

FCC Radio Test Report

FCC ID: XHM-J690222

This report concerns (check one): ⊠Original Grant □Class II Change

Project No. : 1510114 Equipment : POS Model Name : J2 690

Applicant: FLYTECH Technology Co., Ltd.

Address: 1F, No. 168, Sing-Ai Rd., NeiHu District 11494,

Taipei, Taiwan

Date of Receipt : Oct. 13, 2015

Date of Test : Oct. 13, 2015 ~ Feb. 26, 2016

Issued Date : Feb. 29, 2016 Tested by : BTL Inc.

Testing Engineer

(Rush Kao)

Technical Manager

(Jeff Yang)

Authorized Signatory

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Report No.: BTL-FCCP-1-1510114

Page 1 of 32



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BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

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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.

Report No.: BTL-FCCP-1-1510114 Page 2 of 32



Table of Contents

REPORT ISSUED HISTORY					
1	CERTIFICATION	6			
2	SUMMARY OF TEST RESULTS	7			
2.1	TEST FACILITY	7			
2.2	MEASUREMENT UNCERTAINTY	7			
3	GENERAL INFORMATION	8			
3.1	GENERAL DESCRIPTION OF EUT	8			
3.2	DESCRIPTION OF TEST MODES	9			
3.3	BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	9			
3.4	DESCRIPTION OF SUPPORT UNITS	9			
4	CONDUCTED EMISSION	10			
4.1	LIMITS	10			
4.2	TEST PROCEDURES	10			
4.3	TEST SETUP LAYOUT	11			
4.4	DEVIATION FROM TEST STANDARD	11			
4.5	EUT OPERATING CONDITIONS	11			
4.6	EUT TEST CONDITIONS	11			
4.7	TEST RESULTS	11			
5	RADIATED EMISSION	12			
5.1	LIMITS	12			
5.2	TEST PROCEDURE	13			
5.3	DEVIATION FROM TEST STANDARD	13			
5.4	TEST SETUP	14			
5.5	EUT OPERATING CONDITIONS	14			
5.6	EUT TEST CONDITIONS	14			
5.7	TEST RESULTS (BELOW 30MHZ)	14			
5.8	TEST RESULTS (30 TO 1000MHZ)	14			
6 . 20D	B SPECTRUM BANDWIDTH MEASUREMENT	15			
6.1 LIM	IIT OF 20dB BANDWIDTH MEASUREMENT	15			
6.2 TES	ST PROCEDURES	15			
6.3 TES	ST SETUP LAYOUT	15			
6.4 TES	ST DEVIATION	15			
6.5 EUT OPERATION DURING TEST					
6.6 TEST RESULT					
7 . MEASUREMENT INSTRUMENTS LIST					
8 EUT TEST PHOTO					
ATTACHMENT A - CONDUCTED EMISSION					
ATTACHMENT B - RADIATED EMISSION (9KHZ-30MHZ) 23					

Report No.: BTL-FCCP-1-1510114 Page 3 of 32



Tab	e o	f Co	nte	nts
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ATTACHMENT C - RADIATED EMISSION (30MHZ TO 1000MHZ)	28
ATTACHMENT D - 20DB SPECTRUM BANDWIDTH MEASUREMENT	31

Report No.: BTL-FCCP-1-1510114 Page 4 of 32



REPORT ISSUED HISTORY

Issue No.	Description	Issued Date
BTL-FCCP-1-1510114	Original Issue.	Feb. 29, 2015

Report No.: BTL-FCCP-1-1510114 Page 5 of 32



1 CERTIFICATION

Equipment : POS
Brand Name : FLYTECH
Model Name : J2 690

Applicant : FLYTECH Technology Co., Ltd. Manufacturer : FLYTECH Technology Co., Ltd.

Address : 1F, No. 168, Sing-Ai Rd., NeiHu District 11494, Taipei, Taiwan

Factory: FLYTECH TECHNOLOGY CO., LTD.

Address : No.36 Huaya 3rd Rd., Guishan Township, Taoyuan Country 33383, Taiwan

Date of Test : Oct. 13, 2015 ~ Feb. 26, 2016

Test Sample: Engineering Sample

Standards : FCC Part 15, Subpart C (15.209)

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-1-1510114) 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).

Report No.: BTL-FCCP-1-1510114 Page 6 of 32



2 SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

Standard Section	Test Item	Result			
15.207	Conducted emission	PASS			
15.209	Radiated emission	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:

Conducted emission Test:

C05: (VCCI RN: C-4742; FCC RN:965108; FCC DN:TW1082)

No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

Radiated emission Test:

CB11: (VCCI RN: R-4260)

No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

2.2 MEASUREMENT UNCERTAINTY

The measurement uncertainty is not specified by FCC/Industry Canada rules and for reference only.

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

The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2.

The BTL measurement uncertainty is less than the CISPR 16-4-2 Ucispr requirement.

A. Conducted emission test:

Test Site	Method	Measurement Frequency Range	U, (dB)
C05	CISPR	150 kHz~30MHz	2.04

B. Radiated emission test:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
	CISPR	30 MHz ~ 200 MHz	V	3.06
CB11		30 MHz ~ 200 MHz	Н	2.58
(3m)		200 MHz ~ 1, 000 MHz	V	3.50
		200 MHz ~ 1, 000 MHz	Н	3.10

Our calculated Measurement Instrumentation Uncertainty is shown in the tables above. These are our U_{lab} values in CISPR 16-4-2 terminology.

Since Table 1 of CISPR 16-4-2 has values of measurement instrumentation uncertainty, called U_{CISPR} , as follows:

Conducted Disturbance (mains port) - 150 kHz - 30 MHz: 3.6 dB

Radiated Disturbance (electric field strength on an open area test site or alternative test site) – 30 MHz - 1000 MHz: 5.2 dB

It can be seen that our U_{lab} values are smaller than U_{CISPR} .

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

Report No.: BTL-FCCP-1-1510114 Page 7 of 32



3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	POS			
Brand Name	FLYTECH			
Model Name	J2 690			
Model Difference	Model Difference N/A			
Product Description	Operation Frequency	125KHz		
Product Description	Antenna Designation	LOOP Antenna		
Power Source	DC voltage supplied from External Power Supply.			
Power Rating I/P: 100-240V~50-60Hz, 2A O/P: 19V = -6.32A				
2 * Mother Board: D92(Q87) & D92(H81) 1 * CPU: Intel, Haswell i5-4590S 3.0G/Cache 6M 1 * Panel: 15" 2 * 2nd Display: (1) 10.1", (2) 14" 1 * HDD: 2.5" 1 * External Power Supply: Chicony / A11-120P1A				

Note:

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

Report No.: BTL-FCCP-1-1510114 Page 8 of 32



3.2 DESCRIPTION OF TEST MODES

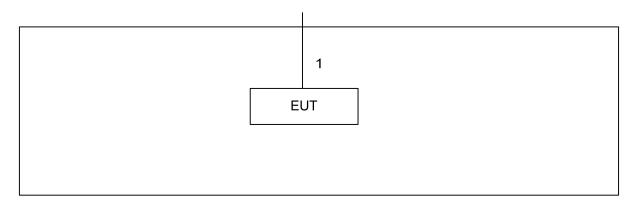
To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration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

Pretest Mode	Description
Mode 1	125KHz Transmit

Conducted emission test				
Final Test Mode Description				
Mode 1	e 1 125KHz Transmit			

Radiated emission test				
Final Test Mode Description				
Mode 1	125KHz Transmit			

3.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



3.4 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
1	NO	NO	1.5m	Power Line

Note:

(1) The support equipment was authorized by Declaration of Conformity (DOC).

Report No.: BTL-FCCP-1-1510114 Page 9 of 32



4 CONDUCTED EMISSION

4.1 LIMITS

FREQUENCY	(dBuV)		
(MHz)	Quasi-peak	Average	
0.15 - 0.5	66 - 56 *	56 - 46 *	
0.50 - 5.0	56.00	46.00	
5.0 - 30.0	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.
- The test result calculated as following:
 Measurement Value = Reading Level + Correct Factor
 Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use)
 Margin Level = Measurement Value Limit Value

4.2 TEST PROCEDURES

- 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.

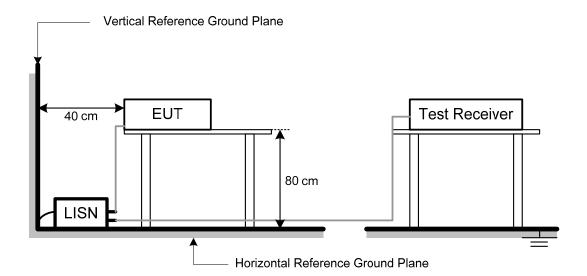
NOTE:

- a. Reading in which marked as Peak, QP or AVG means measurements by using are Quasi-Peak or Average Mode with Detector BW=9 kHz (6 dB Bandwidth).
- b. All readings are Peak Mode value unless otherwise stated QP or AVG in column of Note. If the Peak or 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 Peak or QP Mode was measured, but AVG Mode didn't perform.

Report No.: BTL-FCCP-1-1510114 Page 10 of 32



4.3 TEST SETUP LAYOUT



4.4 DEVIATION FROM TEST STANDARD

No deviation

4.5 EUT OPERATING CONDITIONS

The EUT used during radiated and/or conducted emission measurement was designed to exercise in a manner similar to a typical use.

4.6 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 54% Test Voltage: AC 120V/60Hz

4.7 TEST RESULTS

Please refer to the Attachment A.

Remark:

- (1) All readings are QP Mode value unless otherwise stated AVG in column of <code>『Note』</code>. 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.

Report No.: BTL-FCCP-1-1510114 Page 11 of 32



5 RADIATED EMISSION

5.1 LIMITS

FCC Part 15.209						
Frequency	Field Strength Limitation		Field Strength Limitation at 3m Measurement Dist			
(MHz)	(uV/m)	Dist	(uV/m)	(dBuV/m)		
0.009 - 0.490	2400 / F(KHz)	300m	10000 * 2400/F(KHz)	20log 2400/F(KHz) + 80		
0.490 - 1.705	24000 / F(KHz)	30m	100 * 24000/F(KHz)	20log 24000/F(KHz) + 40		
1.705 – 30.00	30	30m	100* 30	20log 30 + 40		
30.0 - 88.0	100	3m	100	20log 100		
88.0 – 216.0	150	3m	150	20log 150		
216.0 - 960.0	200	3m	200	20log 200		
Above 960.0	500	3m	500	20log 500		

NOTE:

- (1) The tighter limit shall apply at the boundary between two frequency range.
- (2) Limitation expressed in dBuV/m is calculated by 20log Emission Level (uV/m).
- (3) If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula of $L_{d1} = L_{d2} * (d_2/d_1)^2$.

Example:

F.S Limit at 30m distance is 30uV/m, then F.S Limitation at 3m distance is adjusted as $L_{d1} = L_1 =$ $30uV/m * (10)^2 = 100 * 30 uV/m$ (4) The test result calculated as following:

Measurement Value = Reading Level + Correct Factor

Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use)

Margin Level = Measurement Value - Limit Value



5.2 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 height of the equipment or of the substitution antenna shall be 0.8 m 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.
- c. 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.
- d. 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)
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

NOTE: (FCC PART 15.209)

No deviation

- a. Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode with Detector BW=120 kHz.
- b. 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.

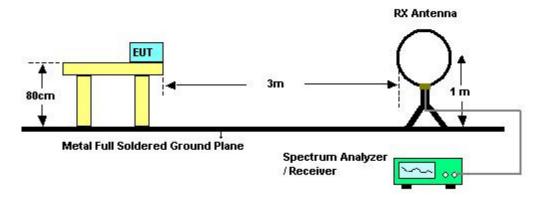
5.3 DEVIATION FROM TEST STANDARD

Report No.: BTL-FCCP-1-1510114 Page 13 of 32

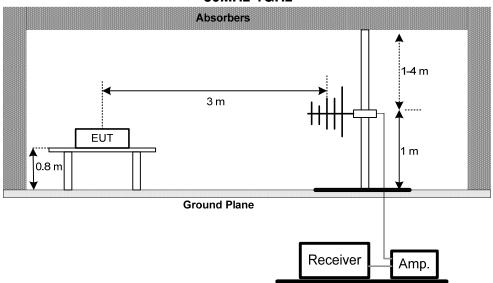


5.4 TEST SETUP

Below 30MHz



30MHz-1GHz



5.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **4.5** unless otherwise a special operating condition is specified in the follows during the testing.

5.6 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 45% Test Voltage: AC 120V/60Hz

5.7 TEST RESULTS (BELOW 30MHZ)

Please refer to the Attachment B.

5.8 TEST RESULTS (30 TO 1000MHZ)

Please refer to the Attachment C.

Report No.: BTL-FCCP-1-1510114



6. 20dB SPECTRUM BANDWIDTH MEASUREMENT

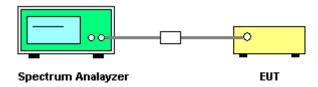
6.1 LIMIT OF 20dB BANDWIDTH MEASUREMENT

The 20dB bandwidth shall be specified in operating frequency band.

6.2 TEST PROCEDURES

The bandwidth of the fundamental frequency was measured by spectrum analyzer with 10kHz RBW and 10kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

6.3 TEST SETUP LAYOUT



6.4 TEST DEVIATION

There is no deviation with the original standard.

6.5 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

6.6 TEST RESULT

Please refer to the Attachment D.

Report No.: BTL-FCCP-1-1510114 Page 15 of 32



7. MEASUREMENT INSTRUMENTS LIST

	Conducted Emission Measurement						
Item	em Kind of Equipment Manufacturer Type No. Serial No. Calibrated unt						
1	TWO-LINE V-NETWORK	R&S	ENV216	101050	Jan. 01, 2017		
2	Test Cable	TIMES	CFD300-NL	C05	Jun. 14, 2016		
3	EMI Test Receiver	R&S	ESR3	101854	Dec. 10, 2016		
4	Measurement Software	EZ	EZ_EMC (Version NB-03A)	N/A	N/A		

	Radiated Emission Measurement						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until		
1	Spectrum Analyzer	Agilent	N9038A	MY51210215	Jun. 07, 2016		
2	Microwave Pre_amplifier	HP	8447D	2944A08891	Mar. 08, 2016		
3	Test Cable	EMCI	EMC8D-NM-N M-8000	150301	Mar. 08, 2016		
4	Test Cable	EMCI	EMC8D-NM-N M-2500	150303	Mar. 08, 2016		
5	Test Cable	EMCI	EMC8D-NM-N M-1000	150304	Mar. 08, 2016		
6	Trilog-Broadband Antenna	Schwarzbeck	VULB9168	9168-364	Feb. 03, 2017		
7	Loop Antenna	EMCO	6502	00042960	Nov. 15. 2016		

	20dB Bandwidth Measurement					
Item	Item Kind of Equipment Manufacturer Type No. Serial No. Calibrated until					
1	Spectrum Analyzer	R&S	FSP-40	100129	Jan. 06, 2017	

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

All calibration period of equipment list is one year.

Report No.: BTL-FCCP-1-1510114 Page 16 of 32



8 EUT TEST PHOTO

Conducted emission test photos

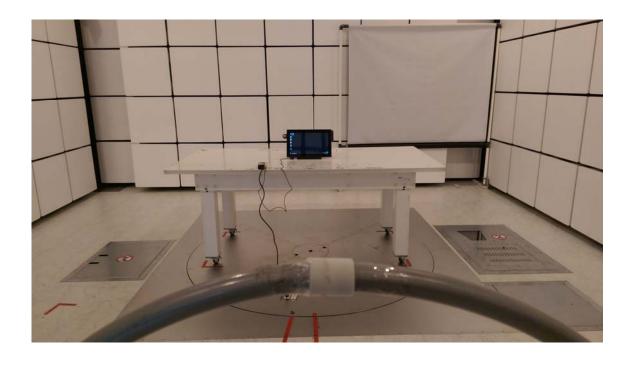


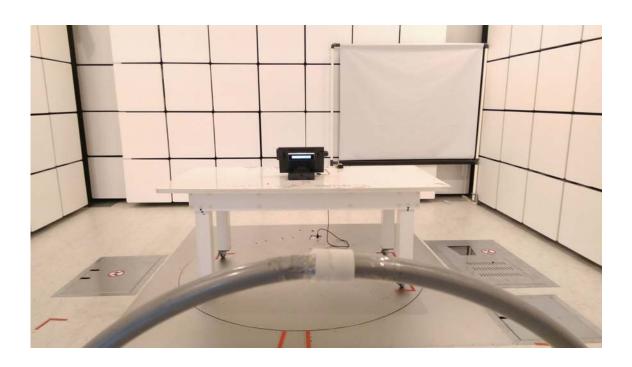


Report No.: BTL-FCCP-1-1510114 Page 17 of 32



Radiated emission test photos 9KHz to 30MHz

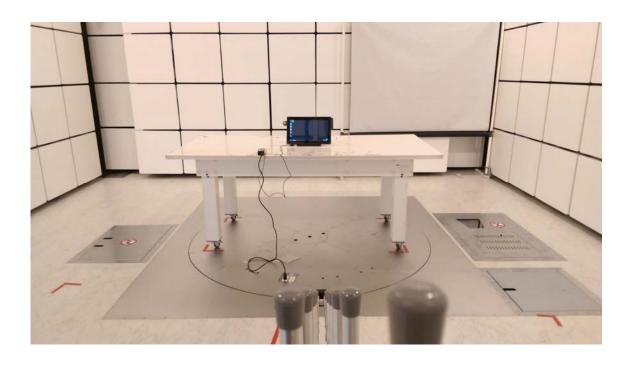


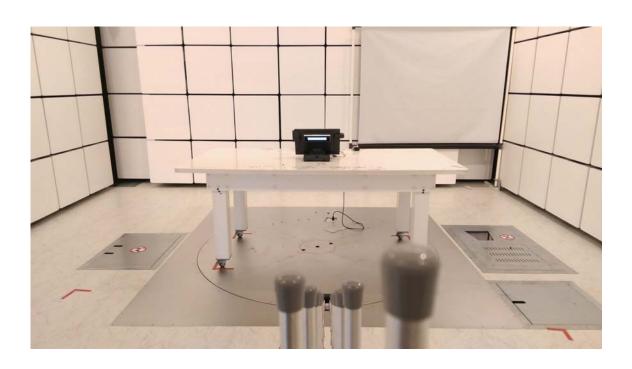


Report No.: BTL-FCCP-1-1510114 Page 18 of 32



Radiated emission test photos 30MHz to 1000MHz





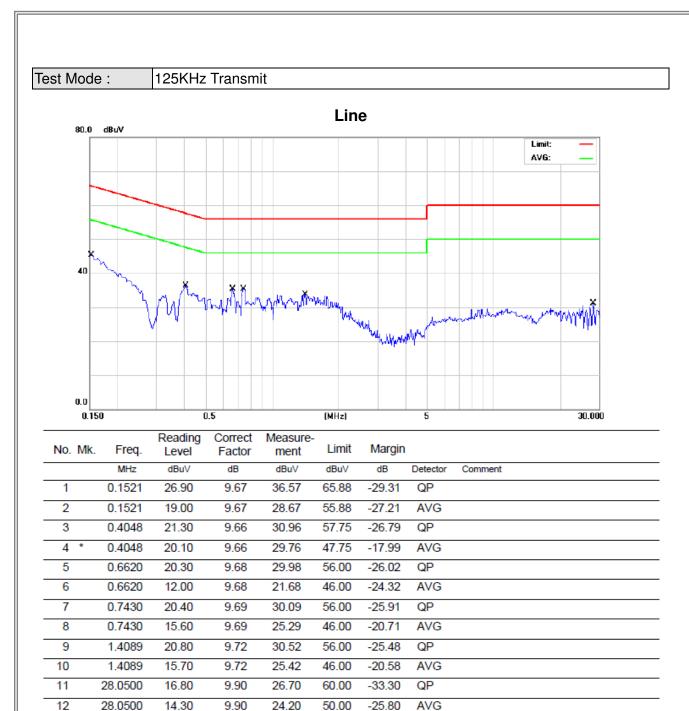
Report No.: BTL-FCCP-1-1510114 Page 19 of 32



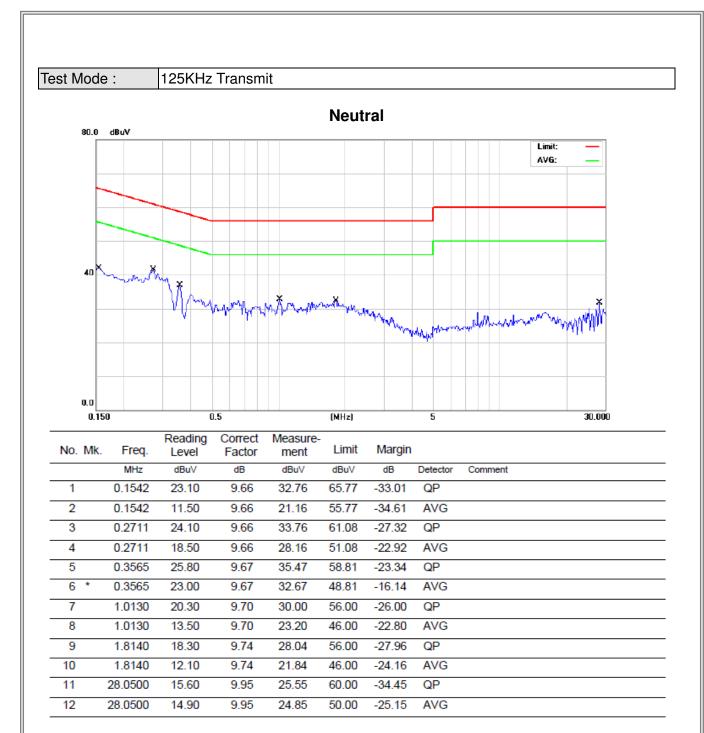
ATTACHMENT A - CONDUCTED EMISSION

Report No.: BTL-FCCP-1-1510114 Page 20 of 32







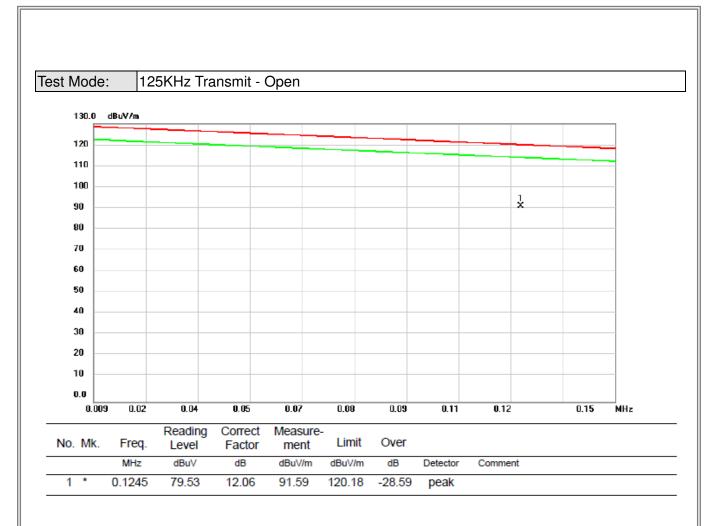




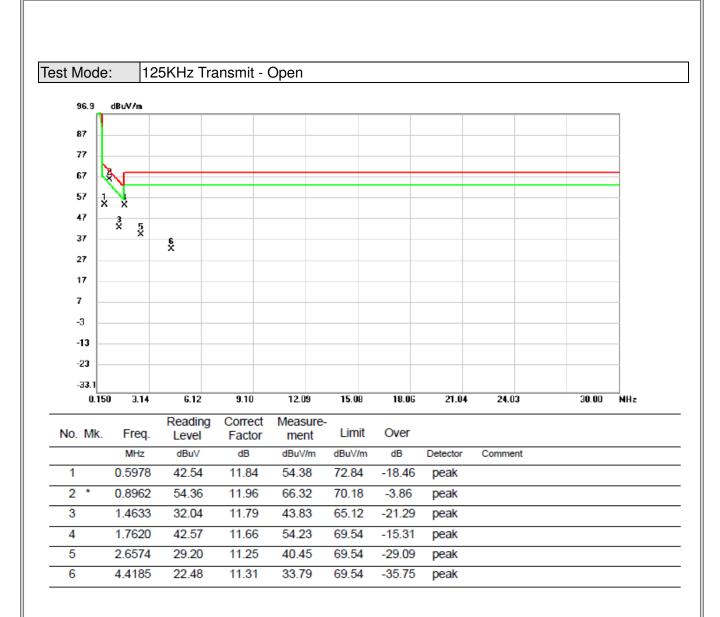
ATTACHMENT B - RADIATED EMISSION (9KHZ-30MHZ)			

Report No.: BTL-FCCP-1-1510114 Page 23 of 32

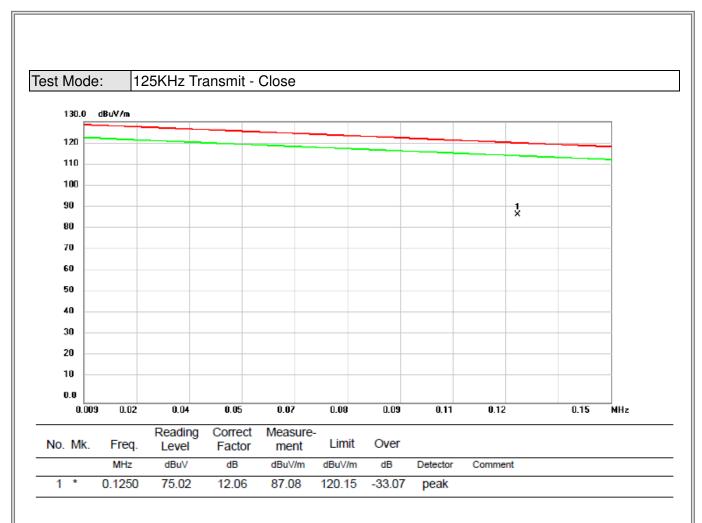




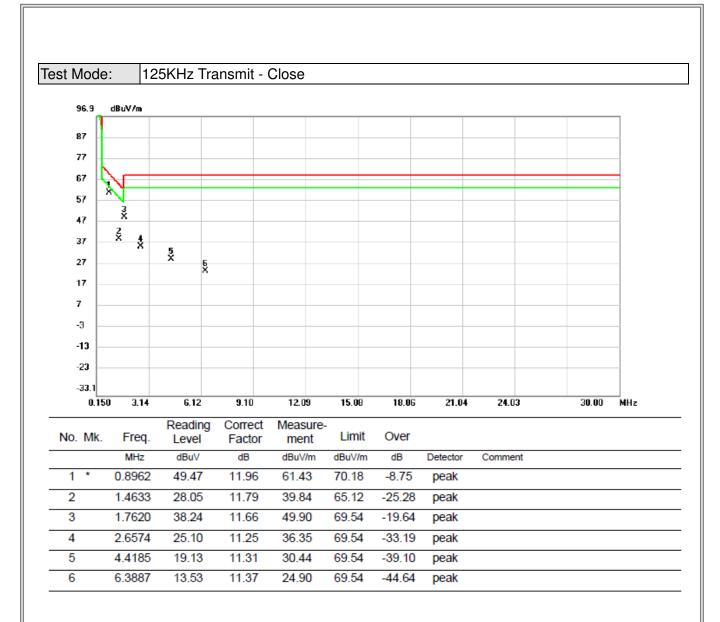










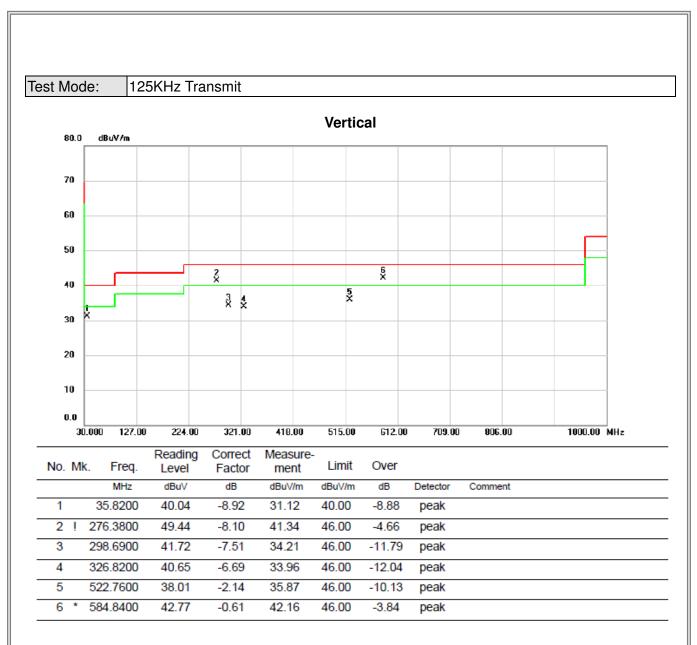




ATTACHMENT C - RADIATED EMISSION (30MHZ TO 1000MHZ)

Report No.: BTL-FCCP-1-1510114 Page 28 of 32





Report No.: BTL-FCCP-1-1510114 Page 29 of 32







ATTACHMENT D - 20dB SPECTRUM BANDWIDTH MEASUREMENT

Report No.: BTL-FCCP-1-1510114 Page 31 of 32



Test Mode 125KHz Transmit

Frequency	20dB Bandwidth	99% OBW	Test Result	
(kHz)	(kHz)	(kHz)		
125	2.76	2.36	Complies	

