

# FCC Radio Test Report FCC ID: WA5WH65B

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

Project No. : 1612C276 Equipment : Weather Station

Model Name : WH65B

Applicant : Fine Offset Electronics Co., LTD

**Address**: 2/F., Building no.3, Ping Shan Mingqi Industrial Park,

Xili Town, Nanshan Distri. Shenzhen, Guangdong,

China

Date of Receipt : Dec. 29, 2016

**Date of Test** : Dec. 29, 2016 ~ Jan. 12, 2017

**Issued Date** : Jan. 13 2017 **Tested by** : BTL Inc.

Testing Engineer : NH (hen

(Nick Chen)

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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-1-1612C276	Original Issue.	Jan. 13, 2017

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#### 1. CERTIFICATION

Equipment : Weather Station

Brand Name : N/A Model Name : WH65B

Applicant : Fine Offset Electronics Co., LTD Manufacturer : Fine Offset Electronics Co., LTD

Address : 2/F., Building no.3, Ping Shan Mingqi Industrial Park, Xili Town,

NanshanDistri. Shenzhen, Guangdong, China

Date of Test : Dec. 29, 2016 ~ Jan. 12, 2017

Test Sample : Engineering Sample

Standard(s) : FCC Part15, Subpart C(15.249)/ 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-1-1612C276) 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).

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## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC Part15, Subpart C (15.249)					
StandardSection	Test Item	Judgment	Remark		
15.207	Conducted Emission	N/A	Note (1)		
15.209 15.249	Radiated Spurious Emission	PASS			
-	Bandwidth	PASS			

## NOTE:

- (1)"N/A" denotes test is not applicable in this test report.
- (2) EUT is used new battery.

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#### 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 astandard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

#### A. Radiated Measurement:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
		9KHz~30MHz	V	3.79
		9KHz~30MHz	Η	3.57
		30MHz~200MHz	V	3.82
	CISPR	30MHz~200MHz	Ι	3.78
DG-CB03		200MHz~ 1,000MHz	V	4.10
DG-CB03		200MHz~ 1,000MHz	Ι	4.06
		1GHz~18GHz	V	3.12
		1GHz~18GHz	Ι	3.68
		18GHz~40GHz	V	4.15
		18GHz~40GHz	Н	4.14

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#### **3.GENERAL INFORMATION**

#### 3.1 GENERAL DESCRIPTION OF EUT

Equipment	Weather Station			
Brand Name	NA			
Model Name	WH65B			
Model Difference	N/A			
	Operation Frequency	915 MHz		
Product Description	Modulation Technology FSK			
Froduct Description	Data rate 17.2Kbps			
	Field Strength 92.85dBuV/m			
PowerSource	2*AA Battery supplied			
Power Rating	DC 3V			

#### Note:

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

## 2. Channel List:

Channe	Frequency (MHz)	
01	915	

#### Table for Filed Antenna:

3.	Ant.	Manufacturer	Model Name	Antenna Type	Connector	Gain (dBi)
	1	N/A	N/A	Internal	N/A	0

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#### 3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based 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 Mode

Final Test Mode	Description
Mode 1	TX Mode

#### 3.3 BLOCKDIAGRAMSHOWINGTHECONFIGURATIONOFSYSTEMTESTED

EUT

#### 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
-	-	-	-	-

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#### 4. EMC EMISSION TEST

#### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 POWER LINE CONDUCTED EMISSION (FREQUENCY RANGE 150KHZ-30MHZ)

Fraguency of Emission (MUT)	Conducted Limit (dBµV)				
Frequency of Emission (MHz)	Quasi-peak	Average			
0.15 -0.5	66 to 56*	56 to 46*			
0.50 -5.0	56	46			
5.0 -30.0	60	50			

#### Note:

(1) The limit of " \* " decreases with the logarithm of the frequency

The following table is the setting of the receiver

Receiver Parameters	Setting		
Attenuation	10 dB		
Start Frequency	0.15 MHz		
Stop Frequency	30 MHz		
IF Bandwidth	9 kHz		

#### 4.1.2 TESTPROCEDURE

- 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 equipmentspowered 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 groundplane 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.

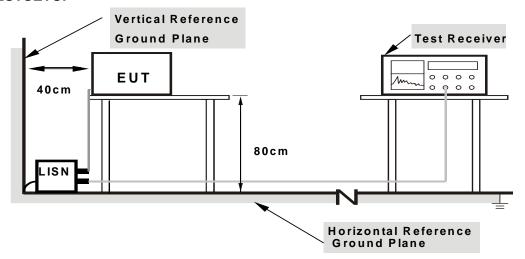
#### 4.1.3 DEVIATIONFROMTESTSTANDARD

No deviation

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#### 4.1.4 TESTSETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

#### **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 mode.

#### 4.1.6 EUT TEST CONDITIONS

Temperature: N/A Relative Humidity: N/A Test Voltage: N/A

#### 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 Note . 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.

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#### 4.2 RADIATED EMISSION MEASUREMENT

#### 4.2.1 RADIATED EMISSION LIMITS (FCC 15.209)

Frequencies (MHz)	Field Strength (micorvolts/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
960~1000	500	3

Harmonic emissions limits comply with below 54dBuV/m at 3m. Other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section15.209(a) limit in the table below has to be followed.

#### Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission level (dBuV/m)=20log Emission level (uV/m).

#### LIMITS OF RADIATED EMISSION MEASUREMENT (FCC 15.209)

EDEOLIENCY (MH-)	(dBuV/m) (at 3m)				
FREQUENCY (MHz)	PEAK	AVERAGE			
Above 1000	74	54			

#### Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting		
Attenuation	Auto		
Start Frequency	1000 MHz		
Stop Frequency	10th carrier harmonic		

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz for PK/AVG detector
Start ~ Stop Frequency	90kHz~110kHz for QP detector
Start ~ Stop Frequency	110kHz~490kHz for PK/AVG detector
Start ~ Stop Frequency	490kHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector

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#### 4.2.2 TESTPROCEDURE

- 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 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 0.8 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.
- 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 DEVIATIONFROMTESTSTANDARD

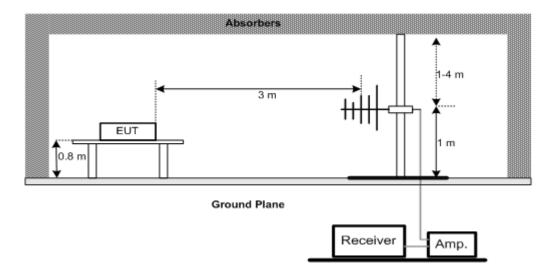
No deviation

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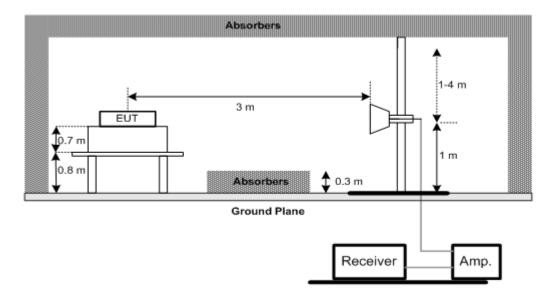


#### 4.2.4 TESTSETUP

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



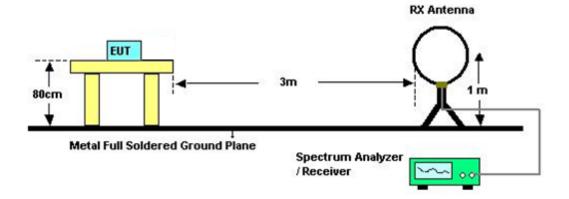
(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



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#### (C) For radiated emissions below 30MHz



#### 4.2.5EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

#### **4.2.6 EUT TEST CONDITIONS**

Temperature: 24°C Relative Humidity: 52% Test Voltage: DC 3V

#### 4.2.7 TEST RESULTS (BELOW 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 (30 TO 1000 MHz)

Please refer to the Attachment C

### 4.2.9 TEST RESULTS(ABOVE1000 MHz)

Please refer to the Attachment D

#### Remark:

- (1) EUT Orthogonal Axis:
  - "X" denotes Laid on Table; "Y" denotes Vertical Stand; "Z" denotes Side Stand
- (2) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

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#### 5. BANDWIDTH TEST

#### **5.1 TEST PROCEDURE**

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 3kHz, VBW=3kHz, Sweep time = Auto.

#### **5.2 DEVIATION FROM STANDARD**

No deviation.

#### **5.3 TEST SETUP**



#### **5.4 EUT OPERATION CONDITIONS**

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

#### **5.5 EUT TEST CONDITIONS**

Temperature: 25°C Relative Humidity: 55% Test Voltage: DC 3V

#### 5.6 TEST RESULTS

Please refer to the Attachment E

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#### 6. MEASUREMENT INSTRUMENTS LIST AND SETTING

	Radiated Emission Measurement									
Item	Kind of Equipment	Calibrated until								
1	Antenna	Schwarbeck	VULB9160	9160-3232	Mar. 27, 2017					
2	Amplifier	HP	8447D	2944A09673	Oct. 20, 2017					
3	Receiver	Agilent	N9038A	MY52130039	Sep. 04, 2017					
4	Cable	emci	LMR-400(30MHz- 1GHz)(8m+5m)	N/A	Jun. 27, 2017					
5	Controller	CT	SC100	N/A	N/A					
6	Controller	MF	MF-7802	MF780208416	N/A					
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A					
8	Double Ridged Guide Antenna	ETS	TS 3115		Mar. 27, 2017					
9	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Apr. 23, 2017					
10	Amplifier	Agilent	8449B	3008A02274	Mar. 10, 2017					
11	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 27, 2017					
12	Receiver	Agilent	N9038A	MY52130039	Sep. 04, 2017					
13	Antenna	EM	EM-6876-1	230	Jul. 08, 2017					
14	Controller	СТ	SC100	N/A	N/A					
15	Controller	MF	MF-7802	MF780208416	N/A					

	Bandwidth										
Item Kind of Equipment Manufacturer Type No. Serial No. Calibrated ur											
1	Spectrum Analyzer	R&S	FSP40	100185	Sep. 04, 2017						
2	Test Cable	emci	EMC104-SM-SM- 9000(0.01GHz- 26.5GHz)	C-100	N/A						

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

All calibration period of equipment list is one year.

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## 7. EUT TEST PHOTO

## **Radiated Measurement Photos**

#### 9KHz to 30MHz





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# Radiated Measurement Photos

## 30MHz to 1000MHz





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## **Radiated Measurement Photos**

## Above 1000MHz





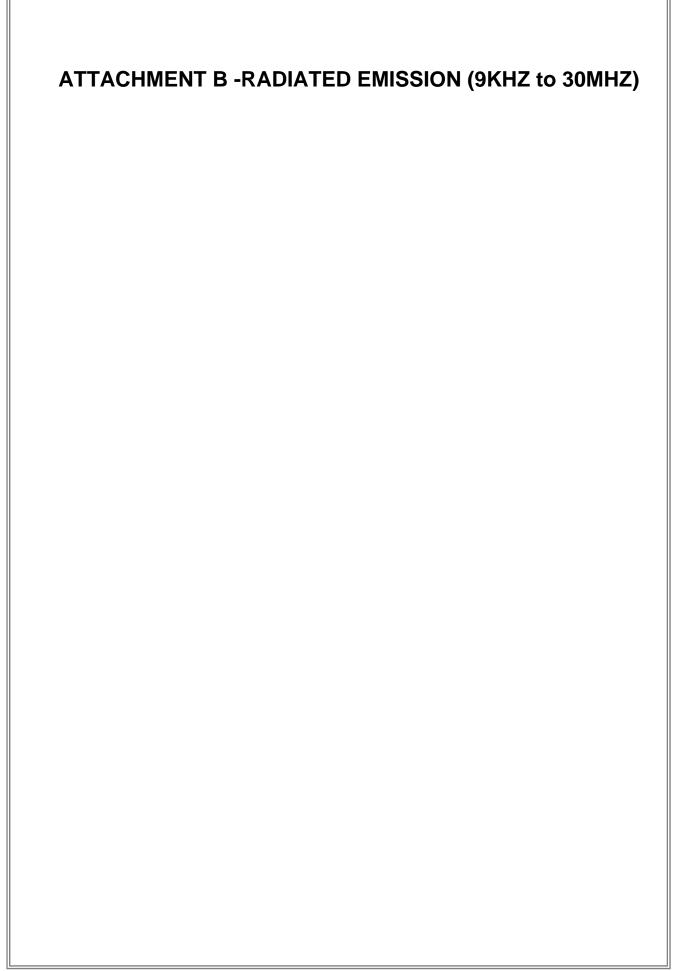
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ATTACHMENT A - CONDUCTED EMISSION						
Test Mode: N/A						
Note: "N/A" denotes test is not applicable to this device.						

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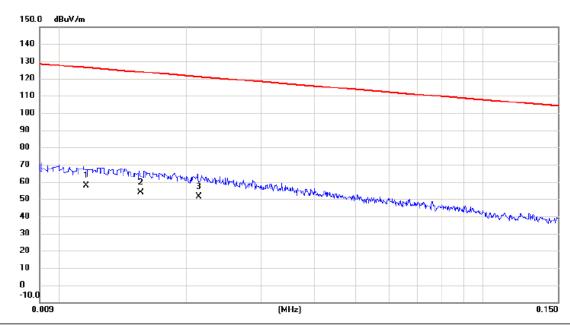


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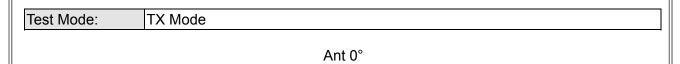
#### Ant 0°

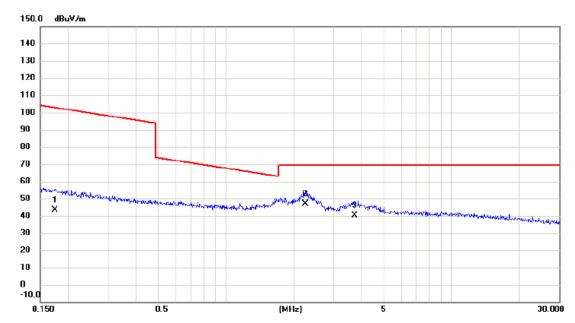


No	. Mk.	Freq.		Correct Factor	Measure ment	- Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.0116	33.90	24.02	57.92	126.32	-68.40	AVG	
2	2	0.0156	30.20	23.78	53.98	123.74	-69.76	AVG	
3	3	0.0214	27.90	23.35	51.25	121.00	-69.75	AVG	

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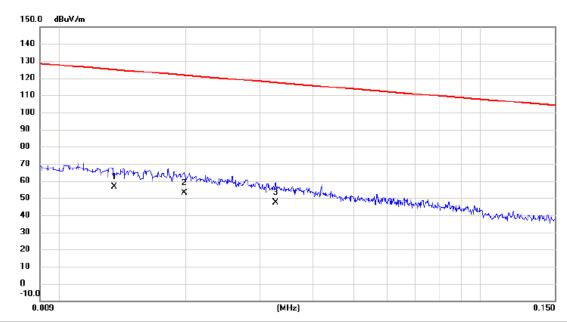
No. Mk.	Freq.			Measure- ment		Margin		
	MHz	dBu∀	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	0.1750	24.50	18.72	43.22	102.75	-59.53	AVG	
2 *	2.2486	29.50	17.59	47.09	69.54	-22.45	QP	
3	3.7198	22.20	18.16	40.36	69.54	-29.18	QP	

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#### Ant 90°



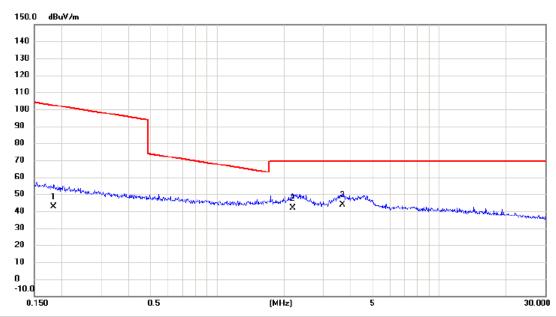
No. Mk.	Freq.			Measure- ment		Margin		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	0.0135	32.80	23.91	56.71	125.00	-68.29	AVG	
2	0.0198	29.50	23.53	53.03	121.67	-68.64	AVG	
3	0.0326	25.38	21.97	47.35	117.34	-69.99	AVG	

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#### Ant 90°



No. Mk.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	0.1835	23.80	18.71	42.51	102.33	-59.82	AVG	
2	2.1898	24.10	17.66	41.76	69.54	-27.78	QP	
3 *	3.6611	25.90	18.04	43.94	69.54	-25.60	QP	

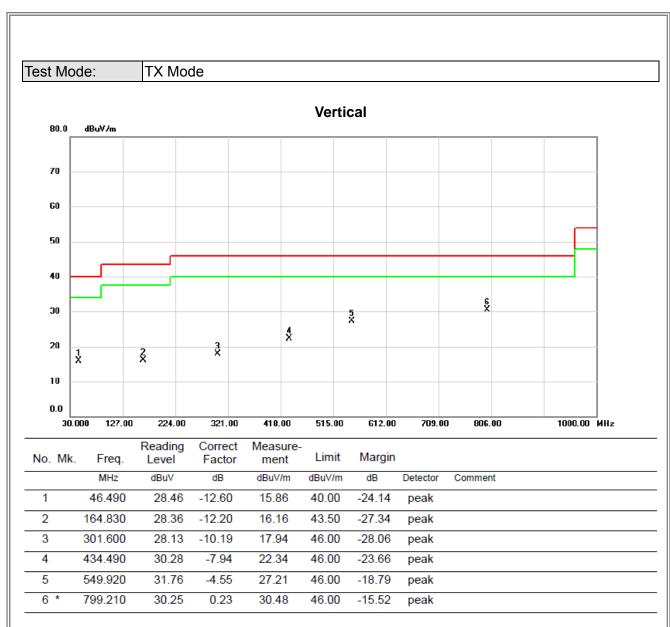
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<b>A</b>	ATTACHMENT C -RADIATED EMISSION (30MHZ TO 1000MHZ)

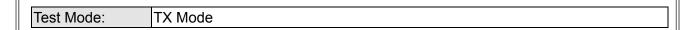
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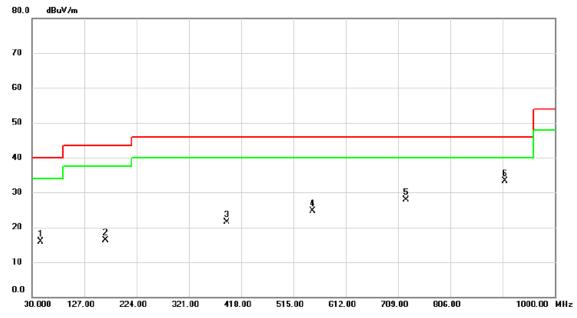


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## Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		45.520	28.55	-12.60	15.95	40.00	-24.05	peak	
2		166.770	28.50	-12.21	16.29	43.50	-27.21	peak	
3		390.840	29.99	-8.41	21.58	46.00	-24.42	peak	
4		550.890	29.21	-4.59	24.62	46.00	-21.38	peak	
5		723.550	29.87	-2.04	27.83	46.00	-18.17	peak	
6	*	907.850	30.62	2.61	33.23	46.00	-12.77	peak	

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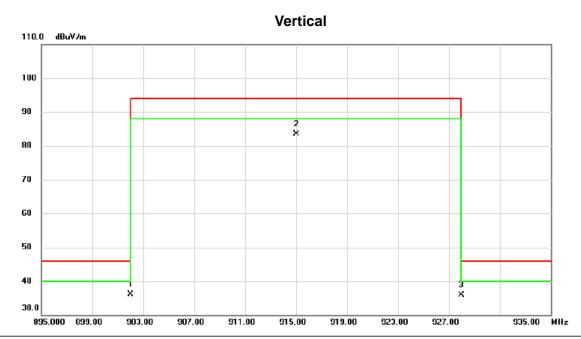


ATTACHMENT D -RADIATED EMISSION (ABOVE 1000MHZ)	

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Orthogonal Axis:	X
Test Mode :	TX Mode

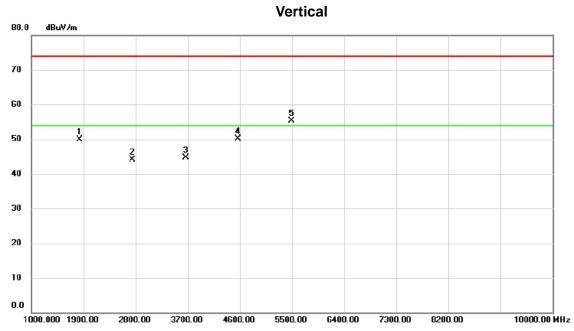


No. Mk.	Freq.		Correct Factor	Measure- ment	Limit	Margin		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	902.000	33.48	2.64	36.12	46.00	-9.88	QP	
2	915.040	80.87	2.58	83.45	94.00	-10.55	QP	
3	928.000	33.34	2.52	35.86	46.00	-10.14	QP	

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Orthogonal Axis: X
Test Mode: TX Mode

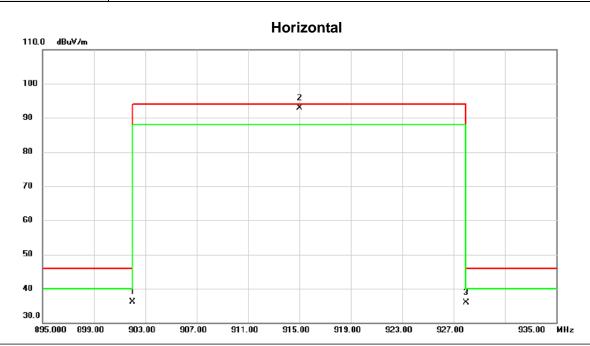


	No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		
_			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
	1		1828.000	54.07	-4.14	49.93	74.00	-24.07	peak	
	2		2746.000	43.87	0.25	44.12	74.00	-29.88	peak	
	3		3664.000	42.82	1.85	44.67	74.00	-29.33	peak	
_	4		4573.000	46.41	3.79	50.20	74.00	-23.80	peak	
_	5	*	5491.000	48.15	7.20	55.35	74.00	-18.65	peak	

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Orthogonal Axis: X
Test Mode: TX Mode

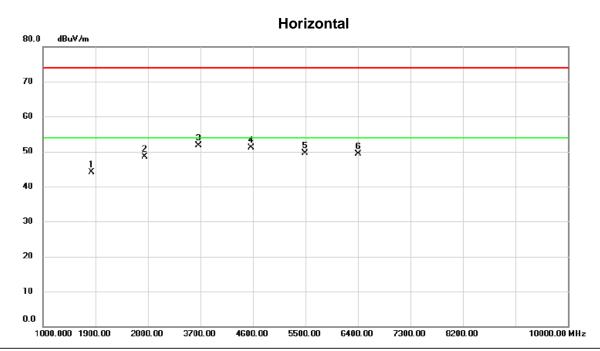


No. Mk.	Freq.	Reading Level		Measure- ment	Limit	Margin		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	902.000	33.49	2.64	36.13	46.00	-9.87	QP	
2 *	915.000	90.27	2.58	92.85	94.00	-1.15	QP	
3	928.000	33.38	2.52	35.90	46.00	-10.10	QP	

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Orthogonal Axis: X
Test Mode: TX Low Channel



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		1828.000	48.29	-4.14	44.15	74.00	-29.85	peak	
2		2746.000	48.30	0.25	48.55	74.00	-25.45	peak	
3	*	3664.000	49.76	1.85	51.61	74.00	-22.39	peak	
4		4573.000	47.33	3.79	51.12	74.00	-22.88	peak	
5		5491.000	42.32	7.20	49.52	74.00	-24.48	peak	
6		6409.000	38.75	10.55	49.30	74.00	-24.70	peak	

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ATTACHMENT E - BANDWIDTH

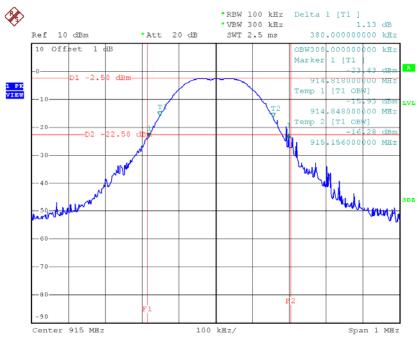
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Toot Mode :	TX Mode
Test Mode :	1 × Wode

Frequency	20dB Bandwidth	99% Occupied BW
(MHz)	(MHz)	(MHz)
915	0.308	

#### **TX Mode**



Date: 6.JAN.2017 17:16:04