

FCC Radio Test Report FCC ID: OMOTX143TH

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

Project No. : 1410C093

Equipment : Wireless Color Weather Station.

Model Name : TX143TH
Applicant : La Crosse Technology Ltd

: La Crosse Technology Ltd, 2809 Losey Blvd. South Address

La Crosse, WI 54601, U.S.A.

Date of Receipt : Oct. 14, 2014

Date of Test : Oct. 14, 2014 ~ Oct. 16, 2014 | Issued Date : Oct. 17, 2014 | BTL Inc.

Testing Engineer

Technical Manager

Authorized Signatory

(Steven Lu)

BTL INC

No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (NML) of R.O.C., or National Institute of Standards and Technology (NIST) of U.S.A.

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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BTL's laboratory quality assurance procedures are in compliance with the **ISO Guide 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

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-1-1410C093	Original Issue.	Oct. 17, 2014

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1. CERTIFICATION

Equipment : Wireless Color Weather Station.

Brand Name : La Crosse Technology

Model Name : TX143TH

Applicant : La Crosse Technology Ltd Manufacturer : La Crosse Technology Ltd

Address : La Crosse Technology Ltd, 2809 Losey Blvd. South La Crosse, WI 54601,

U.S.A.

Factory : La Crosse Technology Ltd

Address : La Crosse Technology Ltd, 2809 Losey Blvd. South La Crosse, WI 54601,

U.S.A.

Date of Test : Oct. 14, 2014 ~ Oct. 16, 2014

Test Sample : Engineering Sample

Standard(s) : FCC Part15, Subpart C(15.249)/ ANSI C63.4-2009

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-1-1410C093) 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	
FCC	reat item	baagment	Remark	
15.207	Conducted Emission	N/A	Note (1)	
15.209 15.249	Radiated Spurious Emission	PASS		
-	Bandwidth	PASS		
-	Antenna Conducted Spurious Emission	PASS		

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

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2.1 TEST FACILITY

The test facilities used to collect the test data in this report is **DG-CB03** at the location of No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China. 523792 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 reported uncertainty of measurement y \pm U,where expended 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. Radiated Measurement:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)	NOTE
		9KHz~30MHz	V	3.79	
		9KHz~30MHz	Н	3.57	
		30MHz ~ 200MHz	V	3.82	
		30MHz ~ 200MHz	Н	3.60	
DG-CB03	CISPR	200MHz ~ 1,000MHz	V	3.86	
DG-CB03	CISER	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	

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3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	Wireless Color Weather Station.		
Brand Name	La Crosse Technology		
Model Name	TX143TH		
Model Difference	N/A		
	Operation Frequency	915 MHz	
Product Description	Modulation Technology	ESK(1 2khpa)	
Froduct Description	Data rate	FSK(1.2kbps)	
	Field Strength	89.53dBuV/m(QP Max)	
Power Source	Supplied from 2*AA battery.		
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.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
	1	N/A	N/A	Internal	N/A	2

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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

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3.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED 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. Mfr/Brand | Model/Type No. Item Equipment FCC ID Series No. Note Shielded Type Ferrite Core Length Note Item

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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 (MHz)	Conducted Limit (dBµV)		
Frequency of Emission (MHz)	Quasi-peak	Average	
0.1 -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 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.

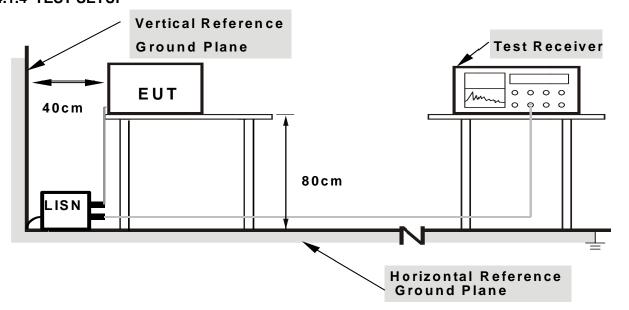
4.1.3 DEVIATION FROM TEST STANDARD

No deviation

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4.1.4 TEST SETUP



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 54 dBuV/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 section 15.209(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)

FREQUENCY (MHz)	(dBuV/m) (at 3m)		
	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).

LIMITS OF RADIATED EMISSION MEASUREMENT (FCC Part 15.249)

FCC Part15 (15.249) , Subpart C				
Limit Frequency Range (MHz)				
Field strength of fundamental 50000 μV/m (94 dBμV/m) @ 3 m	915			
Field strength of harmonics 500 μV/m (54 dBμV/m) @ 3 m	915			

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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

4.2.2 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters 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 EUT was placed on the top of a rotating table 0.8 meters 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; 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. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then AV detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.2.3 DEVIATION FROM TEST STANDARD

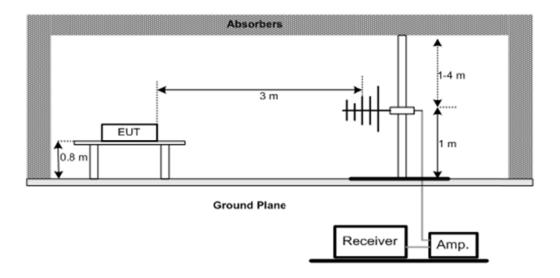
No deviation

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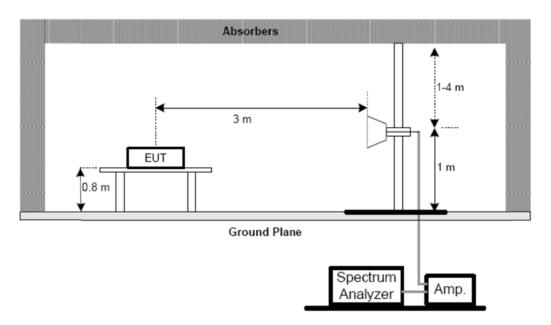


4.2.4 TEST SETUP

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



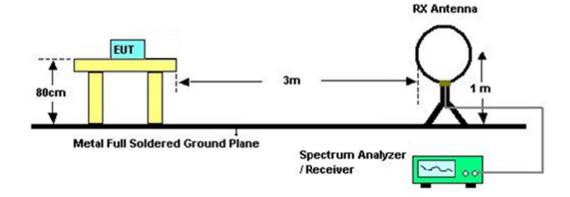
(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



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(C) For radiated emissions below 30MHz



4.2.5 EUT 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: 25°C Relative Humidity: 55% 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

Remark:

- (1) 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. RBW=120kHz, VBW= 300kHz.
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency. "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode or QP detector mode of the emission .

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4.2.9 TEST RESULTS (ABOVE 1000 MHz)

Please refer to the Attachment D

Remark:

- (1) 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.
- (2) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission. RBW=1MHz, VBW =3MHz.
- (3) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (5) EUT Orthogonal Axis:
 - "X" denotes Laid on Table; "Y" denotes Vertical Stand; "Z" denotes Side Stand
- (6) 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= 100KHz, VBW=100KHz, 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. ANTENNA CONDUCTED SPURIOUS EMISSION

6.1 APPLIED PROCEDURES / LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

6.2 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= 100KHz, VBW=100KHz, Sweep time = 10 ms.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP

EUT	SPECTRUM
	ANALYZER

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6.5 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.

6.6 EUT TEST CONDITIONS

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

6.7 TEST RESULTS

Please refer to the Attachment F

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7. MEASUREMENT INSTRUMENTS LIST AND SETTING

	Radiated Emission Measurement							
Item	m Kind of Equipment Manufacturer Type No. Serial No. Calibrated							
1	Antenna	Schwarbeck	VULB9160	9160-3232	Mar. 29, 2015			
2	Amplifier	HP	8447D	2944A09673	Mar. 29, 2015			
3	Receiver	AGILENT	N9038A	MY52130039	Aug. 23, 2015			
4	Test Cable	N/A	C-01_CB03	N/A	Jul. 01, 2015			
5	Antenna	ETS	3115	00075789	Mar. 29, 2015			
6	Amplifier	Agilent	8449B	3008A02274	Mar. 29, 2015			
7	Receiver	AGILENT	N9038A	MY52130039	Aug. 23, 2015			
8	Test Cable	HUBER+SUHNER	C-48	N/A	Apr. 30, 2015			
9	Controller	СТ	SC100	N/A	N/A			
10	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Feb. 22, 2015			
11	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Feb. 22, 2015			
12	Active Loop Antenna	R&S	HFH2-Z2	830749/020	Mar. 29, 2015			

	Bandwidth						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until		
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov. 11, 2014		

Antenna Conducted Spurious Emission						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov. 11, 2014	

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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8. EUT TEST PHOTO

Radiated Measurement Photos

9KHz to 30MHz





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Radiated Measurement Photos

30MHz to 1000MHz





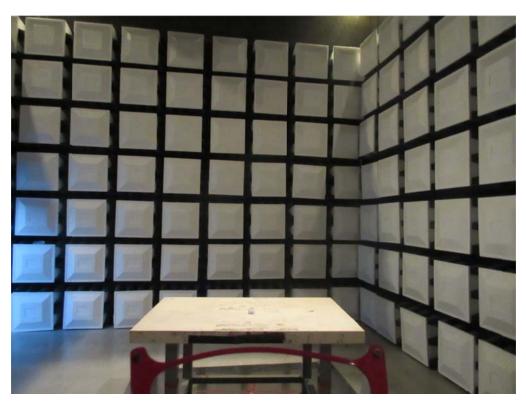
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Radiated Measurement Photos

Above 1000MHz





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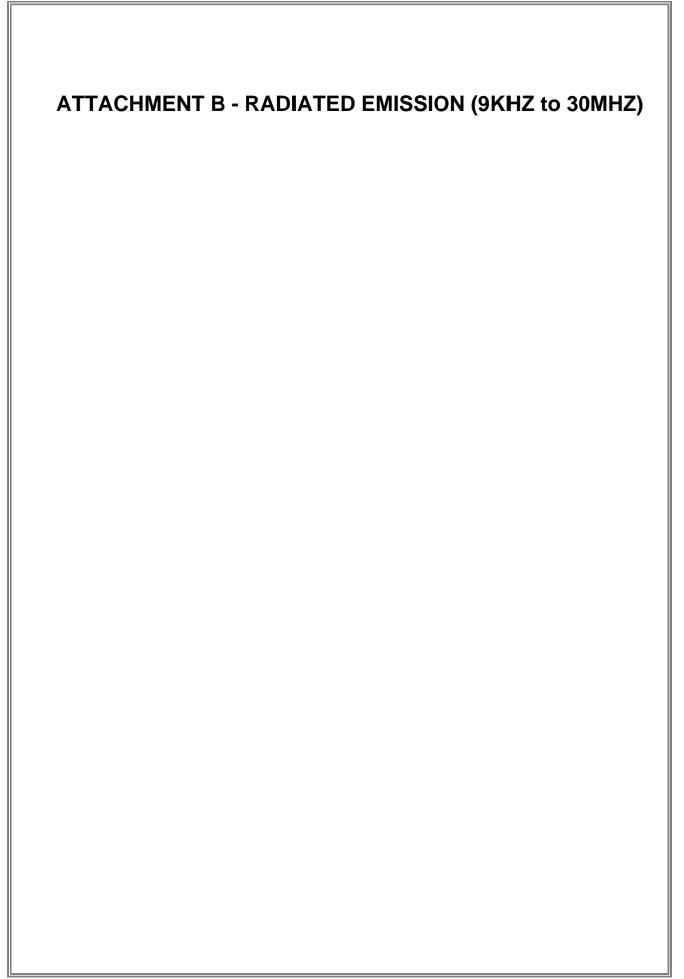
ATTACHMENT A - CONDUCTED EMISSION

Test Mode: N/A

Note: "N/A" denotes test is not applicable to this device.

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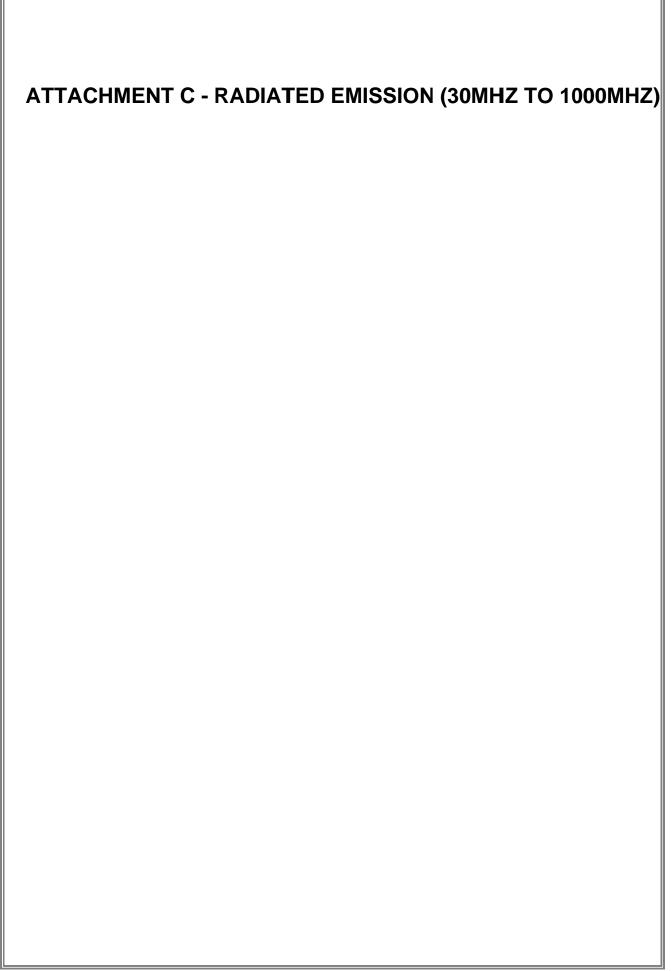
Test Mode: TX Mode

Frequency	Ant	Read level	Factor	Measured(FS)	Limit(QP)	Margin	Note
(MHz)	0°/90°	dBuV/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Note
0.0105	0°	9.84	24.90	34.74	107.18	-72.44	AVG
0.0105	0°	14.46	24.90	39.36	127.18	-87.82	PEAK
0.0211	0°	15.34	24.23	39.57	101.12	-61.55	AVG
0.0211	0°	21.95	24.23	46.18	121.12	-74.94	PEAK
0.0347	0°	16.42	23.37	39.79	96.80	-57.01	AVG
0.0347	0°	22.08	23.37	45.45	116.80	-71.35	PEAK
0.0543	0°	17.62	22.31	39.93	92.91	-52.97	AVG
0.0543	0°	23.16	22.31	45.47	112.91	-67.43	PEAK
0.4184	0°	19.75	20.00	39.75	75.17	-35.43	QP
1.7028	0°	20.53	19.53	40.06	62.98	-22.92	QP

Frequency	Ant	Read level	Factor	Measured(FS)	Limit(QP)	Margin	Note
(MHz)	0°/90°	dBuV/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Note
0.0105	90°	10.80	24.30	35.10	127.18	-92.08	AVG
0.0105	90°	14.72	24.30	39.02	147.18	-108.16	PEAK
0.0253	90°	16.80	23.96	40.76	119.54	-78.78	AVG
0.0253	90°	21.86	23.96	45.82	139.54	-93.72	PEAK
0.0341	90°	17.42	23.41	40.83	116.95	-76.12	AVG
0.0341	90°	22.56	23.41	45.97	136.95	-90.98	PEAK
0.0449	90°	19.97	22.72	42.69	114.56	-71.87	AVG
0.0449	90°	23.05	22.72	45.77	134.56	-88.79	PEAK
0.4189	90°	19.68	19.99	39.67	95.16	-55.49	QP
1.5823	90°	20.39	19.54	39.93	63.62	-23.69	QP

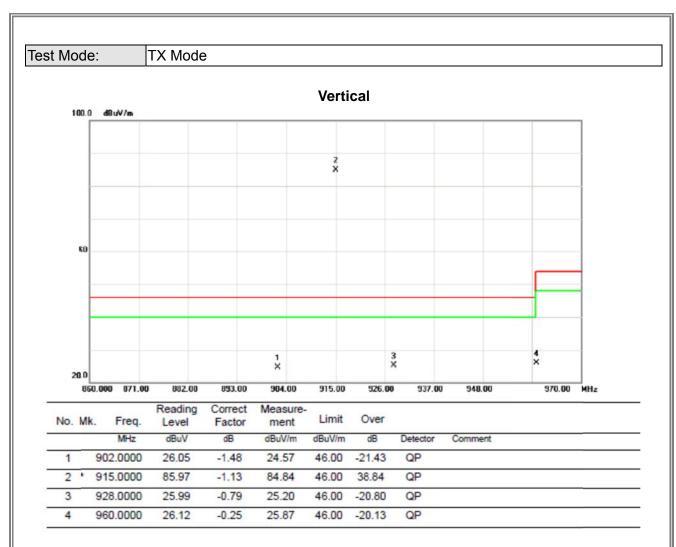
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Note: QP limit is 94.

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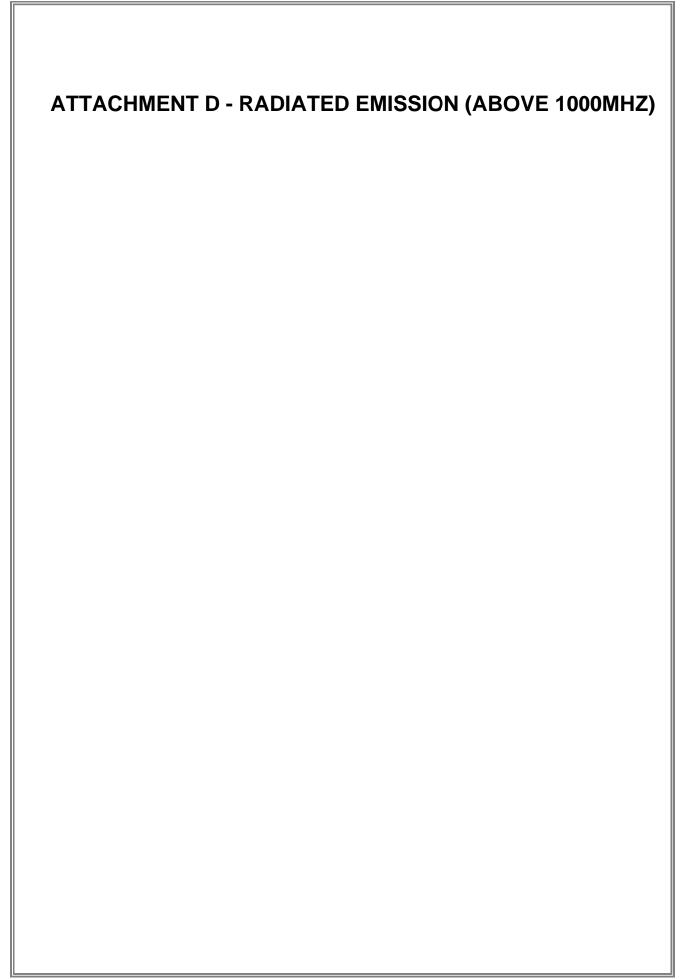




Note: QP limit is 94.

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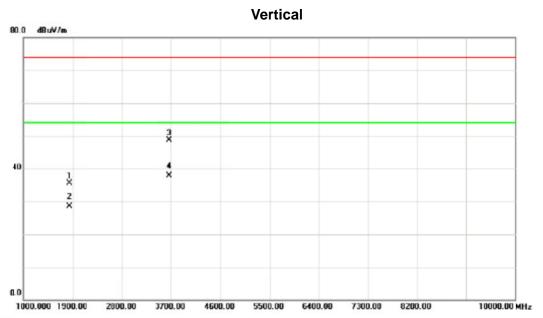




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Orthogonal Axis: X
Test Mode: TX Mode



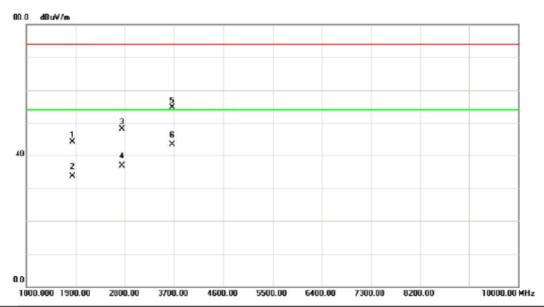
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1		1828.000	39.69	-3.91	35.78	74.00	-38.22	peak		
2	1	1828.000	32.43	-3.91	28.52	54.00	-25.48	AVG		
3		3664.000	46.89	1.86	48.75	74.00	-25.25	peak		
4	*	3664.000	35.95	1.86	37.81	54.00	-16.19	AVG		

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Orthogonal Axis: X
Test Mode: TX Mode

Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	-	1828.000	48.08	-3.91	44.17	74.00	-29.83	peak	
2		1828.000	37.62	-3.91	33.71	54.00	-20.29	AVG	
3		2746.000	49.40	-1.25	48.15	74.00	-25.85	peak	
4	-	2746.000	38.15	-1.25	36.90	54.00	-17.10	AVG	
5	;	3664.000	52.81	1.86	54.67	74.00	-19.33	peak	
6	k :	3664.000	41.46	1.86	43.32	54.00	-10.68	AVG	

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ATTACHMENT E - BANDWIDTH

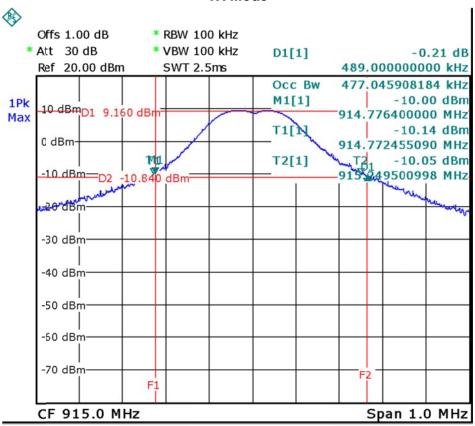
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Test Mode : TX Mode

Frequency	20dB Bandwidth	99% Occupied BW		
(MHz)	(MHz)	(MHz)		
915.0	0.489	0.477		

TX Mode



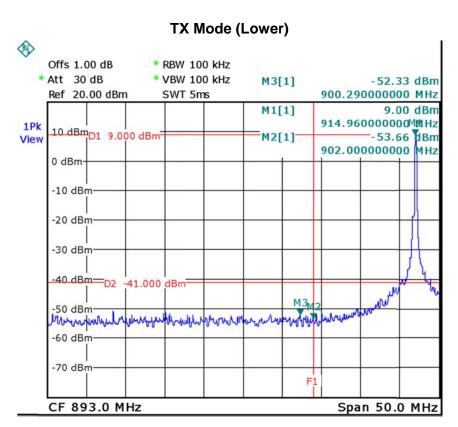
Date: 16.0CT.2014 15:22:35



ATTACHMENT F - ANTENNA CONDUCTED SPURIOUS EMISSION

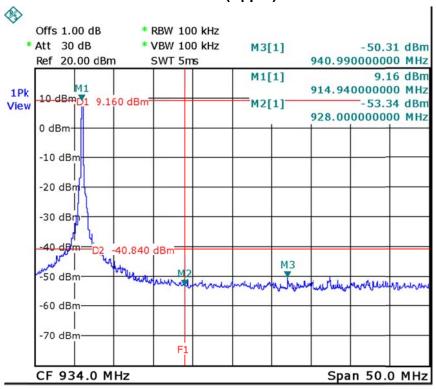
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Date: 16.0CT.2014 15:28:10

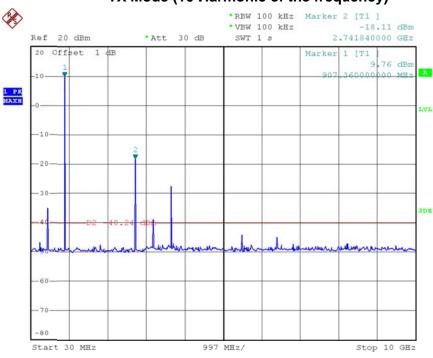
TX Mode (Upper)



Date: 16.0CT.2014 15:33:42







Date: 16.0CT.2014 18:20:27

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