

FCC Radio Test Report

FCC ID: OMOLTV-TH2

This report concerns: Class II Change

Project No. : 1705C283A
Equipment : TH SENSOR
Brand Name : LA CROSSE
Test Model : LTV-TH2
Series Model : LTV-TH2i, LTV-TH2i-INT, LTV-TH2ivX, LTV-TH2ivX-INT, LTV-TH2i-XX, LTV-TH2i-XX-INT, LTV-TH2iXX, LTV-TH2iXX-INT, LTV-TH2-INT, LTV-TH2vX, LTV-TH2vX-INT, LTV-TH2-XX, LTV-TH2-XX-INT, LTV-TH2XX, LTV-TH2XX-INT, LTV-TH1, LTV-TH1-INT, LTV-TH1vX, LTV-TH1vX-INT, LTV-TH1-XX, LTV-TH1-XX-INT, LTV-TH1XX, LTV-TH1XX-INT(X can be 0~9 or A~Z, the difference for different version are the product shell color , software, and packaging upgrade version number, when upgrade a version the number progressed to next number.)
Applicant : La Crosse Technology Ltd.
Address : 2809 Losey Blvd. South La Crosse Wisconsin United States
Manufacturer : La Crosse Technology Ltd.
Address : 2809 Losey Blvd. South La Crosse Wisconsin United States
Factory : La Crosse Technology Ltd.
Address : 2809 Losey Blvd. South La Crosse Wisconsin United States
Date of Receipt : May 06, 2020
Date of Test : May 08, 2020 ~ May 20, 2020
Issued Date : Jun. 16, 2020
Report Version : R00
Test Sample : Engineering Sample No.: DG2020041761
Standard(s) : FCC Part15, Subpart C (15.247)
ANSI C63.10-2013
FCC KDB 558074 D01 15.247 Meas Guidance v05r02

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



Prepared by : Simon Ling



Approved by : Ethan Ma



Certificate #5123.02

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

Tel: +86-769-8318-3000

Web: www.newbtl.com

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 standards traceable to international standard(s) and/or national standard(s).

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.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, A2LA, or any agency of the U.S. Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and ourselves, the test report shall not be reproduced, except in full, without our written approval.

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

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

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.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

Table of Contents	Page
1 . SUMMARY OF TEST RESULTS	5
1.1 TEST FACILITY	6
1.2 MEASUREMENT UNCERTAINTY	6
2 .GENERAL INFORMATION	7
2.1 GENERAL DESCRIPTION OF EUT	7
2.2 DESCRIPTION OF TEST MODES	8
2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	8
2.4 DESCRIPTION OF SUPPORT UNITS	8
3 .EMC EMISSION TEST	9
3.1 RADIATED EMISSION MEASUREMENT	9
3.1.1 RADIATED EMISSION LIMITS	9
3.1.2 TESTP ROCEDURE	10
3.1.3 DEVIATION FROM TEST STANDARD	10
3.1.4 TEST SETUP	11
3.1.5 EUT OPERATING CONDITIONS	12
3.1.6 EUT TEST CONDITIONS	12
3.1.7 TEST RESULTS (BELOW 30MHz)	12
3.1.8 TEST RESULTS (30 TO 1000 MHz)	12
4 . MEASUREMENT INSTRUMENTS LIST AND SETTING	13
5 . EUT TEST PHOTO	14
APPENDIX A - RADIATED EMISSION (9KHZ to 30MHZ)	16
APPENDIX B -RADIATED EMISSION (30MHZ TO 1000MHZ)	21

REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Compared with previous report (BTL-FCCP-1-1705C283), 1. Changed the brand name,model name, applicant ,manufacturer and Factory'information. 2. Added a segment of display to LCD. So the test data of radiated emissions below 1GHz have been re-evaluated and recorded in the test report, The original test results please refer to original report.	Jun. 16, 2020

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC Part15, Subpart C (15.249)			
StandardSection	Test Item	Judgment	Remark
15.209 15.249	Radiated Spurious Emission	PASS	-----

NOTE:

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

1.1 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, DalangTown,Dongguan, Guangdong, China.

BTL's Test Firm Registration Number for FCC: 357015

BTL's Designation Number for FCC: CN1240

1.2 MEASUREMENT UNCERTAINTY

The measurement uncertainty figures shall be calculated according the methods described in the ETSI TR 100 028 and shall correspond to an expansion factor (coverage factor) $k=1.96$ or $k=2$ (which provide confidence levels of respectively 90% and 95.45% in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Measurement Uncertainty for a Level of Confidence of 95 %, $U=2xUc(y)$.

The BTL measurement uncertainty as below table:

A. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
DG-CB03	CISPR	9kHz ~ 30MHz	V	3.79
		9kHz ~ 30MHz	H	3.57
		30MHz ~ 200MHz	V	4.88
		30MHz ~ 200MHz	H	4.14
		200MHz ~ 1,000MHz	V	4.62
		200MHz ~ 1,000MHz	H	4.80

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	TH SENSOR	
Brand Name	LA CROSSE	
Model Name	LTV-TH2	
Series Model	LTV-TH2i, LTV-TH2i-INT, LTV-TH2ivX, LTV-TH2ivX-INT, LTV-TH2i-XX, LTV-TH2i-XX-INT, LTV-TH2iXX, LTV-TH2iXX-INT, LTV-TH2-INT, LTV-TH2vX, LTV-TH2vX-INT, LTV-TH2-XX, LTV-TH2-XX-INT, LTV-TH2XX, LTV-TH2XX-INT, LTV-TH1, LTV-TH1-INT, LTV-TH1vX, LTV-TH1vX-INT, LTV-TH1-XX, LTV-TH1-XX-INT, LTV-TH1XX, LTV-TH1XX-INT	
Model Difference	X can be 0~9 or A~Z, the difference for different version are the product shell color , software, and packaging upgrade version number, when upgrade a version the number progressed to next number.	
Product Description	Operation Frequency	915 MHz
	Modulation Technology	FSK
	Data rate	9.6Kbps
	Field Strength	80.47dBuV/m
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:

Channel	Frequency (MHz)
01	915

3. Table for Filed Antenna:

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

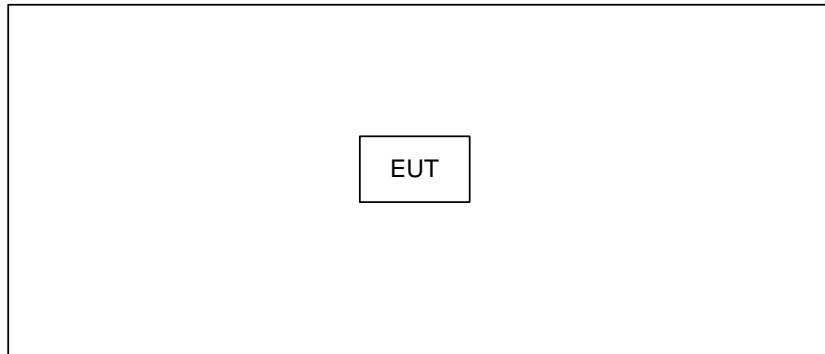
2.2 DESCRIPTION OF TEST MODES

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

2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.4DESCRIPTION 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.	Series No.
-	-	-	-	-

Item	Cable Type	Shielded Type	Ferrite Core	Length
-	-	-	-	-

3.EMC EMISSION TEST

3.1 RADIATED EMISSION MEASUREMENT

3.1.1 RADIATED EMISSION LIMITS (FCC 15.209 and 15.249)

Frequencies (MHz)	Field Strength (micovolts/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.

Fundamental Frequency	Field Strength of Fundamental (micovolts/meter)	Field Strength of Harnibucs (micovolts/meter)
902-928	50	500

Note:

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

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

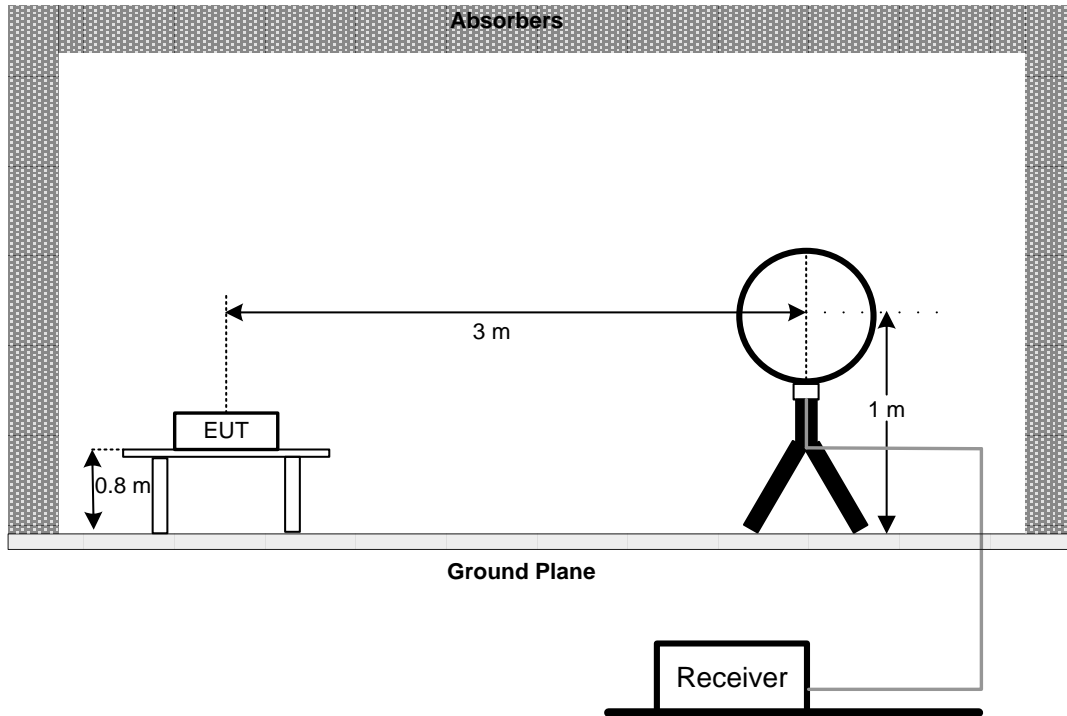
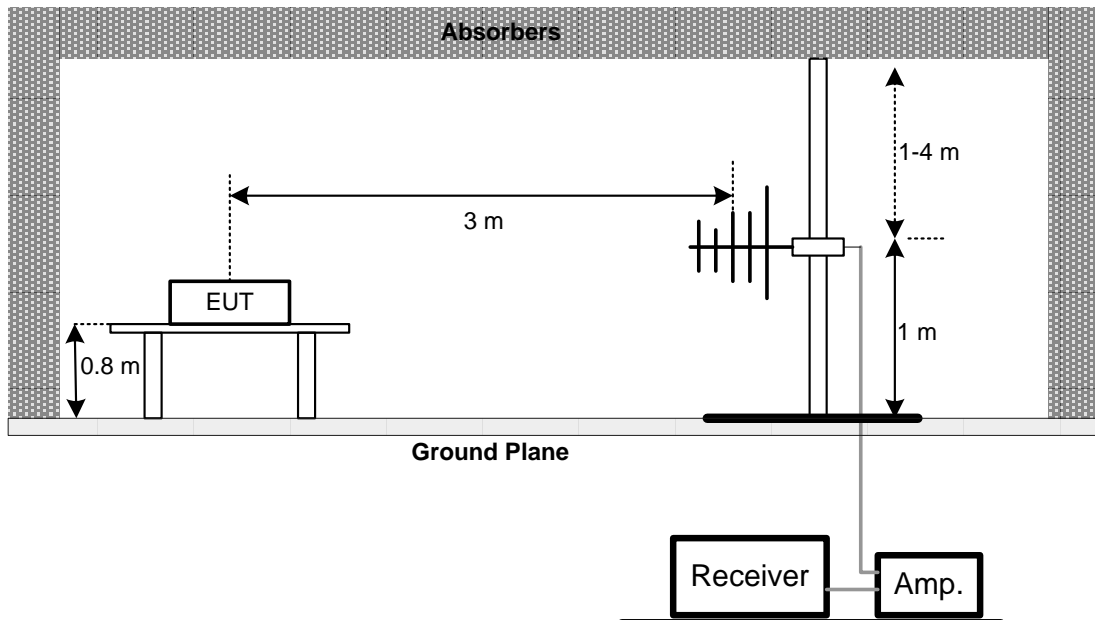
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz for PK/AVG detector
Start ~ Stop Frequency	90kHz~110kHz for QP detector
Start ~ Stop Frequency	110kHz~490kHz for PK/AVG detector
Start ~ Stop Frequency	490kHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP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

3.1.2 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 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 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.
- f. 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)
- g. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP**9 kHz-30 MHz****30 MHz to 1 GHz**

3.1.5 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.

3.1.6 EUT TEST CONDITIONS

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

3.1.7 TEST RESULTS (BELOW 30MHz)

Please refer to the Appendix A.

Remark:

- (1) Distance extrapolation factor = $40 \log(\text{specific distance} / \text{test distance})$ (dB);.
- (2) Limit line = specific limits (dBuV) + distance extrapolation factor..

3.1.8 TEST RESULTS (30 TO 1000 MHz)

Please refer to the Appendix B.

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

4. MEASUREMENT INSTRUMENTS LIST AND SETTING

Radiated Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	Mar. 09, 2021
2	Amplifier	HP	8447D	2944A09673	Aug. 11, 2021
3	Receiver	AGILENT	N9038A	MY52130039	Aug. 03, 2020
4	Cable	emci	LMR-400(30MHz-1GHz)(8m+5m)	N/A	May 24, 2020
5	Antenna	ETS	3115	00075846	Mar. 19, 2021
6	Amplifier	HP	8447D	2944A09673	Aug. 11, 2021
7	Cable	emci	EMC104-SM-SM-10000 (1GHz-26.5GHz)(10m)	N/A	N/A
8	Controller	CT	SC100	N/A	N/A
9	Position Control	MF	MF-7802	MF780208416	N/A
10	Loop Antenna	EM	EM-6876-1	230	Apr. 16, 2021
11	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.

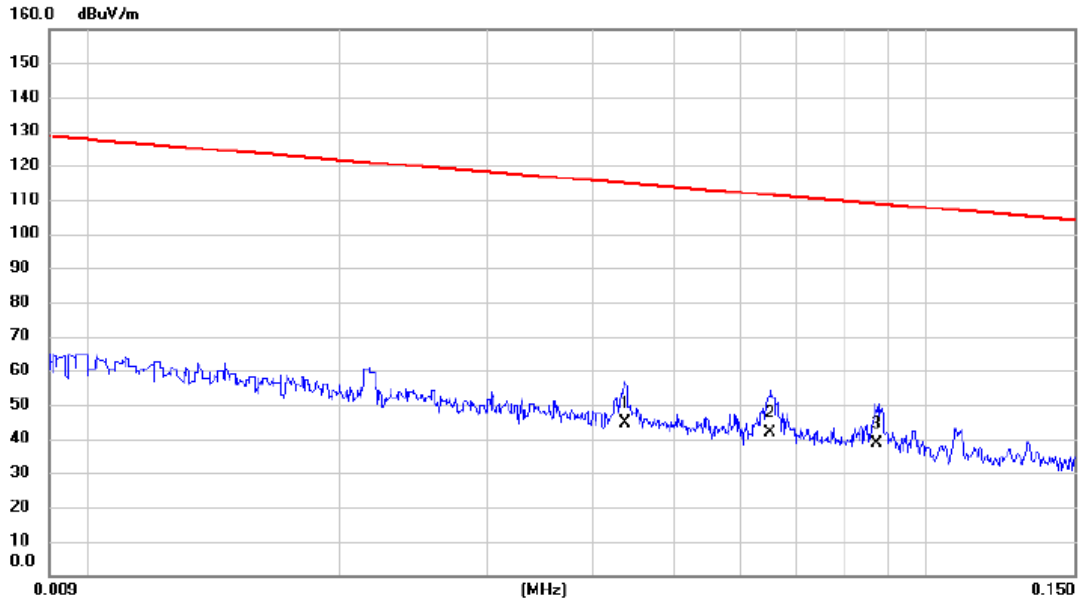
5. EUT TEST PHOTO**Radiated Measurement Photos****9KHz to 30MHz**

Radiated Measurement Photos**30MHz to 1000MHz**

APPENDIX A - RADIATED EMISSION (9KHZ to 30MHZ)

Test Mode: TX Mode

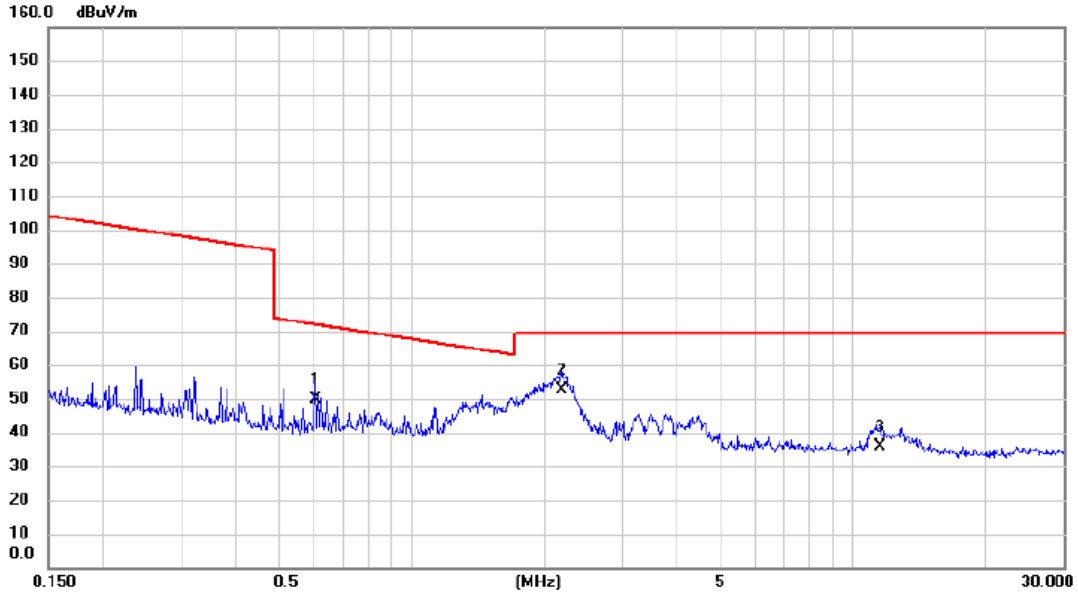
Ant 0



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.044	32.18	12.50	44.68	114.80	-70.12	AVG	
2	*	0.065	29.57	12.42	41.99	111.32	-69.33	AVG	
3		0.087	26.19	12.56	38.75	108.80	-70.05	AVG	

Test Mode: TX Mode

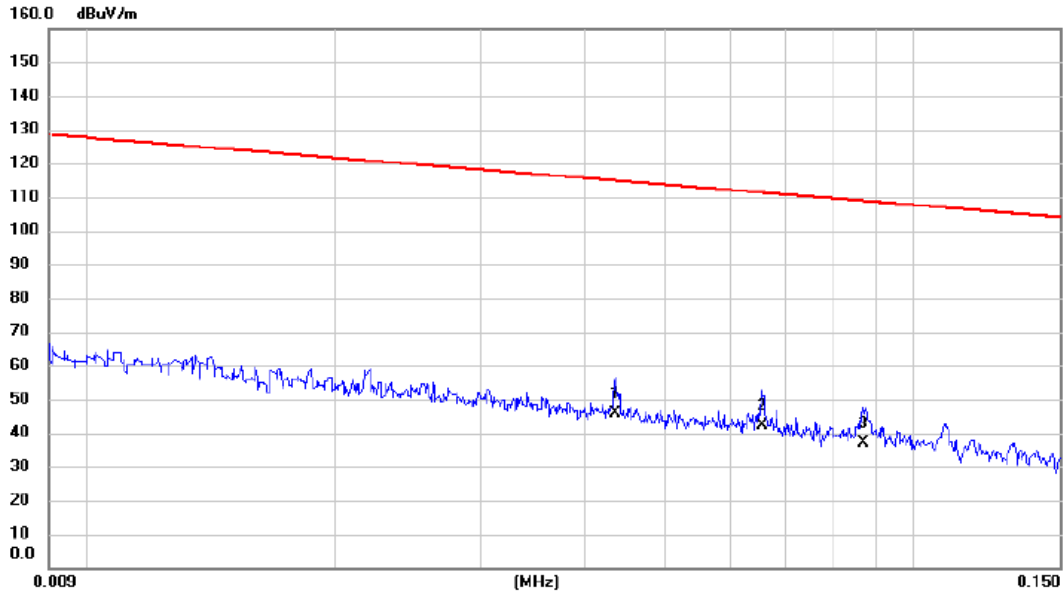
Ant 0



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.608	37.94	11.73	49.67	71.93	-22.26	QP	
2	*	2.190	41.58	10.91	52.49	69.54	-17.05	QP	
3		11.559	25.13	10.87	36.00	69.54	-33.54	QP	

Test Mode: TX Mode

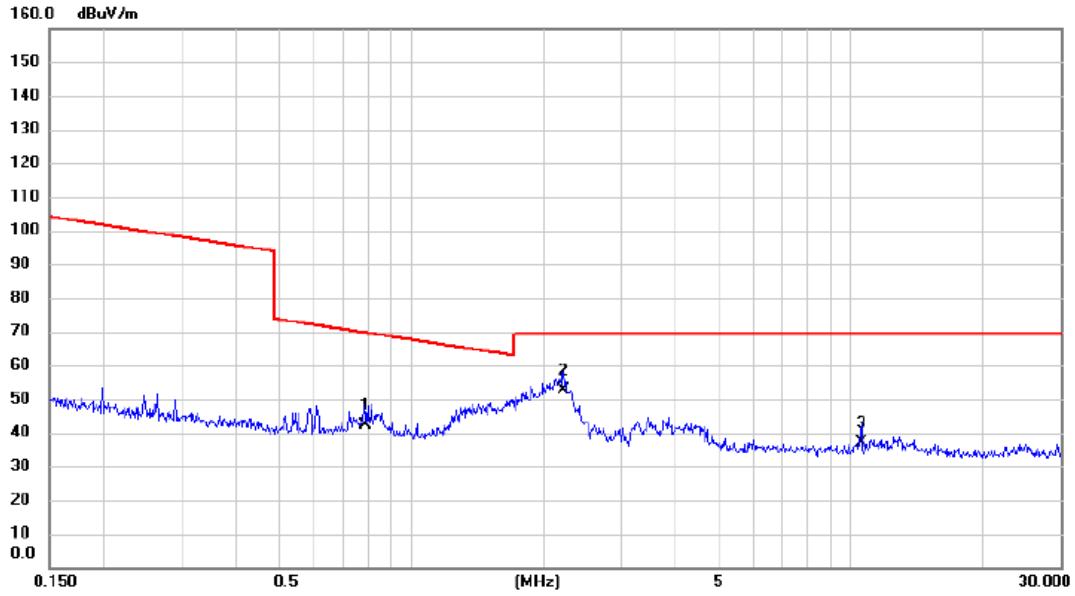
Ant 90



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.044	33.38	12.50	45.88	114.82	-68.94	AVG	
2	*	0.066	29.95	12.42	42.37	111.27	-68.90	AVG	
3		0.087	24.64	12.56	37.20	108.83	-71.63	AVG	

Test Mode: TX Mode

Ant 90

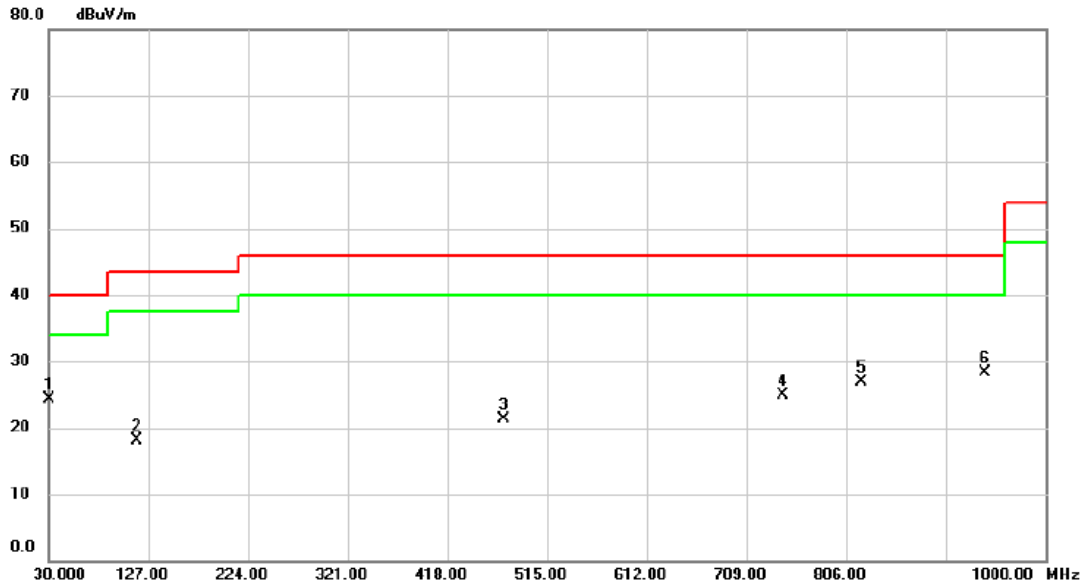


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		0.783	30.57	11.67	42.24	69.72	-27.48	QP	
2	*	2.225	41.84	10.89	52.73	69.54	-16.81	QP	
3		10.564	26.28	10.85	37.13	69.54	-32.41	QP	

APPENDIX B -RADIATED EMISSION (30MHZ TO 1000MHZ)

Test Mode: TX Mode

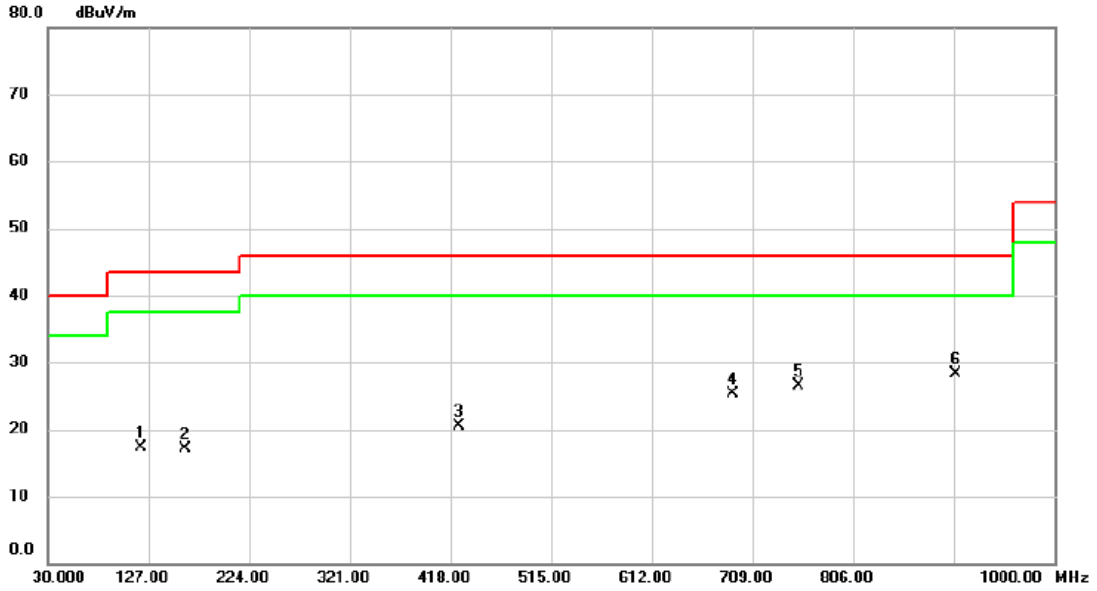
Vertical



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1 *	30.970	38.86	-14.65	24.21	40.00	-15.79	peak	
2	115.360	31.84	-13.80	18.04	43.50	-25.46	peak	
3	472.320	29.62	-8.22	21.40	46.00	-24.60	peak	
4	744.890	29.05	-4.15	24.90	46.00	-21.10	peak	
5	820.550	30.01	-3.15	26.86	46.00	-19.14	peak	
6	940.830	29.43	-1.12	28.31	46.00	-17.69	peak	

Test Mode: TX Mode

Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		119.240	30.49	-13.24	17.25	43.50	-26.25	peak	
2		161.920	28.60	-11.40	17.20	43.50	-26.30	peak	
3		425.760	29.57	-9.02	20.55	46.00	-25.45	peak	
4		689.600	29.88	-4.59	25.29	46.00	-20.71	peak	
5		753.620	30.50	-4.05	26.45	46.00	-19.55	peak	
6	*	904.940	30.23	-2.02	28.21	46.00	-17.79	peak	

End of Test Report