



FCC Radio Test Report		
FCC ID: QISB525S-65A		
This report concerns (check one): ⊠Original Grant		
Project No.: 1701C181AEquipment: LTE CPEModel Name: B525s-65aApplicant: Huawei Technologies Co. ,Ltd.Address: Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District Shenzhen,518129, P.R.C		
Date of Receipt : Feb. 21, 2017   Date of Test : Feb. 21, 2017 ~ Mar. 02, 2017   Issued Date : Mar. 03, 2017   Tested by : BTL Inc.		
Testing Engineer : <u>Shawn Xim</u> (Shawn Xiao)		
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### Declaration

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### Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.





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# **REPORT ISSUED HISTORY**

Issued No.	Description	Issued Date
BTL-FCCP-2-1701C181A	Original Issue.	Mar. 03, 2017





# **1. CERTIFICATION**

Equipment :	
Brand Name : Model Name :	-
	Huawei Technologies Co. ,Ltd.
	Huawei Technologies Co. ,Ltd.
	Administration Building, Headquarters of Huawei Technologies Co., Ltd.,
	Bantian, Longgang District Shenzhen, 518129, P.R.C
Factory :	Shenzhen Zowee Technology.co.,Itd
	Shenzhen songgang town pond under chung industrial avenue with rich
	industrial area
	Feb. 21, 2017 ~ Mar. 02, 2017
	Engineering Sample
Standard(s) :	FCC Part15, Subpart E(15.407) / ANSI C63.10-2013

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-2-1701C181A) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).



# 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC Part15, Subpart E(15.407)			
Standard(s) Section	Test Item	Judgment	Remark
15.207	AC Power Line Conducted Emissions	PASS	
15.407(a)	Radiated Emissions	PASS	

### NOTE:

(1)" N/A" denotes test is not applicable in this test report.





### 2.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China. BTL's test firm number for FCC: 319330

### 2.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2  $U_{cispr}$  requirement.

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

A. Conducted Measurement:

Test Site	Method	Measurement Frequency Range	U, (dB)
DG-C02	CISPR	150 KHz ~ 30MHz	1.94

B. Radiated Measurement:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
		9kHz~30MHz	V	3.79
		9kHz~30MHz	Н	3.57
		30MHz ~ 200MHz	V	3.82
	CISPR	30MHz ~ 200MHz	Н	3.60
DG-CB03		200MHz ~ 1,000MHz	V	3.86
DG-CB03		200MHz ~ 1,000MHz	Н	3.94
		1GHz~18GHz	V	3.12
		1GHz~18GHz	Н	3.68
		18GHz~40GHz	V	4.15
		18GHz~40GHz	Н	4.14

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.



# **3. GENERAL INFORMATION**

# 3.1 GENERAL DESCRIPTION OF EUT

Equipment	LTE CPE	
Brand Name	HUAWEI	
Model Name	B525s-65a	
Mode Different	N/A	
Braduat Description	Operation Frequency	UNII-1: 5150-5250MHz
Product Description	Modulation Type	OFDM
Power Source	DC Voltage supplied from AC/DC adapter. #1 Manufacturer / Model: Fu Hua / HW-120200U01(US) #2 Manufacturer / Model: Ou Lu Tong / HW-120200U01(US)	
Power Rating	DC12V 2A	
HW Version	WL1B525I	
SW Version	11.232.08.DM.00	

### Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

### 3. Channel List:

802.11a 802.11n 20MHz 802.11ac 20MHz		802.11n 40MHz 802.11ac 40MHz		802.11ac 80MHz	
UNI	I-1	UNII-1		UNII-1	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	38	5190	42	5210
40	5200	46	5230		
44	5220				
48	5240				



# 3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	TX A Mode / CH36, CH40, CH48 (UNII-1)
Mode 2	TX N20 Mode / CH36, CH40, CH48 (UNII-1)
Mode 3	TX N40 Mode / CH38, CH46 (UNII-1)
Mode 4	TX AC20 Mode / CH36, CH40, CH48 (UNII-1)
Mode 5	TX AC40 Mode / CH38, CH46 (UNII-1)
Mode 6	TX AC80 Mode / CH42 (UNII-1)
Mode 7	TX Mode

The EUT system operated these modes were found to be the worst case during the pre-scanning test as following:

For Conducted Test		
Final Test Mode	Description	
Mode 7	TX Mode	

For Radiated Test		
Final Test Mode	Description	
Mode 1	TX A Mode / CH36, CH40, CH48 (UNII-1)	
Mode 2	TX N20 Mode / CH36, CH40, CH48 (UNII-1)	
Mode 3	TX N40 Mode / CH38, CH46 (UNII-1)	
Mode 4	TX AC20 Mode / CH36, CH40, CH48 (UNII-1)	
Mode 5	TX AC40 Mode / CH38, CH46 (UNII-1)	
Mode 6	TX AC80 Mode / CH42 (UNII-1)	

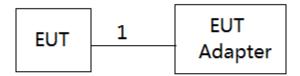
Note:

(1) For radiated below 1GHz test, the 802.11a mode is found to be the worst case and recorded.





# 3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



### **3.5 DESCRIPTION OF SUPPORT UNITS**

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.
-	-	-	-	-	-

	Item	Shielded Type	Ferrite Core	Length	Note
F	1	NO	NO	1.5m	AC Cable





# 4. EMC EMISSION TEST

### 4.1 CONDUCTED EMISSION MEASUREMENT

### 4.1.1 POWER LINE CONDUCTED EMISSION (Frequency Range 150kHz-30MHz)

	Class A	(dBuV)	Class B (dBuV)	
FREQUENCY (MHz)	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

### 4.1.2 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item -EUT Test Photos.

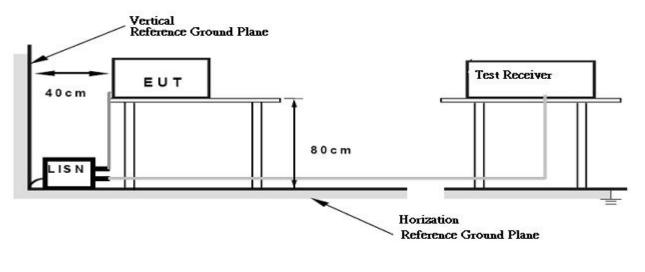
### 4.1.3 DEVIATION FROM TEST STANDARD

No deviation





### 4.1.4 TEST SETUP



### 4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

The EUT was programmed to be in continuously transmitting/TX Mode mode.

### 4.1.6 EUT TEST CONDITIONS

Temperature: 23°C Relative Humidity: 60% Test Voltage: AC 120V/60Hz

### 4.1.7 TEST RESULTS

Please refer to the Attachment A.

Remark:

- (1) All readings are QP Mode value unless otherwise stated AVG in column of <sup>ℂ</sup>Note<sub>⊥</sub>. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform ∘ In this case, a "\*" marked in AVG Mode column of Interference Voltage Measured ∘
- (2) Measuring frequency range from 150kHz to 30MHz •



# 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 RADIATED EMISSION LIMITS

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies	Field Strength	Measurement Distance	
(MHz)	(micorvolts/meter)	(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	

Frequencies (MHz)	EIRP Limit (dBm) Band edge at 3m (dBµV/m)		Harmonic at 1.5m (dBµV/m)
5150-5250	-27	68.3	74.3 (Note 3)
5250-5350	-27	68.3	74.3 (Note 3)
5470-5725 -27		68.3	74.3 (Note 3)
	-27(Note 2)	68.3	74.3 (Note 3)
E705 E850	10(Note 2)	105.3	111.3(Note 3)
5725-5850	15.6(Note 2)	110.9	116.9(Note 3)
	27(Note 2)	122.3	128.3(Note 3)

Note:

3.

- 1. The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:  $E = \frac{1000000\sqrt{30P}}{1000000}$ 
  - µV/m, where P is the eirp (Watts)
- 2. According to FCC 16-24,All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below theband edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above orbelow the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27dBm/MHz at the band edge.

$$FS_{\text{limit}} = FS_{\text{max}} - 20\log\left(\frac{d_{\text{limit}}}{d_{\text{measure}}}\right)$$

 $\frac{1}{2}$  as  $\frac{1}{2}$  and  $\frac{1}{2}$  log d limit/d measure=20log 3/1.5=6dB.





# 4.2.2 TEST PROCEDURE

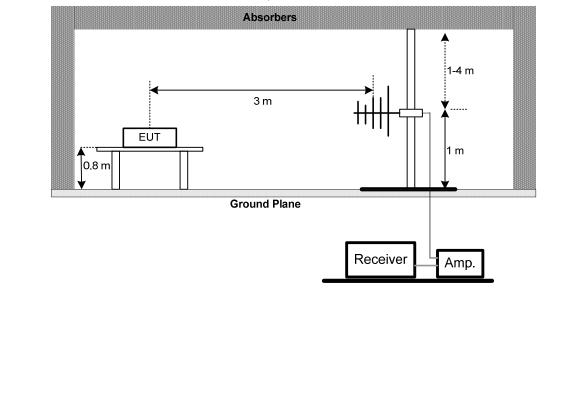
- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The measuring distance of 3 m or 1.5m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- c. The height of the equipment or of the substitution antenna shall be 0.8m or 1.5m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
- e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.
- f. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- g. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform. (below 1GHz)
- h. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (above 1GHz)
- i. For the actual test configuration, please refer to the related Item -EUT Test Photos.

### 4.2.3 DEVIATION FROM TEST STANDARD

No deviation

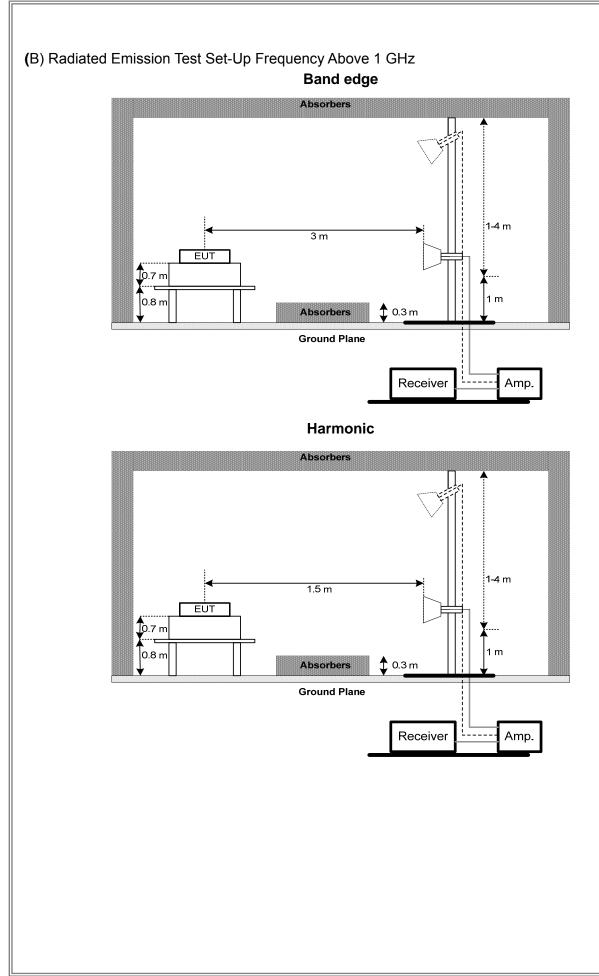
# 4.2.4 TEST SETUP

(A)Radiated Emission Test Set-Up Frequency Below 1GHz



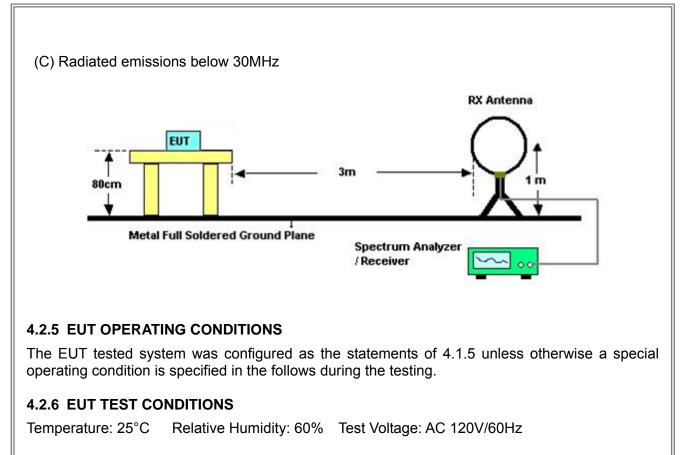














# 4.2.7 TEST RESULTS (9K TO 30MHz)

Please refer to the Attachment B

Remark:

- (1) The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.
- (2) Distance extrapolation factor = 40 log (specific distance / test distance) (dB);
- (3) Limit line = specific limits (dBuV) + distance extrapolation factor.

### 4.2.8 TEST RESULTS (BETWEEN 30 TO 1000 MHz)

Please refer to the Attachment C.

### 4.2.9 TEST RESULTS (ABOVE 1000 MHz)

Please refer to the Attachment D.

Remark:

(1) No limit: This is fundamental signal, the judgment is not applicable. For fundamental signal judgment was referred to Peak output test.



# 5. MEASUREMENT INSTRUMENTS LIST

	Conducted Emission Measurement						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until		
1	LISN	EMCO	3816/2	0052765	Mar. 27, 2017		
2	LISN	R&S	ENV216	101447	Mar. 27, 2017		
3	Test Cable	emci	RG223(9KHz-30 MHz)	C_17	Mar. 10, 2017		
4	EMI Test Receiver	R&S	ESCI	100382	Mar. 27, 2017		
5	50Ω Terminator	SHX	TF2-3G-A	08122901	Mar. 27, 2017		
6	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A		

	Radiated Emission Measurement						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until		
1	Antenna	Schwarbeck	VULB9160	9160-3232	Mar. 27, 2017		
2	Amplifier	HP	8447D	2944A09673	Nov. 08, 2017		
3	Receiver	AGILENT	N9038A	MY52130039	Oct. 10, 2017		
4	Test Cable	emci	LMR-400(30MH z-1GHz)	C-01	Jun. 26, 2017		
5	Control	СТ	SC100	N/A	N/A		
6	Position Control	MF	MF-7802	MF780208416	N/A		
7	Antenna	ETS	3115	00075789	Mar. 27, 2017		
8	Amplifier	Agilent	8449B	3008A02274	Nov. 01, 2017		
9	Receiver	AGILENT	N9038A	MY52130039	Oct. 10, 2017		
10	Test Cable	emci	EMC104-SM-S M-10000(1GHz - 26.5GHz)	C-68	Jun. 26, 2017		
11	Controller	СТ	SC100	N/A	N/A		
12	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Apr. 23, 2017		
13	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 27, 2017		
14	Active Loop Antenna	R&S	HFH2-Z2	830749/020	Sep. 06, 2017		
15	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A		

Remark: "N/A" denotes no model name, serial no. or calibration specified.

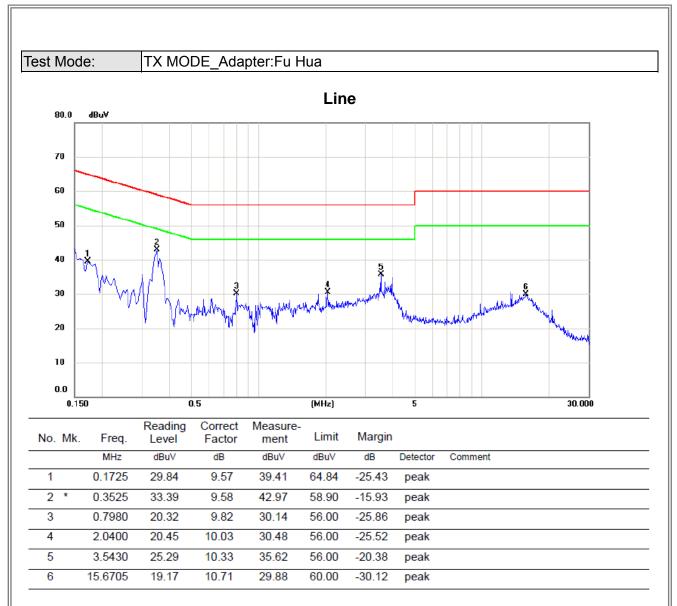
All calibration period of equipment list is one year.



# **ATTACHMENT A - CONDUCTED EMISSION**

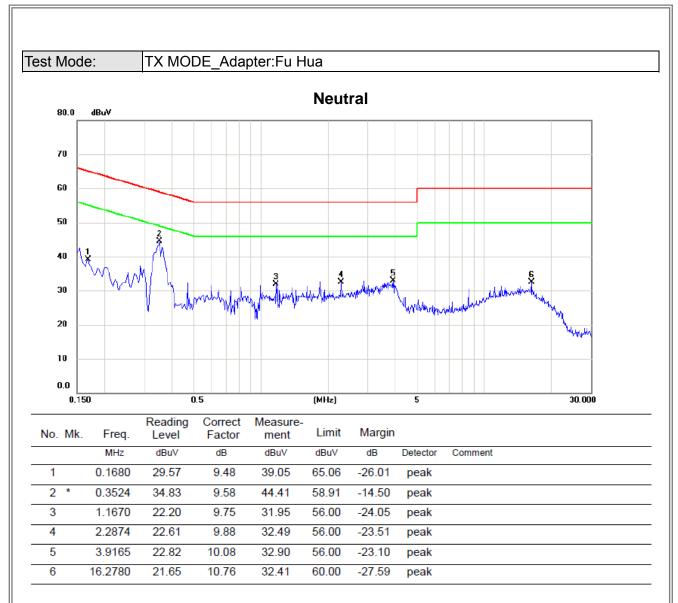






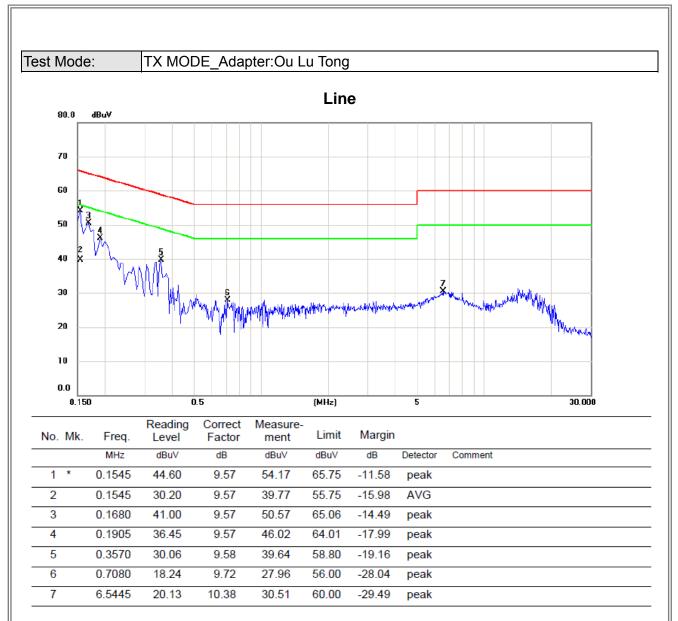






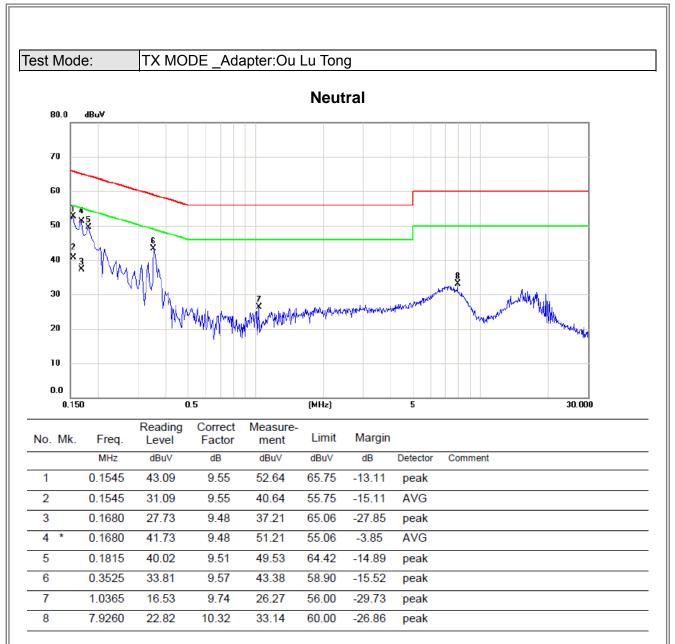










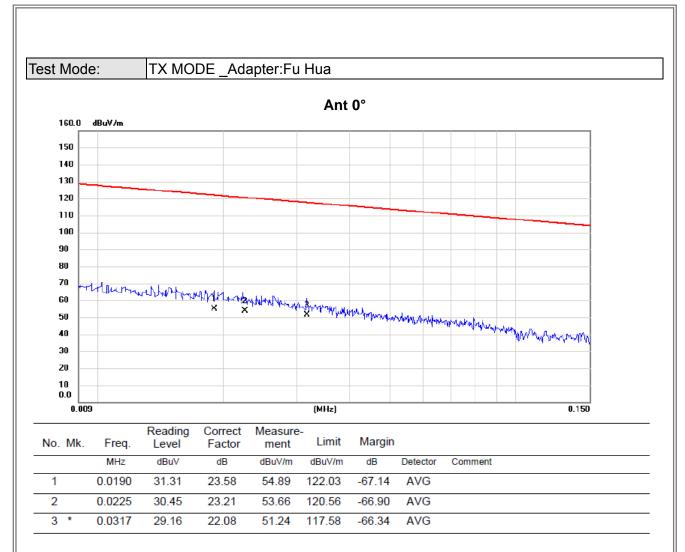




# ATTACHMENT B - RADIATED EMISSION (9KHZ TO 30MHZ)

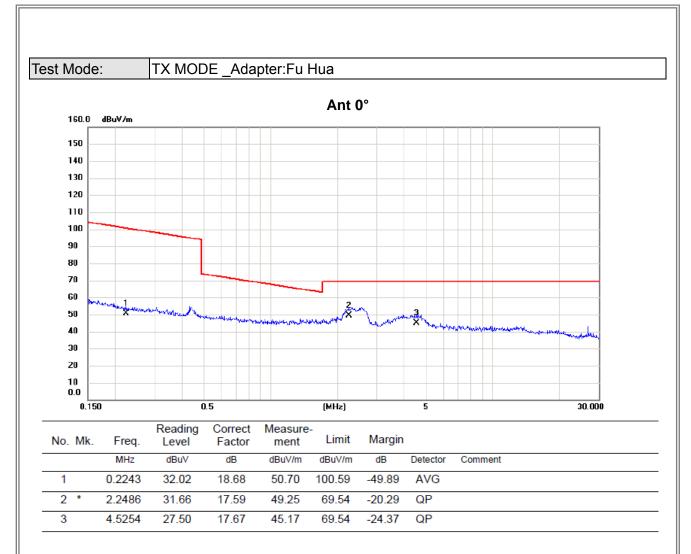






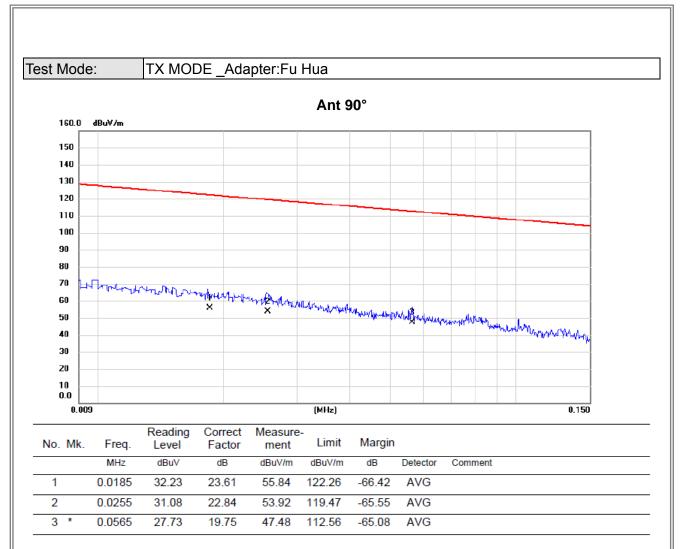






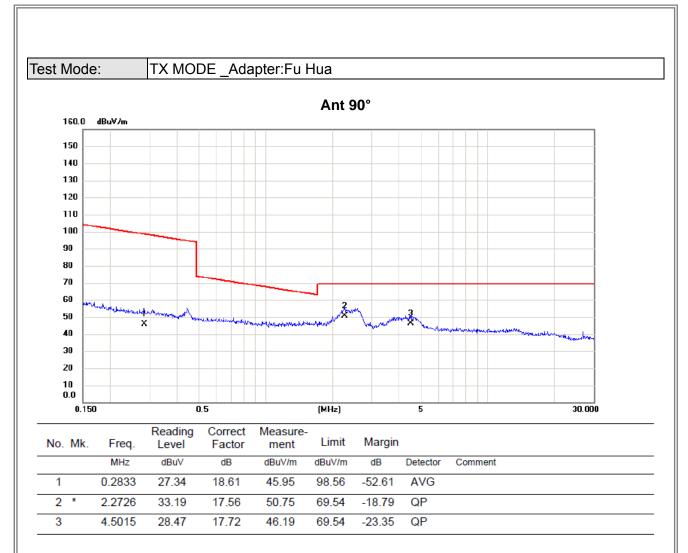






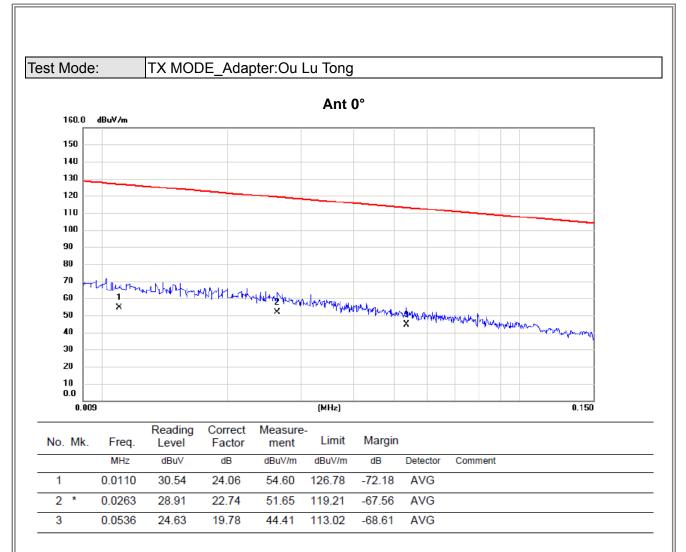






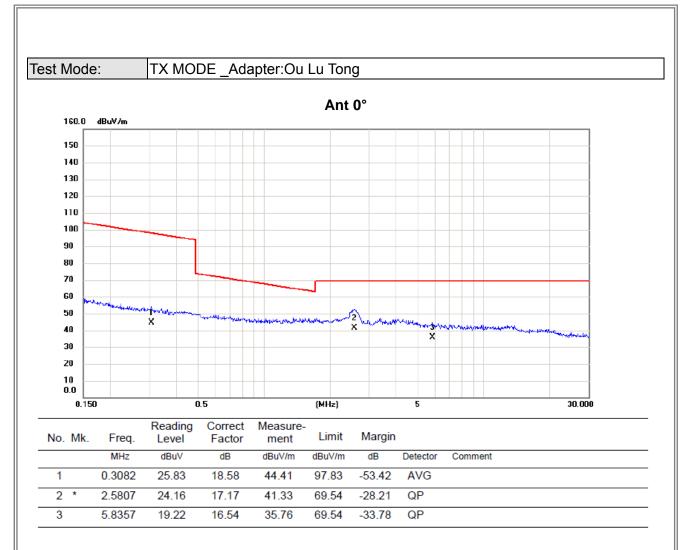






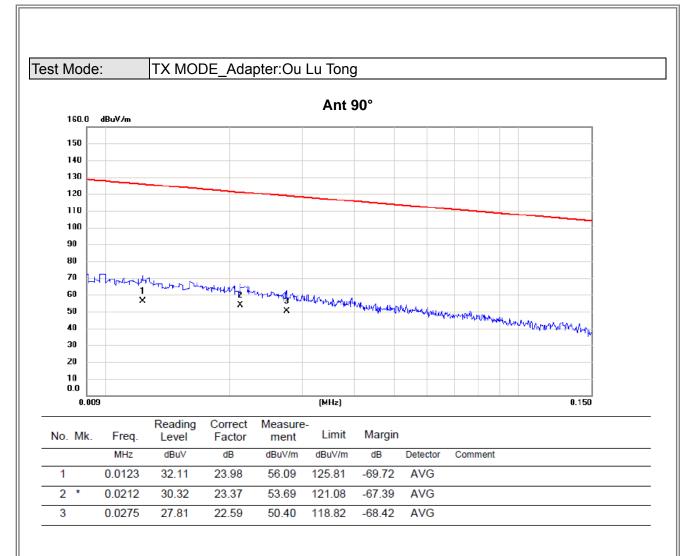






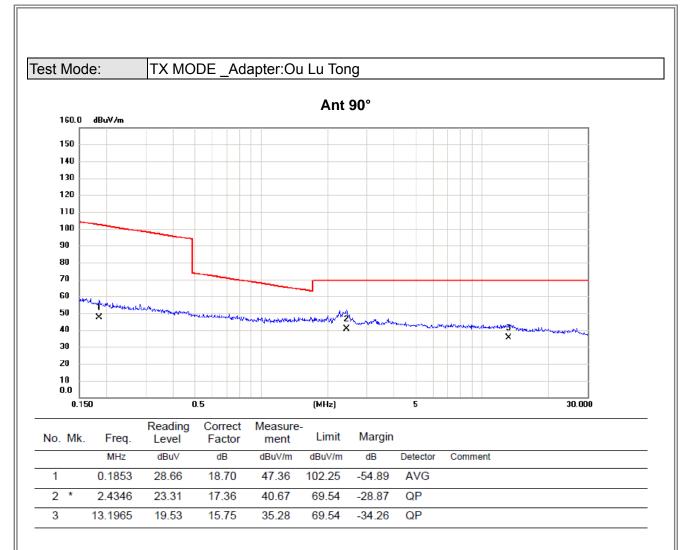












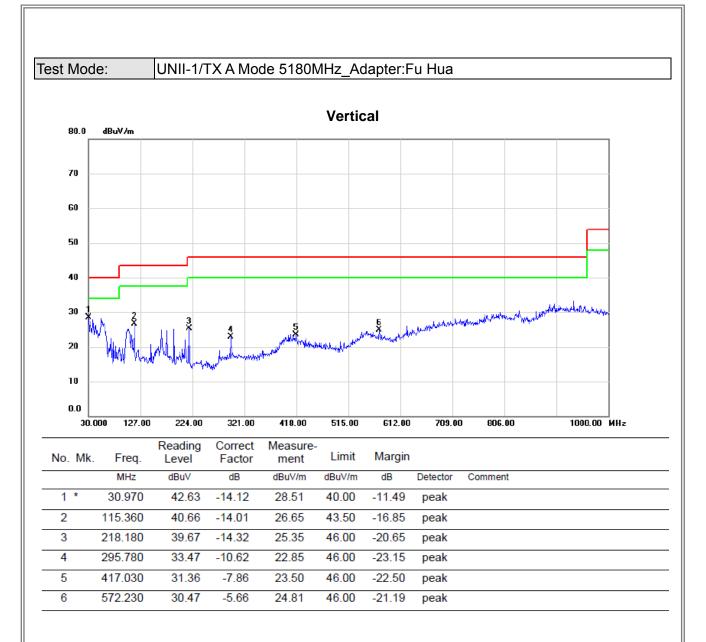




# ATTACHMENT C - RADIATED EMISSION (30MHZ TO 1000MHZ)

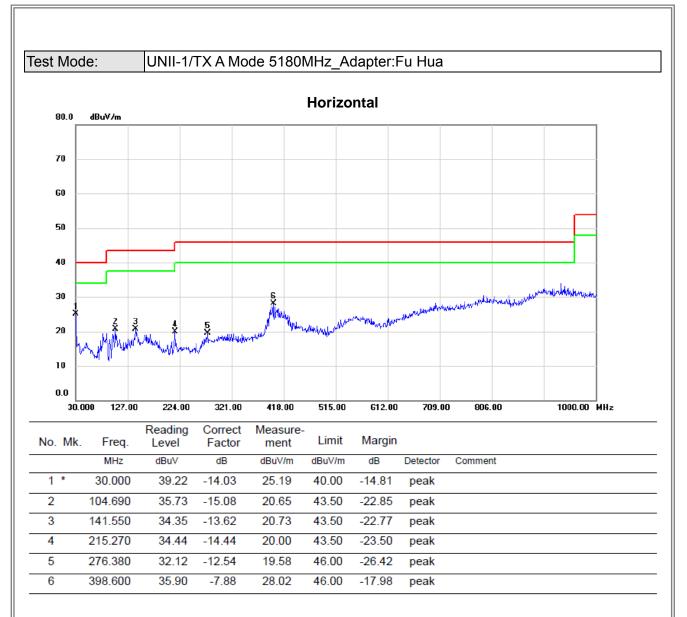






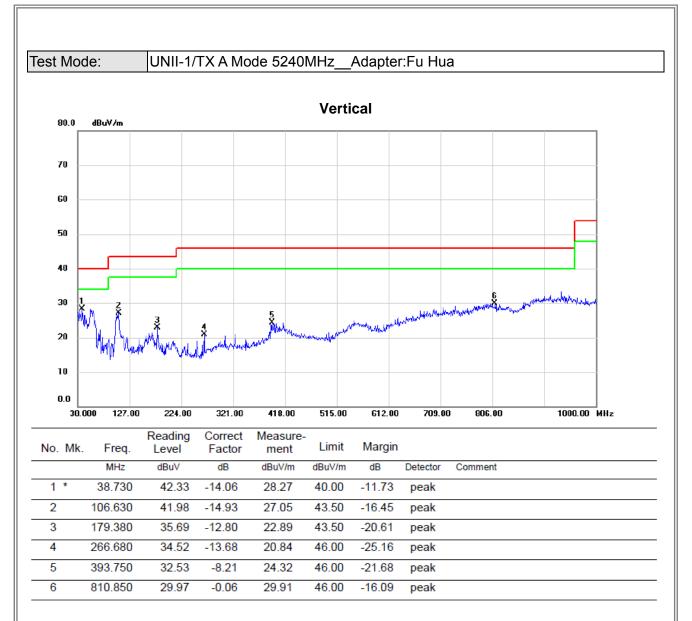






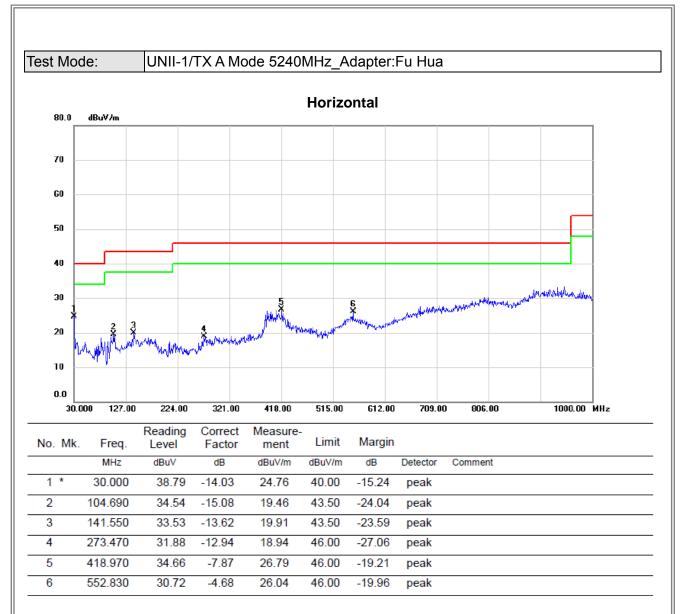






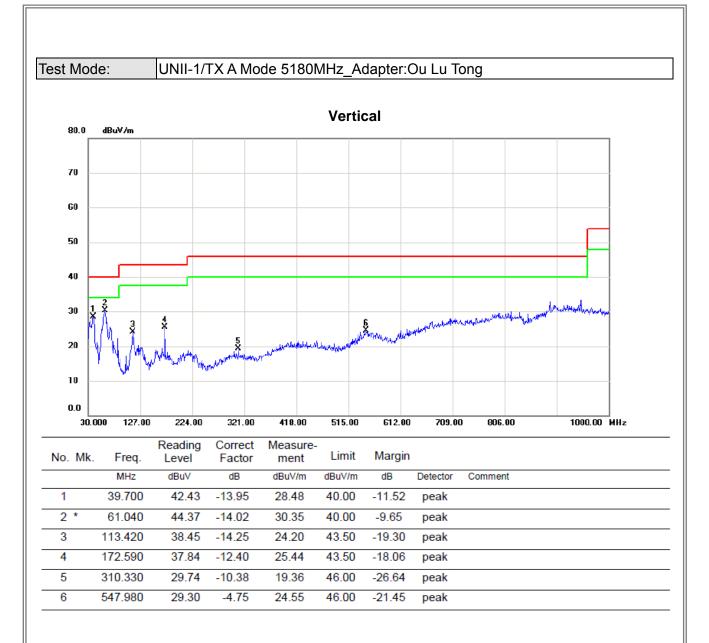






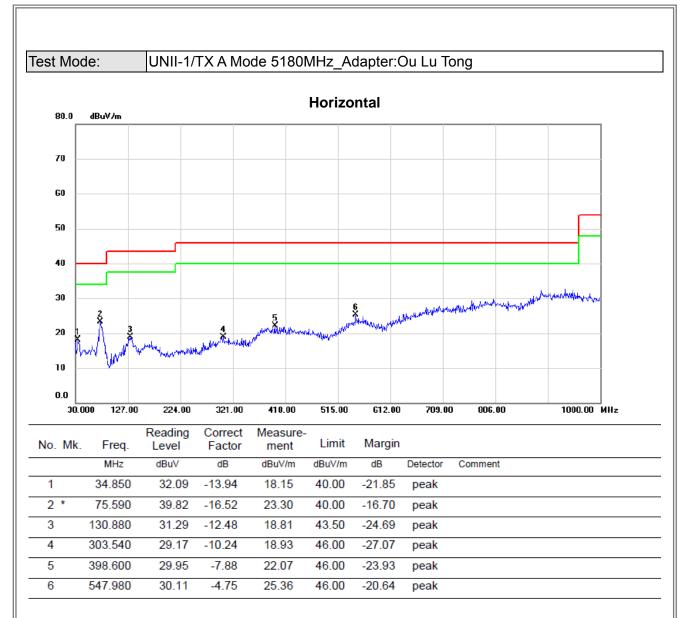






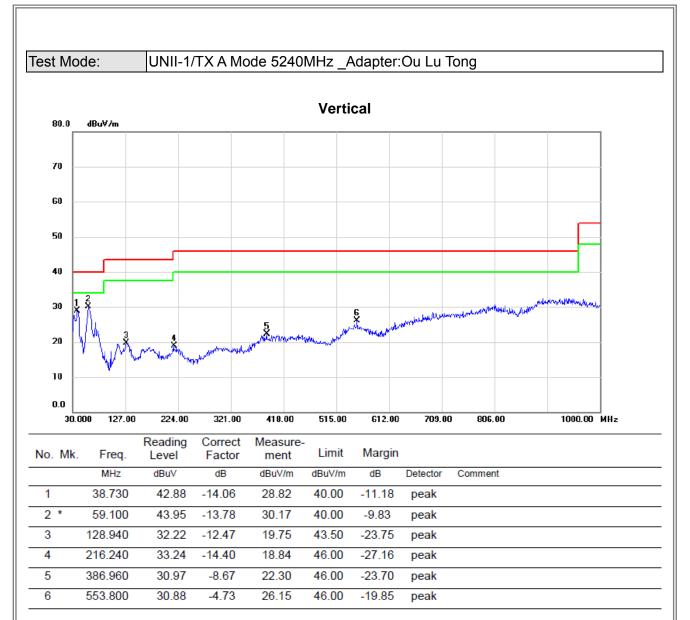






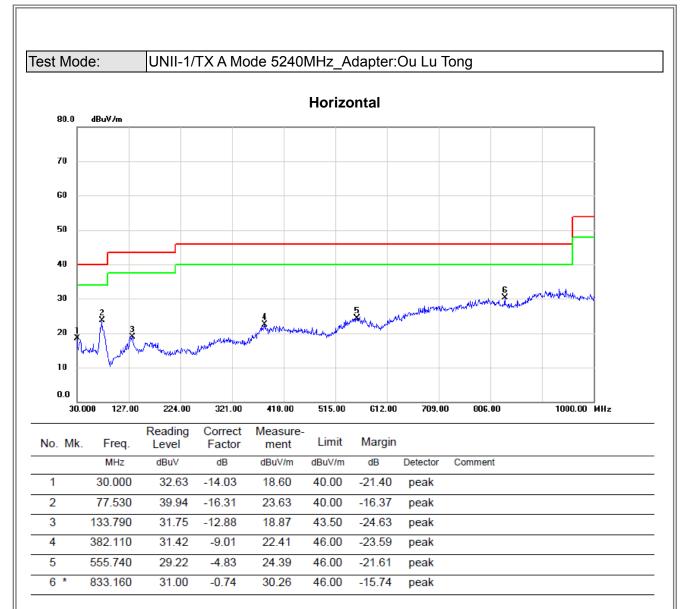














## ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)





