



# FCC RF Test Report

**APPLICANT** : Thundercomm Technology Co., Ltd  
**EQUIPMENT** : Cellular Module  
**BRAND NAME** : TurboX  
**MODEL NAME** : CM6125  
**FCC ID** : 2AOHHTURBOXCM6125  
**STANDARD** : FCC Part 15 Subpart C §15.247  
**CLASSIFICATION** : (DTS) Digital Transmission System  
**TEST DATE(S)** : Sep. 30, 2022 ~ Nov. 08, 2022

We, Sporton International Inc. (Shenzhen), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Shenzhen), the test report shall not be reproduced except in full.

Jason Jia



Approved by: Jason Jia

**Sporton International Inc. (ShenZhen)**

**1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055**

**People's Republic of China**



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## REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR232517-01C	Rev. 01	Initial issue of report	Nov. 17, 2022



### SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(b)	Power Output Measurement	≤ 30dBm	Pass	-
3.2	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.52 dB at 2483.52 MHz
3.3	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 9.40 dB at 0.51 MHz
3.4	15.203 & 15.247(b)	Antenna Requirement	15.203 & 15.247(b)	Pass	-

**Note:** This is a variant report. The change note could be referred to the Class II Permissive Change letter which is exhibit separately. The cellular module remains the same as the original module, only the antenna is different, so the conducted power is reused from the original report. Based on the similarity between current and previous project, only the related cases of two new antennas were tested and shown in this report, all the other test results are referred to the original report FR232517C.

<b>Declaration of Conformity:</b>
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits.
<b>Comments and Explanations:</b>
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 Applicant

**Thundercomm Technology Co., Ltd**

No. 107, Middle Datagu Road, Xiantao Street, Yubei District, Chongqing, China, 401122

## 1.2 Manufacturer

**Thundercomm Technology Co., Ltd**

No. 107, Middle Datagu Road, Xiantao Street, Yubei District, Chongqing, China, 401122

## 1.3 Product Feature of Equipment Under Test

Product Feature	
<b>Equipment</b>	Cellular Module
<b>Brand Name</b>	TurboX
<b>Model Name</b>	CM6125
<b>FCC ID</b>	2AOHHTURBOXCM6125
<b>IMEI Code</b>	Conducted: 869835050001758/869835050002558 Conduction: 869835050002210/869835050003010 Radiation: 869835050002210/869835050003010
<b>HW Version</b>	V03
<b>SW Version</b>	Turbox-CM6125_xx.xx_la1.0.V.userdebug.20220509.0843
<b>EUT Stage</b>	Identical Prototype

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

## 1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
<b>Tx/Rx Channel Frequency Range</b>	2412 MHz ~ 2462 MHz
<b>Maximum (Peak) Output Power to antenna</b>	802.11b : 19.55 dBm (0.0902 W) 802.11g : 21.12 dBm (0.1294 W) 802.11n HT20 : 21.17 dBm (0.1309 W) 802.11n HT40 : 22.40 dBm (0.1738 W)
<b>Antenna Type / Gain</b>	<Ant.1>: Dipole Antenna with gain 2.90 dBi <Ant.2>: PIFA Antenna with gain 3.50 dBi
<b>Type of Modulation</b>	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

## 1.5 Modification of EUT

No modifications are made to the EUT during all test items.



### 1.6 Testing Location

Sporton International Inc. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

<b>Test Firm</b>	Sporton International Inc. (Shenzhen)		
<b>Test Site Location</b>	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
<b>Test Site No.</b>	<b>Sporton Site No.</b>	<b>FCC Designation No.</b>	<b>FCC Test Firm Registration No.</b>
	CO01-SZ	CN1256	421272

<b>Test Firm</b>	Sporton International Inc. (Shenzhen)		
<b>Test Site Location</b>	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City Guangdong Province China 518103 TEL: +86-755-33202398		
<b>Test Site No.</b>	<b>Sporton Site No.</b>	<b>FCC Designation No.</b>	<b>FCC Test Firm Registration No.</b>
	03CH03-SZ	CN1256	421272

### 1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH03-SZ	AUDIX	E3	6.2009-8-24
2.	CO01-SZ	AUDIX	E3	6.120613b

### 1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 15 Subpart C §15.247
- ♦ FCC KDB 558074 D01 15.247 Meas Guidance v05r02
- ♦ ANSI C63.10-2013

**Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

## 2 Test Configuration of Equipment Under Test

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.
- b. AC power line Conducted Emission was tested under maximum output power.

### 2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437		

### 2.2 Test Mode

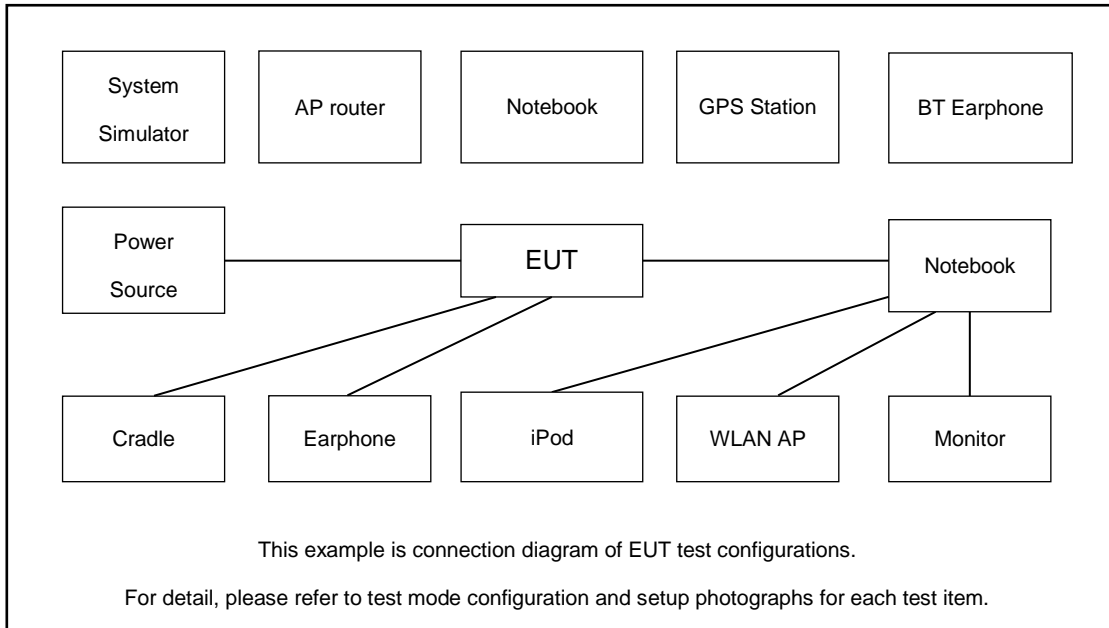
Final test modes are considering the modulation and worse data rates as below table

For Ant. 1/ Ant. 2 :

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
Co-location Mode	
802.11n HT20 Tx CH11 with Ant. 1 + LTE Band 7 Tx	
802.11n HT40 Tx CH09 with Ant. 2 + LTE Band 7 Tx	

Test Cases	
AC Conducted Emission	Mode 1 : WCDMA Band V Idle + Bluetooth Link + WLAN Link(2.4G) + Adapter + Ant. 1
	Mode 2 : WCDMA Band V Idle + Bluetooth Link + WLAN Link(2.4G) + Adapter + Ant. 2

### 2.3 Connection Diagram of Test System



### 2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8m
2.	WLAN AP	Dlink	DIR-820L	KA2IR820LA1	N/A	Unshielded, 1.8m
3.	Notebook	Lenovo	E540	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Samsung	EO-MG900	PYAHS-107W	N/A	N/A
5.	Test Jig	N/A	N/A	N/A	N/A	N/A
6.	Antenna 1	N/A	N/A	N/A	N/A	N/A
7.	Antenna 2	N/A	N/A	N/A	N/A	N/A
8.	WWAN Antenna	N/A	N/A	N/A	N/A	N/A
9.	Adapter	N/A	N/A	N/A	N/A	N/A

### 2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuous transmit.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.



### 3 Test Result

#### 3.1 Output Power Measurement

##### 3.1.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

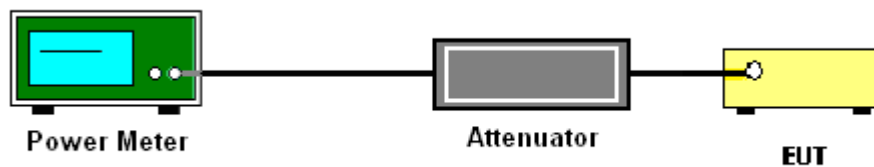
##### 3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

##### 3.1.3 Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10-2013 clause 11.9.1.3 PKPM1 Peak power meter or ANSI C63.10-2013 clause 11.9.2.3.1 Method AVGPM method.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

##### 3.1.4 Test Setup





3.1.5 Test Result of Peak Output Power

Test Mode	Antenna	Freq (MHz)	Set Power	Peak Power [dBm]	Conducted Limit [dBm]	EIRP [dBm]	EIRP Limit [dBm]	Verdict
11B	Ant1	2412	17	19.15	≤30.00	22.05	≤36.00	PASS
		2437	17	19.55	≤30.00	22.45	≤36.00	PASS
		2462	17	18.99	≤30.00	21.89	≤36.00	PASS
11G		2412	17	20.91	≤30.00	23.81	≤36.00	PASS
		2437	17	21.12	≤30.00	24.02	≤36.00	PASS
		2462	17	20.88	≤30.00	23.78	≤36.00	PASS
11N20		2412	17	20.84	≤30.00	23.74	≤36.00	PASS
		2437	17	21.16	≤30.00	24.06	≤36.00	PASS
		2462	17	21.17	≤30.00	24.07	≤36.00	PASS
11N40		2422	16	22.40	≤30.00	25.3	≤36.00	PASS
		2437	16	22.07	≤30.00	24.97	≤36.00	PASS
		2452	13.5	19.88	≤30.00	22.78	≤36.00	PASS
11B	Ant2	2412	17	19.15	≤30.00	22.65	≤36.00	PASS
		2437	17	19.55	≤30.00	23.05	≤36.00	PASS
		2462	17	18.99	≤30.00	22.49	≤36.00	PASS
11G		2412	17	20.91	≤30.00	24.41	≤36.00	PASS
		2437	17	21.12	≤30.00	24.62	≤36.00	PASS
		2462	17	20.88	≤30.00	24.38	≤36.00	PASS
11N20		2412	17	20.84	≤30.00	24.34	≤36.00	PASS
		2437	17	21.16	≤30.00	24.66	≤36.00	PASS
		2462	17	21.17	≤30.00	24.67	≤36.00	PASS
11N40		2422	16	22.40	≤30.00	25.9	≤36.00	PASS
		2437	16	22.07	≤30.00	25.57	≤36.00	PASS
		2452	13.5	19.88	≤30.00	23.38	≤36.00	PASS



### 3.2 Radiated Band Edges and Spurious Emission Measurement

#### 3.2.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

#### 3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

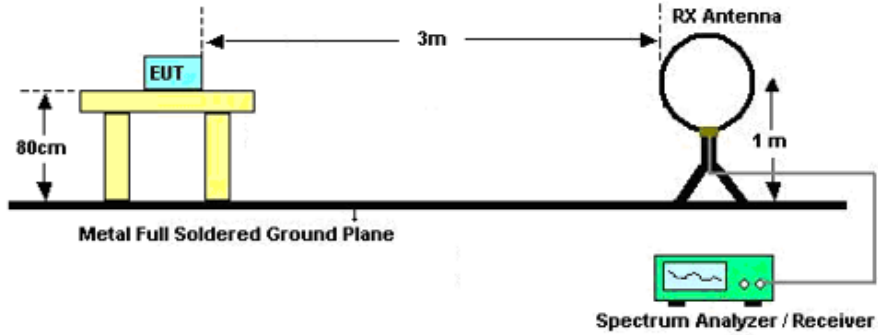


### 3.2.3 Test Procedures

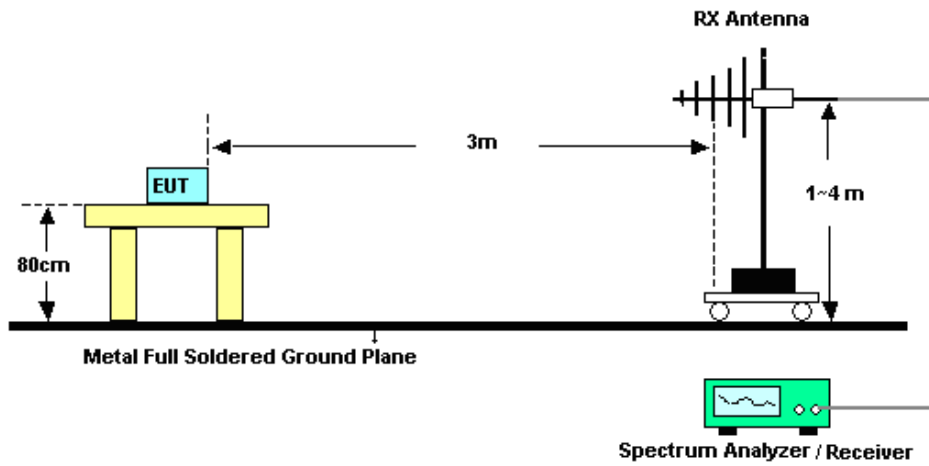
1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than peak limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW=100 kHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold;
  - (3) Set RBW = 1 MHz, VBW= 3MHz for  $f \geq 1$  GHz for peak measurement.  
For average measurement:
    - VBW = 10 Hz, when duty cycle is no less than 98 percent.
    - VBW  $\geq 1/T$ , when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

### 3.2.4 Test Setup

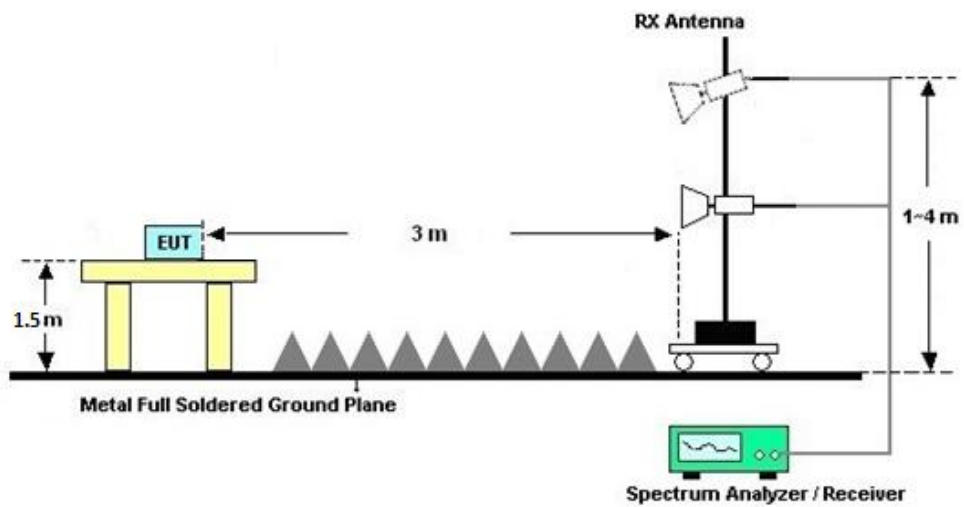
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





### **3.2.5 Test Results of Radiated Spurious Emissions (9kHz ~ 30MHz)**

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

### **3.2.6 Test Result of Radiated Spurious at Band Edges**

Please refer to Appendix B.

### **3.2.7 Duty Cycle**

Please refer to Appendix C.

### **3.2.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic or 40GHz, whichever is lower)**

Please refer to Appendix B.



### 3.3 AC Conducted Emission Measurement

#### 3.3.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

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

\*Decreases with the logarithm of the frequency.

#### 3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.3.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF bandwidth = 9kHz) with Maximum Hold Mode.

### 3.3.4 Test Setup



### 3.3.5 Test Result of AC Conducted Emission

Please refer to Appendix A.





## **3.4 Antenna Requirements**

### **3.4.1 Standard Applicable**

If directional gain of transmitting Antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached Antenna or of an Antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

### **3.4.2 Antenna Anti-Replacement Construction**

An embedded-in antenna design is used.

### **3.4.3 Antenna Gain**

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver&SA	KEYSIGHT	N9038A	MY54450083	20Hz~8.4GHz	Apr. 06, 2022	Oct. 14, 2022~Nov. 08, 2022	Apr. 05, 2023	Radiation (03CH03-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150246	10Hz~44GHz;	Apr. 06, 2022	Oct. 14, 2022~Nov. 08, 2022	Apr. 05, 2023	Radiation (03CH03-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jul. 28, 2022	Oct. 14, 2022~Nov. 08, 2022	Jul. 27, 2024	Radiation (03CH03-SZ)
Bilog Antenna	TeseQ	CBL6112D	35408	30MHz~2GHz	Aug. 09, 2022	Oct. 14, 2022~Nov. 08, 2022	Aug. 08, 2023	Radiation (03CH03-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1355	1GHz~18GHz	Apr. 08, 2022	Oct. 14, 2022~Nov. 08, 2022	Apr. 07, 2023	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Oct. 22, 2021	Oct. 14, 2022~Nov. 08, 2022	Oct. 21, 2022	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Oct. 21, 2022		Oct. 20, 2023	Radiation (03CH03-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz~40GHz	Apr. 10, 2022	Oct. 14, 2022~Nov. 08, 2022	Apr. 09, 2023	Radiation (03CH03-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz~3000MHz	Oct. 22, 2021	Oct. 14, 2022~Nov. 08, 2022	Oct. 21, 2022	Radiation (03CH03-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz~3000MHz	Oct. 21, 2022		Oct. 20, 2023	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1943528	1GHz~18GHz	Oct. 22, 2021	Oct. 14, 2022~Nov. 08, 2022	Oct. 21, 2022	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1943528	1GHz~18GHz	Oct. 21, 2022		Oct. 20, 2023	Radiation (03CH03-SZ)
Amplifier	Agilent Technologies	83017A	MY39501302	500MHz~26.5GHz	Dec. 27, 2021	Oct. 14, 2022~Nov. 08, 2022	Dec. 26, 2022	Radiation (03CH03-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Oct. 14, 2022~Nov. 08, 2022	NCR	Radiation (03CH03-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Oct. 14, 2022~Nov. 08, 2022	NCR	Radiation (03CH03-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Oct. 14, 2022~Nov. 08, 2022	NCR	Radiation (03CH03-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Jul. 07, 2022	Sep. 30, 2022	Jul. 06, 2023	Conduction (CO01-SZ)
AC LISN	R&S	ENV216	100063	9kHz~30MHz	Sep. 15, 2022	Sep. 30, 2022	Sep. 14, 2023	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Oct. 29, 2021	Sep. 30, 2022	Oct. 28, 2022	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 07, 2022	Sep. 30, 2022	Jul. 06, 2023	Conduction (CO01-SZ)

NCR: No Calibration Required



## 5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

### Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.2dB
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0dB
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### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.9dB
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### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0dB
---	-------

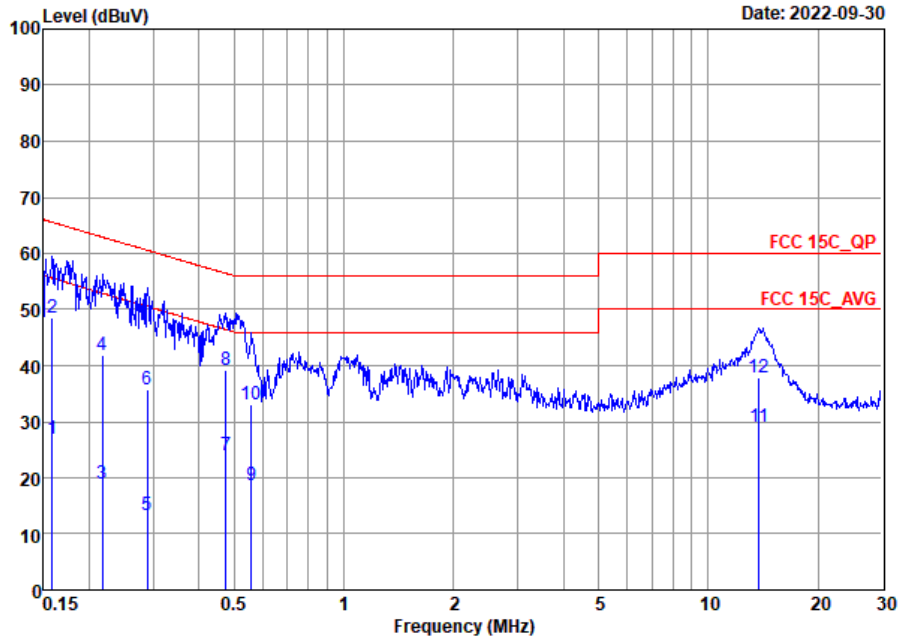
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# Appendix A. AC Conducted Emission Test Results

Mode 1(Ant. 1):

Test Engineer :	Lily Qiu	Temperature :	22~25°C
		Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

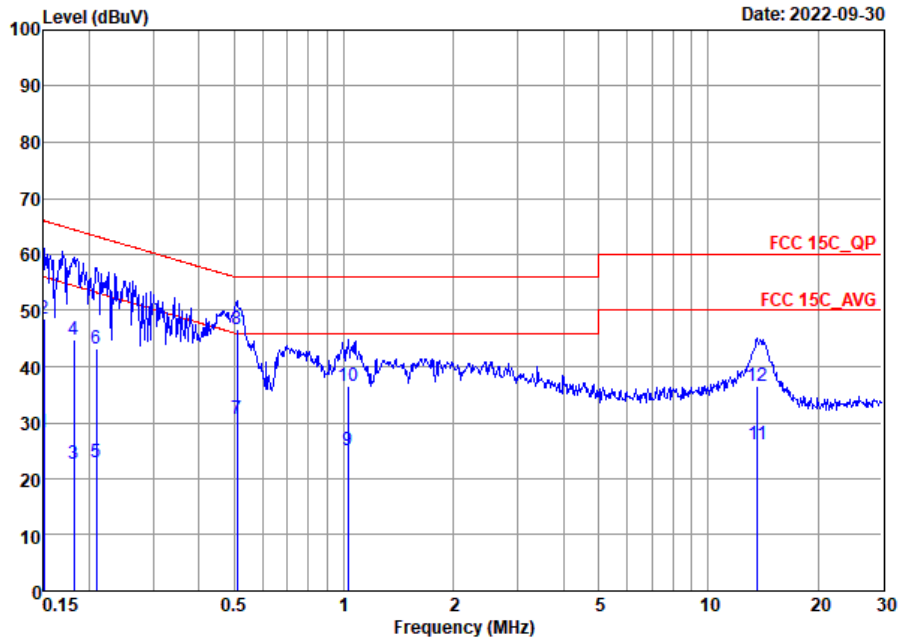


Site : CO01-SZ  
Condition: FCC 15C\_QP LISN\_20220811\_ L LINE

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.16	26.93	-28.63	55.56	6.00	10.20	10.73	Average
2 *	0.16	48.43	-17.13	65.56	27.50	10.20	10.73	QP
3	0.22	18.91	-34.01	52.92	-1.60	10.19	10.32	Average
4	0.22	41.91	-21.01	62.92	21.40	10.19	10.32	QP
5	0.29	13.41	-37.13	50.54	-7.60	10.16	10.85	Average
6	0.29	35.71	-24.83	60.54	14.70	10.16	10.85	QP
7	0.47	23.98	-22.47	46.45	2.09	10.12	11.77	Average
8	0.47	39.28	-17.17	56.45	17.39	10.12	11.77	QP
9	0.56	18.60	-27.40	46.00	-3.10	10.11	11.59	Average
10	0.56	33.00	-23.00	56.00	11.30	10.11	11.59	QP
11	13.77	29.00	-21.00	50.00	8.91	9.76	10.33	Average
12	13.77	37.90	-22.10	60.00	17.81	9.76	10.33	QP



Test Engineer :	Lily Qiu	Temperature :	22~25°C
		Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



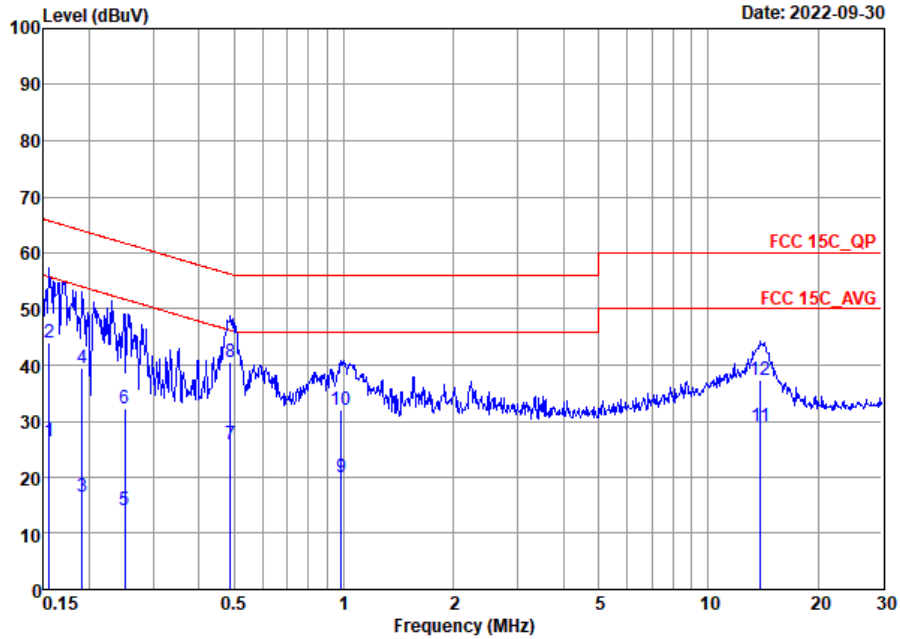
Site : CO01-SZ  
 Condition: FCC 15C\_QP LISN\_20220811\_N NEUTRAL

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.15	28.26	-27.74	56.00	7.10	10.31	10.85	Average
2	0.15	48.56	-17.44	66.00	27.40	10.31	10.85	QP
3	0.18	22.59	-31.83	54.42	1.90	10.30	10.39	Average
4	0.18	44.69	-19.73	64.42	24.00	10.30	10.39	QP
5	0.21	22.81	-30.42	53.23	2.30	10.27	10.24	Average
6	0.21	43.31	-19.92	63.23	22.80	10.27	10.24	QP
7	0.51	30.60	-15.40	46.00	8.60	10.20	11.80	Average
8 *	0.51	46.60	-9.40	56.00	24.60	10.20	11.80	QP
9	1.03	24.95	-21.05	46.00	4.50	10.22	10.23	Average
10	1.03	36.65	-19.35	56.00	16.20	10.22	10.23	QP
11	13.62	26.03	-23.97	50.00	5.80	9.90	10.33	Average
12	13.62	36.43	-23.57	60.00	16.20	9.90	10.33	QP



Mode 2(Ant. 2):

Test Engineer :	Lily Qiu	Temperature :	22~25°C
		Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

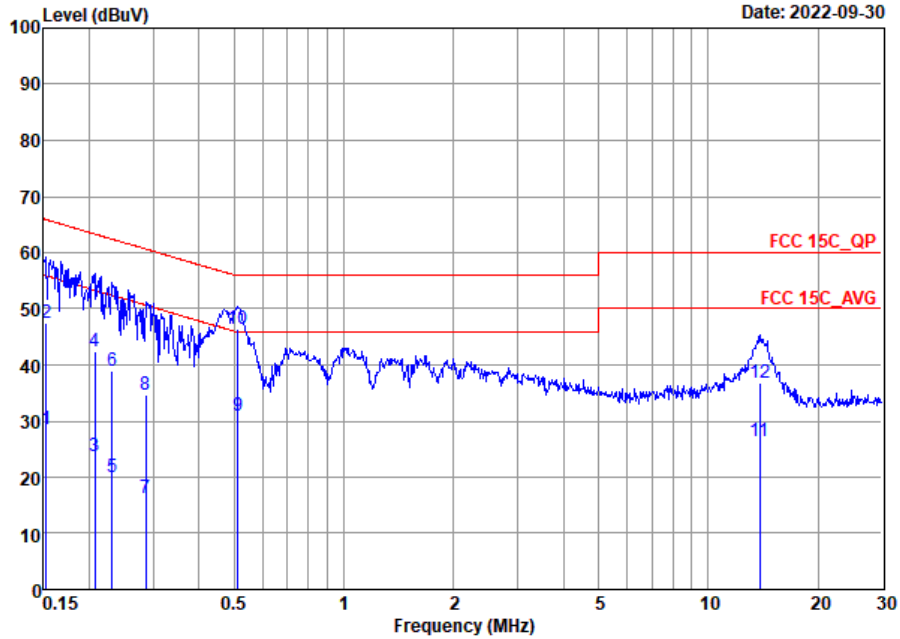


Site : CO01-SZ  
 Condition: FCC 15C\_QP LISN\_20220811\_ L LINE

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.16	26.27	-29.42	55.69	5.30	10.20	10.77	Average
2	0.16	43.87	-21.82	65.69	22.90	10.20	10.77	QP
3	0.19	16.55	-37.43	53.98	-3.90	10.20	10.25	Average
4	0.19	39.45	-24.53	63.98	19.00	10.20	10.25	QP
5	0.25	14.15	-37.58	51.73	-6.60	10.18	10.57	Average
6	0.25	32.25	-29.48	61.73	11.50	10.18	10.57	QP
7	0.49	25.93	-20.26	46.19	4.00	10.12	11.81	Average
8 *	0.49	40.43	-15.76	56.19	18.50	10.12	11.81	QP
9	0.98	19.89	-26.11	46.00	-0.50	10.12	10.27	Average
10	0.98	31.89	-24.11	56.00	11.50	10.12	10.27	QP
11	13.91	29.19	-20.81	50.00	9.10	9.76	10.33	Average
12	13.91	37.29	-22.71	60.00	17.20	9.76	10.33	QP



Test Engineer :	Lily Qiu	Temperature :	22~25°C
		Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ  
 Condition: FCC 15C\_QP LISN\_20220811\_ N NEUTRAL

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.15	28.42	-27.45	55.87	7.30	10.31	10.81	Average
2	0.15	47.42	-18.45	65.87	26.30	10.31	10.81	QP
3	0.21	23.80	-29.52	53.32	3.29	10.28	10.23	Average
4	0.21	42.40	-20.92	63.32	21.89	10.28	10.23	QP
5	0.23	19.98	-32.41	52.39	-0.70	10.26	10.42	Average
6	0.23	38.98	-23.41	62.39	18.30	10.26	10.42	QP
7	0.29	16.15	-34.48	50.63	-4.90	10.22	10.83	Average
8	0.29	34.65	-25.98	60.63	13.60	10.22	10.83	QP
9	0.51	31.00	-15.00	46.00	9.00	10.20	11.80	Average
10 *	0.51	46.40	-9.60	56.00	24.40	10.20	11.80	QP
11	13.84	26.43	-23.57	50.00	6.21	9.89	10.33	Average
12	13.84	36.83	-23.17	60.00	16.61	9.89	10.33	QP

Note:

- Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
- Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)



## Appendix B. Radiated Spurious Emission

For Ant. 1:

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
802.11b CH 01 2412MHz		2350.005	51.14	-22.86	74	47.91	32.11	4.81	33.69	346	347	P	H
		2389.485	40.01	-13.99	54	36.57	32.21	4.89	33.66	346	347	A	H
	*	2412	108.25	-	-	104.71	32.27	4.92	33.65	346	347	P	H
	*	2412	105.21	-	-	101.67	32.27	4.92	33.65	346	347	A	H
		2383.92	51.14	-22.86	74	47.74	32.2	4.88	33.68	100	59	P	V
		2389.695	39.81	-14.19	54	36.37	32.21	4.89	33.66	100	59	A	V
	*	2412	99.77	-	-	96.23	32.27	4.92	33.65	100	59	P	V
	*	2412	96.72	-	-	93.18	32.27	4.92	33.65	100	59	A	V
802.11b CH 11 2462MHz	*	2462	108.44	-	-	104.7	32.4	4.97	33.63	371	340	P	H
	*	2462	105.15	-	-	101.41	32.4	4.97	33.63	371	340	A	H
		2483.76	55.69	-18.31	74	51.86	32.46	4.99	33.62	371	340	P	H
		2483.52	42.49	-11.51	54	38.66	32.46	4.99	33.62	371	340	A	H
	*	2462	102.12	-	-	98.38	32.4	4.97	33.63	100	59	P	V
	*	2462	99.08	-	-	95.34	32.4	4.97	33.63	100	59	A	V
		2483.88	51.6	-22.4	74	47.77	32.46	4.99	33.62	100	59	P	V
		2483.56	40.52	-13.48	54	36.69	32.46	4.99	33.62	100	59	A	V
Remark	<ol style="list-style-type: none"> <li>No other spurious found.</li> <li>All results are PASS against Peak and Average limit line.</li> </ol>												





**2.4GHz 2400~2483.5MHz  
WIFI 802.11b (Harmonic @ 3m)**

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11b		4824	50.48	-23.52	74	60.74	34.67	7.98	52.91	-	-	P	H
CH 01		4824	51.96	-22.04	74	62.22	34.67	7.98	52.91	310	295	P	V
2412MHz		4824	48.96	-5.04	54	59.22	34.67	7.98	52.91	310	295	A	V
802.11b		4874	49.56	-24.44	74	59.76	34.65	7.99	52.84	-	-	P	H
CH 06		7311	45.26	-28.74	74	53.61	36.41	9.36	54.12	-	-	P	H
2437MHz		4874	49.44	-24.56	74	59.64	34.65	7.99	52.84	-	-	P	V
		7311	45.07	-28.93	74	53.42	36.41	9.36	54.12	-	-	P	V
802.11b		4924	49.21	-24.79	74	59.35	34.63	8.01	52.78	-	-	P	H
CH 11		7386	45.5	-28.5	74	53.54	36.49	9.54	54.07	-	-	P	H
2462MHz		4924	49.98	-24.02	74	60.12	34.63	8.01	52.78	-	-	P	V
		7386	45.67	-28.33	74	53.71	36.49	9.54	54.07	-	-	P	V
<b>Remark</b>	<ol style="list-style-type: none"> <li>No other spurious found.</li> <li>All results are PASS against Peak and Average limit line.</li> </ol>												



**2.4GHz 2400~2483.5MHz  
WIFI 802.11g (Band Edge @ 3m)**

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11g CH 01 2412MHz		2389.905	55.88	-18.12	74	52.44	32.21	4.89	33.66	342	353	P	H
		2390	44.66	-9.34	54	41.22	32.21	4.89	33.66	342	353	A	H
	*	2412	108.28	-	-	104.74	32.27	4.92	33.65	342	353	P	H
	*	2412	100.05	-	-	96.51	32.27	4.92	33.65	342	353	A	H
		2390	54.76	-19.24	74	51.32	32.21	4.89	33.66	400	287	P	V
		2390	43.98	-10.02	54	40.54	32.21	4.89	33.66	400	287	A	V
	*	2412	108.74	-	-	105.2	32.27	4.92	33.65	400	287	P	V
	*	2412	100.73	-	-	97.19	32.27	4.92	33.65	400	287	A	V
802.11g CH 11 2462MHz	*	2462	110.24	-	-	106.5	32.4	4.97	33.63	282	10	P	H
	*	2462	102.26	-	-	98.52	32.4	4.97	33.63	282	10	A	H
		2483.72	59.18	-14.82	74	55.35	32.46	4.99	33.62	282	10	P	H
		2483.52	48.32	-5.68	54	44.49	32.46	4.99	33.62	282	10	A	H
	*	2462	106.75	-	-	103.01	32.4	4.97	33.63	369	112	P	V
	*	2462	98.74	-	-	95	32.4	4.97	33.63	369	112	A	V
		2483.56	57.94	-16.06	74	54.11	32.46	4.99	33.62	369	112	P	V
		2483.52	47.07	-6.93	54	43.24	32.46	4.99	33.62	369	112	A	V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz
WIFI 802.11g (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Margin (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Path Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include data for CH 01 (2412MHz), CH 06 (2437MHz), and CH 11 (2462MHz). A Remark section at the bottom states: '1. No other spurious found. 2. All results are PASS against Peak and Average limit line.'



**2.4GHz 2400~2483.5MHz  
WIFI 802.11n HT20 (Band Edge @ 3m)**

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11n HT20 CH 01 2412MHz		2389.8	58.16	-15.84	74	54.72	32.21	4.89	33.66	341	353	P	H
		2389.905	47	-7	54	43.56	32.21	4.89	33.66	341	353	A	H
	*	2412	108.83	-	-	105.29	32.27	4.92	33.65	341	353	P	H
	*	2412	99.57	-	-	96.03	32.27	4.92	33.65	341	353	A	H
		2389.59	56.15	-17.85	74	52.71	32.21	4.89	33.66	365	287	P	V
		2389.8	45.95	-8.05	54	42.51	32.21	4.89	33.66	365	287	A	V
	*	2412	106.85	-	-	103.31	32.27	4.92	33.65	365	287	P	V
	*	2412	98.77	-	-	95.23	32.27	4.92	33.65	365	287	A	V
802.11n HT20 CH 11 2462MHz		2462	107.89	-	-	104.15	32.4	4.97	33.63	279	9	P	H
		2462	99.61	-	-	95.87	32.4	4.97	33.63	279	9	A	H
		2483.6	60.3	-13.7	74	56.47	32.46	4.99	33.62	279	9	P	H
		2483.52	50.48	-3.52	54	46.65	32.46	4.99	33.62	279	9	A	H
		* 2462	110.16	-	-	106.42	32.4	4.97	33.63	381	285	P	V
		* 2462	102.02	-	-	98.28	32.4	4.97	33.63	381	285	A	V
			2483.76	60.18	-13.82	74	56.35	32.46	4.99	33.62	381	285	P
		2483.56	50.11	-3.89	54	46.28	32.46	4.99	33.62	381	285	A	V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Margin (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Path Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include data for 802.11n HT20 CH 01 (2412MHz) and CH 06 (2437MHz), and 802.11n HT20 CH 11 (2462MHz). A Remark section at the bottom states: 1. No other spurious found. 2. All results are PASS against Peak and Average limit line.



2.4GHz 2400~2483.5MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Margin (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Path Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include test data for 802.11n HT40 CH 03 and 802.11n HT40 CH 09, and a Remark section at the bottom.



**2.4GHz 2400~2483.5MHz  
WIFI 802.11n HT40 (Harmonic @ 3m)**

WIFI Ant. 1	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. (P/A)	Pol. (H/V)
802.11n		4844	44.36	-29.64	74	54.6	34.66	7.99	52.89	-	-	P	H
HT40		7266	45.51	-28.49	74	54.01	36.37	9.27	54.14	-	-	P	H
CH 03		4844	44.82	-29.18	74	55.06	34.66	7.99	52.89	-	-	P	V
2422MHz		7266	45.63	-28.37	74	54.13	36.37	9.27	54.14	-	-	P	V
802.11n		4874	43.36	-30.64	74	53.56	34.65	7.99	52.84	-	-	P	H
HT40		7311	45.77	-28.23	74	54.12	36.41	9.36	54.12	-	-	P	H
CH 06		4874	45.21	-28.79	74	55.41	34.65	7.99	52.84	-	-	P	V
2437MHz		7311	44.91	-29.09	74	53.26	36.41	9.36	54.12	-	-	P	V
802.11n		4904	44.43	-29.57	74	54.59	34.64	8	52.8	-	-	P	H
HT40		7356	45.51	-28.49	74	53.69	36.46	9.45	54.09	-	-	P	H
CH 09		4904	43.73	-30.27	74	53.89	34.64	8	52.8	-	-	P	V
2452MHz		7356	45.63	-28.37	74	53.81	36.46	9.45	54.09	-	-	P	V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

WIFI Ant.	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
2.4GHz 802.11n HT20 LF		30.97	24.36	-15.64	40	30.93	25.29	0.54	32.4	-	-	P	H
		127.97	17.49	-26.01	43.5	30.94	17.59	1.16	32.2	-	-	P	H
		303.54	22.71	-23.29	46	32.61	19.99	1.81	31.7	-	-	P	H
		587.75	28.82	-17.18	46	30.76	26.28	2.53	30.75	-	-	P	H
		747.8	30.51	-15.49	46	30.31	28.45	2.85	31.1	-	-	P	H
		948.59	34.02	-11.98	46	31.18	31.11	3.23	31.5	-	-	P	H
		30	26.47	-13.53	40	32.48	25.86	0.53	32.4	-	-	P	V
		66.86	21.95	-18.05	40	41.13	12.4	0.82	32.4	-	-	P	V
		118.27	18.67	-24.83	43.5	32.12	17.64	1.11	32.2	-	-	P	V
		286.08	21.15	-24.85	46	31.54	19.58	1.76	31.73	-	-	P	V
		778.84	31.07	-14.93	46	30.65	28.74	2.9	31.22	-	-	P	V
	945.68	33.31	-12.69	46	30.59	31	3.22	31.5	-	-	P	V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.												





Co-location mode: 802.11n HT20 CH11 & LTE Band7

2.4GHz 2400~2483.5MHz (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	(dBμV)	( dB/m )	( dB )	( dB )	( cm )	( deg )	(P/A)	(H/V)
11n20_TX_ CH11 2462MHz & LTE Band7	*	2462	110.07	-	-	106.36	32.41	4.92	33.62	100	300	P	H
	*	2462	101.85	-	-	98.22	32.4	4.86	33.63	100	300	A	H
		2483.64	60.02	-13.98	74	56.26	32.46	4.92	33.62	100	300	P	H
		2483.8	48.47	-5.53	54	44.71	32.46	4.92	33.62	100	300	A	H
	*	2462	108.1	-	-	104.47	32.4	4.86	33.63	160	254	P	V
	*	2462	99.77	-	-	96.14	32.4	4.86	33.63	160	254	A	V
		2483.56	56.21	-17.79	74	52.45	32.46	4.92	33.62	160	254	P	V
		2483.6	47.8	-6.2	54	44.04	32.46	4.92	33.62	160	254	A	V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	(dBμV)	( dB/m )	( dB )	( dB )	( cm )	( deg )	(P/A)	(H/V)
11n20_TX CH11	*	4924	42.99	-31.01	74	53.34	34.63	7.8	52.78	-	-	P	H
		5052.18	48.24	-25.76	74	58.49	34.58	7.86	52.69	-	-	A	H
		7386	44.61	-29.39	74	52.99	36.49	9.2	54.07	-	-	P	H
		7578.27	45.76	-28.24	74	53.98	36.58	9.15	53.95	-	-	P	H
		10104.36	46.68	-27.32	74	49.45	39.56	10.52	52.85	-	-	P	H
2462MHz & LTE Band7	*	4924	43.03	-30.97	74	53.38	34.63	7.8	52.78	-	-	A	V
		5052.18	49.72	-24.28	74	59.97	34.58	7.86	52.69	-	-	P	V
		7386	44.62	-29.38	74	53	36.49	9.2	54.07	-	-	A	V
		7578.27	49.92	-24.08	74	58.14	36.58	9.15	53.95	-	-	P	V
		10104.36	49.95	-24.05	74	52.72	39.56	10.52	52.85	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



For Ant. 2:

2.4GHz 2400~2483.5MHz
WIFI 802.11b (Band Edge @ 3m)

Table with 14 columns: WIFI Ant., Note, Frequency (MHz), Level (dBµV/m), Margin (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Path Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include data for 802.11b CH 01 (2412MHz) and 802.11b CH 11 (2462MHz).

Remark
1. No other spurious found.
2. All results are PASS against Peak and Average limit line.



2.4GHz 2400~2483.5MHz
WIFI 802.11b (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 2, Note, Frequency (MHz), Level (dBµV/m), Margin (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Path Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include data for CH 01 (2412MHz), CH 06 (2437MHz), and CH 11 (2462MHz).

Remark

- 1. No other spurious found.
2. All results are PASS against Peak and Average limit line.



**2.4GHz 2400~2483.5MHz  
WIFI 802.11g (Band Edge @ 3m)**

WIFI Ant. 2	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11g CH 01 2412MHz		2389.695	52.18	-21.82	74	48.82	32.21	4.81	33.66	311	235	P	H
		2390	40.52	-13.48	54	37.16	32.21	4.81	33.66	311	235	A	H
	*	2412	98.48	-	-	95.05	32.27	4.81	33.65	311	235	P	H
	*	2412	90.38	-	-	86.95	32.27	4.81	33.65	311	235	A	H
		2389.275	50.94	-23.06	74	47.58	32.21	4.81	33.66	374	136	P	V
		2390	40.79	-13.21	54	37.43	32.21	4.81	33.66	374	136	A	V
	*	2412	98.99	-	-	95.56	32.27	4.81	33.65	374	136	P	V
	*	2414	90.93	-	-	87.49	32.28	4.81	33.65	374	136	A	V
802.11g CH 11 2462MHz	*	2462	99.47	-	-	95.84	32.4	4.86	33.63	338	246	P	H
	*	2462	91.43	-	-	87.8	32.4	4.86	33.63	338	246	A	H
		2483.64	53.96	-20.04	74	50.2	32.46	4.92	33.62	338	246	P	H
		2483.52	42.37	-11.63	54	38.61	32.46	4.92	33.62	338	246	A	H
	*	2462	100.99	-	-	97.36	32.4	4.86	33.63	400	198	P	V
	*	2462	92.54	-	-	88.91	32.4	4.86	33.63	400	198	A	V
		2484.04	53.25	-20.75	74	49.49	32.46	4.92	33.62	400	198	P	V
		2483.52	42.71	-11.29	54	38.95	32.46	4.92	33.62	400	198	A	V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz
WIFI 802.11g (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 2, Note, Frequency (MHz), Level (dBµV/m), Margin (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Path Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include data for CH 01 (2412MHz), CH 06 (2437MHz), and CH 11 (2462MHz).

Remark

- 1. No other spurious found.
2. All results are PASS against Peak and Average limit line.



2.4GHz 2400~2483.5MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

Table with 14 columns: WIFI Ant. 2, Note, Frequency (MHz), Level (dBµV/m), Margin (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Path Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include test data for 802.11n HT20 CH 01 (2412MHz) and CH 11 (2462MHz) with various frequency points and results.

Remark

- 1. No other spurious found.
2. All results are PASS against Peak and Average limit line.



**2.4GHz 2400~2483.5MHz  
WIFI 802.11n HT20 (Harmonic @ 3m)**

WIFI Ant. 2	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		4824	44.44	-29.56	74	54.93	34.67	7.75	52.91	-	-	P	H
		4824	46.3	-27.7	74	56.79	34.67	7.75	52.91	-	-	P	V
802.11n HT20 CH 06 2437MHz		4874	44.22	-29.78	74	54.65	34.65	7.76	52.84	-	-	P	H
		7311	45.17	-28.83	74	53.93	36.41	8.95	54.12	-	-	P	H
		4874	45.12	-28.88	74	55.55	34.65	7.76	52.84	-	-	P	V
		7311	45.43	-28.57	74	54.19	36.41	8.95	54.12	-	-	P	V
802.11n HT20 CH 11 2462MHz		4924	44.22	-29.78	74	54.57	34.63	7.8	52.78	-	-	P	H
		7386	44.52	-29.48	74	52.9	36.49	9.2	54.07	-	-	P	H
		4924	44.35	-29.65	74	54.7	34.63	7.8	52.78	-	-	P	V
		7386	44.5	-29.5	74	52.88	36.49	9.2	54.07	-	-	P	V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												





**2.4GHz 2400~2483.5MHz  
WIFI 802.11n HT40 (Band Edge @ 3m)**

WIFI Ant. 2	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )
802.11n HT40 CH 03 2422MHz		2381.68	51.3	-22.7	74	48.02	32.19	4.77	33.68	333	232	P	H
		2389.94	42.15	-11.85	54	38.79	32.21	4.81	33.66	333	232	A	H
	*	2422	97.51	-	-	94.05	32.3	4.81	33.65	333	232	P	H
	*	2422	88.99	-	-	85.53	32.3	4.81	33.65	333	232	A	H
		2488.31	51.88	-22.12	74	48.11	32.47	4.92	33.62	333	232	P	H
		2490.13	42.26	-11.74	54	38.47	32.47	4.92	33.6	333	232	A	H
		2311.68	51.83	-22.17	74	48.8	32.01	4.73	33.71	400	154	P	V
		2389.8	42.16	-11.84	54	38.8	32.21	4.81	33.66	400	154	A	V
	*	2422	97.81	-	-	94.35	32.3	4.81	33.65	400	154	P	V
	*	2422	90.04	-	-	86.58	32.3	4.81	33.65	400	154	A	V
		2495.8	51.44	-22.56	74	47.63	32.49	4.92	33.6	400	154	P	V
		2486.7	42.37	-11.63	54	38.6	32.47	4.92	33.62	400	154	A	V
802.11n HT40 CH 09 2452MHz		2384.62	51.22	-22.78	74	47.89	32.2	4.81	33.68	373	65	P	H
		2388.26	41.89	-12.11	54	38.53	32.21	4.81	33.66	373	65	A	H
	*	2452	97.33	-	-	93.72	32.38	4.86	33.63	373	65	P	H
	*	2452	88.8	-	-	85.19	32.38	4.86	33.63	373	65	A	H
		2483.5	54.78	-19.22	74	51.02	32.46	4.92	33.62	373	65	P	H
		2483.62	45.96	-6.04	54	44.2	32.46	4.92	33.62	373	65	A	H
		2367.12	51.02	-22.98	74	47.78	32.15	4.77	33.68	344	300	P	V
		2389.38	41.59	-12.41	54	38.23	32.21	4.81	33.66	344	300	A	V
	*	2452	92.73	-	-	89.12	32.38	4.86	33.63	344	300	P	V
	*	2452	84.56	-	-	80.95	32.38	4.86	33.63	344	300	A	V
	2488.8	51.94	-22.06	74	48.17	32.47	4.92	33.62	344	300	P	V	
	2483.62	42.91	-11.09	54	39.15	32.46	4.92	33.62	344	300	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 2, Note, Frequency (MHz), Level (dBµV/m), Margin (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Path Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include data for 802.11n HT40 CH 03 (2422MHz) and CH 06 (2437MHz), and 802.11n HT40 CH 09 (2452MHz).

Remark

- 1. No other spurious found.
2. All results are PASS against Peak and Average limit line.



2.4GHz 2400~2483.5MHz

Emission below 1GHz

2.4GHz WIFI 802.11n HT40 (LF)

WIFI Ant.	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
2		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
2.4GHz 802.11n HT40 LF		30.97	24.36	-15.64	40	30.93	25.29	0.54	32.4	-	-	P	H
		127.97	17.49	-26.01	43.5	30.94	17.59	1.16	32.2	-	-	P	H
		303.54	22.71	-23.29	46	32.61	19.99	1.81	31.7	-	-	P	H
		587.75	28.82	-17.18	46	30.76	26.28	2.53	30.75	-	-	P	H
		747.8	30.51	-15.49	46	30.31	28.45	2.85	31.1	-	-	P	H
		948.59	34.02	-11.98	46	31.18	31.11	3.23	31.5	-	-	P	H
		30	26.47	-13.53	40	32.48	25.86	0.53	32.4	-	-	P	H
		66.86	21.95	-18.05	40	41.13	12.4	0.82	32.4	-	-	P	H
		118.27	18.67	-24.83	43.5	32.12	17.64	1.11	32.2	-	-	P	V
		286.08	21.15	-24.85	46	31.54	19.58	1.76	31.73	-	-	P	V
		778.84	31.07	-14.93	46	30.65	28.74	2.9	31.22	-	-	P	V
	945.68	33.31	-12.69	46	30.59	31	3.22	31.5	-	-	P	V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



Co-location mode: 802.11n HT40 CH09 & LTE Band7

2.4GHz 2400~2483.5MHz (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
2		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
802.11n HT40 CH 09 2452MHz & LTE Band7	*	2386.58	51.51	-22.49	74	48.15	32.21	4.81	33.66	368	63	P	H
	*	2380.84	42.2	-11.8	54	38.92	32.19	4.77	33.68	368	63	A	H
		2452	94.91	-	-	91.3	32.38	4.86	33.63	368	63	P	H
		2452	86.63	-	-	83.02	32.38	4.86	33.63	368	63	A	H
		2483.48	57.19	-92.81	150	53.43	32.46	4.92	33.62	368	63	P	H
		2483.55	47.74	-6.26	54	43.98	32.46	4.92	33.62	368	63	A	H
	*	2343.04	51.39	-22.61	74	48.26	32.09	4.73	33.69	384	133	P	V
	*	2389.66	41.84	-12.16	54	38.48	32.21	4.81	33.66	384	133	A	V
		2452	94.41	-	-	90.8	32.38	4.86	33.63	384	133	P	V
		2452	85.99	-	-	82.38	32.38	4.86	33.63	384	133	A	V
	2483.62	54.65	-19.35	74	50.89	32.46	4.92	33.62	384	133	P	V	
	2483.5	45.97	-8.03	54	42.21	32.46	4.92	33.62	384	133	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz (Harmonic @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
2		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
802.11n HT40 CH 09		4904	43.34	-30.66	74	53.72	34.64	7.78	52.8	-	-	P	H
		5052.18	47.08	-26.92	74	57.33	34.58	7.86	52.69	-	-	P	H
		7356	45.23	-28.77	74	53.78	36.46	9.08	54.09	-	-	P	H
		7578.27	46.69	-27.31	74	54.91	36.58	9.15	53.95	-	-	P	H
2452MHz & LTE Band7		10104.36	47.01	-26.99	74	49.78	39.56	10.52	52.85	-	-	P	H
		4904	42.83	-31.17	74	53.21	34.64	7.78	52.8	-	-	P	V
		5052.18	54.56	-19.44	74	64.81	34.58	7.86	52.69	-	-	P	V
		7356	44.26	-29.74	74	52.81	36.46	9.08	54.09	-	-	P	V
		7578.27	53.47	-20.53	74	61.69	36.58	9.15	53.95	-	-	P	V
		10104.36	50.5	-23.5	74	53.27	39.56	10.52	52.85	-	-	P	V
Remark	<ol style="list-style-type: none"> <li>No other spurious found.</li> <li>All results are PASS against Peak and Average limit line.</li> </ol>												



**Note symbol**

*	<b>Fundamental Frequency</b> which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is <b>Margin</b> line.
P/A	<b>Peak</b> or <b>Average</b>
H/V	<b>Horizontal</b> or <b>Vertical</b>



A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) =  
Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Margin (dB) = Level(dBμV/m) – Limit Line(dBμV/m)

**For Peak Limit @ 2390MHz:**

1. Level(dBμV/m)  
= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)  
= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)  
= 55.45 (dBμV/m)
2. Margin (dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 55.45(dBμV/m) – 74(dBμV/m)  
= -18.55(dB)

**For Average Limit @ 2390MHz:**

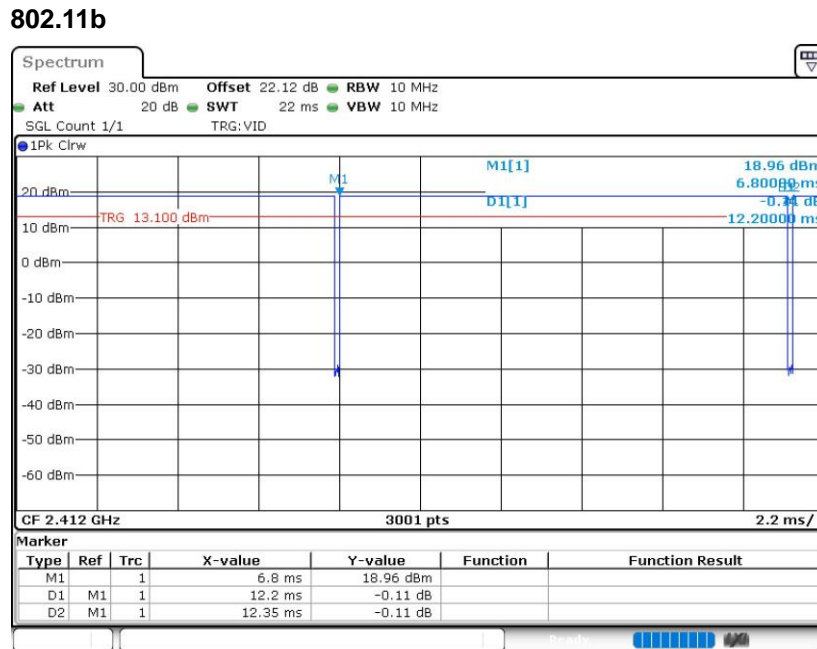
1. Level(dBμV/m)  
= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)  
= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)  
= 43.54 (dBμV/m)
2. Margin (dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 43.54(dBμV/m) – 54(dBμV/m)  
= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.



### Appendix C. Duty Cycle Plots

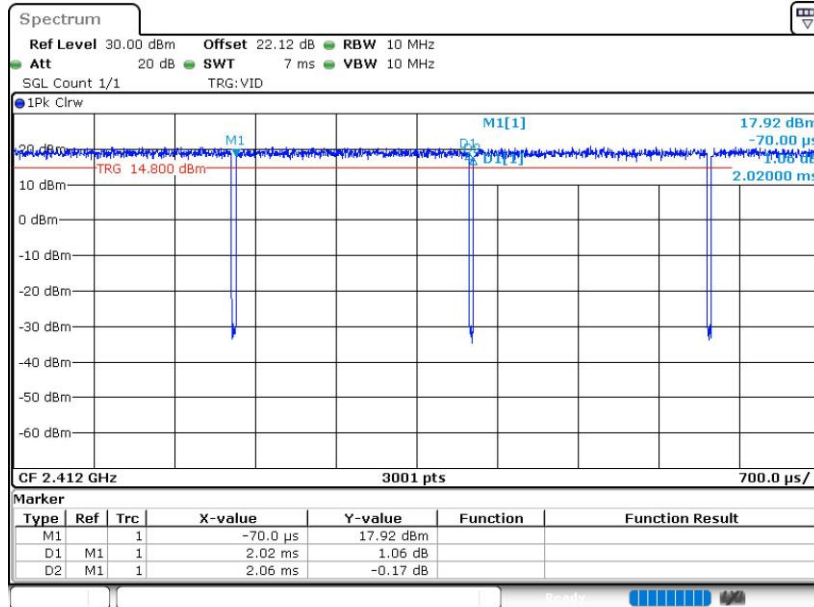
Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
802.11b	98.79	-	-	10Hz
802.11g	98.06	-	-	10Hz
802.11n HT20	97.92	1.880	0.532	1kHz
802.11n HT40	94.90	0.930	1.075	3kHz



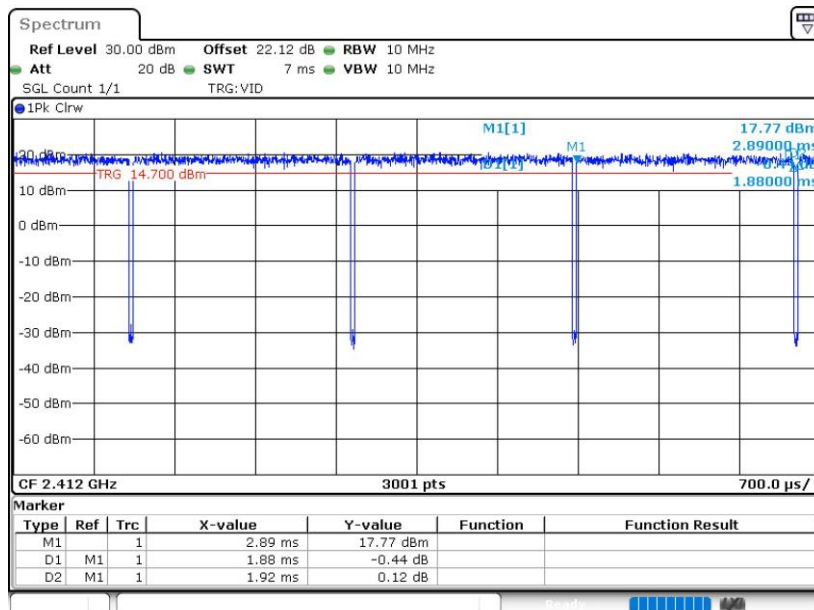




802.11g



802.11n HT20





802.11n HT40

