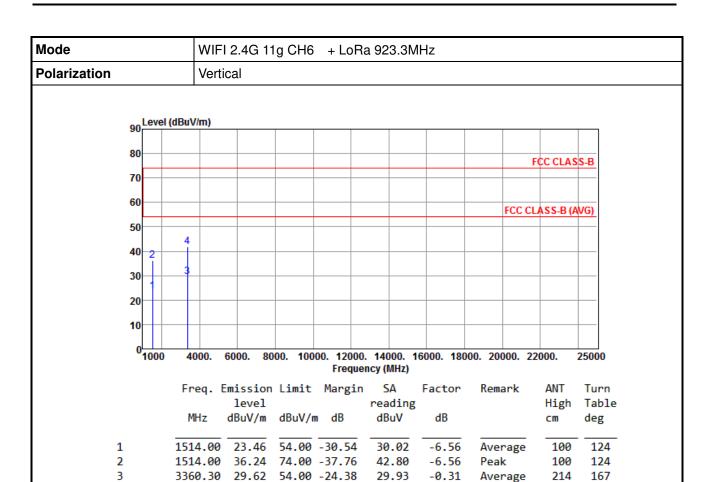
Note 1: Emission Level $(dBuV/m) = SA Reading (dBuV/m) + Factor^* (dB)$

*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR732802CO Page: 12 of 14





42.03

-0.31

Peak

214

167

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

3360.30 41.72 74.00 -32.28

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

Report No.: FR732802CO Page: 13 of 14

Report Version: Rev. 01

4



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==

Report No.: FR732802CO Page: 14 of 14