

FCC Test Report

for

Contactless Module

Trade Name : VeriFone
Model Number : VX810 CTLS
P/N : P281-XXX-XX-R(X:0~9,A~Z)
FCC ID : B32VX810-CTLS
Report Number : RF-V040-0810-326
Date of Receipt : Oct. 24, 2008
Date of Report : Nov. 7, 2008

Prepared for

VeriFone Inc.

3755 ATHERTON RD, ROCKLIN, CA 95765, USA

Prepared by



Central Research Technology Co.

EMC Test Laboratory

No.11, Lane41, Fushuen St., Jungshan Chiu, Taipei, Taiwan, 104, R.O.C.



NVLAP LAB CODE 200575-0

This report shall not be reproduced, except in full, without the written approval of Central Research Technology Co.. It may be duplicated completely in its entirety for legal use with the permission of the applicant. It should not be used to claim product endorsement by NVLAP, NIST or any U.S. government agency. The test result in the report applies only to the sample tested.

Certification

Equipment under Test : Contactless Module
Model No. : VX810 CTLS
P/N : P281-XXX-XX-R(X:0~9,A~Z)
FCC ID : B32VX810-CTLS
Manufacturer : Inventec Appliances (Pudong) Co.,Ltd.
VeriFone Inc.
Inventec Appliances (Shanghai) Co.,Ltd.
Sanmina-SCI Systems (Kunshan) Co.,Ltd.
Applicant : VeriFone Inc.
Address : 3755 ATHERTON RD, ROCKLIN, CA 95765, USA
Date of Testing : Oct. 29~ Nov. 3
Applicable Standards : 47 CFR part 15, Subpart C
- Field Strength of fundamental *
- Radiated Emission *
- Frequency Tolerance
- Occupied Bandwidth
- Conducted Emission Measurement *
Deviation : Some items subcontracted to WTS "" Marked
Condition of Test Sample : Enigneering Sample



We, **Central Research Technology Co.**, hereby certify that one sample of the designated product was tested in our facility during the period mentioned above. The test records, data evaluation and Equipment Under Test (EUT) configurations shown in the present report are true and accurate representation of the measurements of the sample's RF characteristics under the conditions herein specified.

The test results show that the EUT as described in the present report is in compliance with the requirements set forth in the standards mentioned above and apply to the tested sample identified in the present report only. The test report shall not be reproduced, except in its entirety, without the written approval of Central Research Technology Co.

PREPARED BY : Cathy Chen , **DATE** : Nov. 7, 2008
(Cathy Chen/ Technical Manager)
APPROVED BY : J. Y. Shih , **DATE** : Nov. 7, 2008
(Tsun-Yu Shih/Laboratory Head)

Contents

1	General Description	5
1.1	GENERAL DESCRIPTION OF EUT	5
1.2	TEST METHODOLOGY	5
1.3	REQUIREMENT FOR COMPLIANCE.....	6
1.4	THE SUPPORT UNITS	8
1.5	LAYOUT OF SETUP	8
1.6	TEST CAPABILITY	9
1.7	MEASUREMENT UNCERTAINTY	10
2	Field Strength of fundamental.....	11
2.1	APPLIED STANDARD	11
2.2	TEST INSTRUMENTS	11
2.3	TEST DATA	12
3	Radiated Emission	17
3.1	APPLIED STANDARD	17
3.2	TEST INSTRUMENTS	18
3.3	TEST DATA	19
4	Frequency Tolerece	23
4.1	APPLIED STANDARD	23
4.2	TEST INSTRUMENTS	23
4.3	MEASUREMENT PROCEDURE	24
4.4	TEST CONFIGURATION	24
4.5	TEST DATA	25
5	20dB Bandwidth	28
5.1	APPLIED STANDARD	28
5.2	TEST INSTRUMENTS	28
5.3	MEASUREMENT PROCEDURE	29
5.4	TEST CONFIGURATION	29
5.5	TEST DATA	30
6	Conducted Emission Measurement	31
6.1	LIMITS FOR EMISSION MEASUREMENT	31
6.2	TEST INSTRUMENTS	32
6.3	TEST RESULTS	33

Attachment 1 – Photographs of the Test Configurations

Attachment 2 – External Photographs of EUT

Attachment 3 – Internal Photographs of EUT

1 General Description

1.1 General Description of EUT

Equipment under Test: Contactless Module

Model No. : VX810 CTLS

P/N : P281-XXX-XX-R(X:0~9,A~Z)

Power in : 3.3Vdc, 500mA (Power supplied by POS terminal VX810)

Test Voltage : 120Vac/ 50Hz to the adapter

Manufacturer : Inventec Appliances (Pudong) Co.,Ltd.

VeriFone Inc.

Inventec Appliances (Shanghai) Co.,Ltd.

Sanmina-SCI Systems (Kunshan) Co.,Ltd.

Channel Numbers : 1

Frequency Range : 13.56MHz

Function Modulation : ASK

Function Description :

The EUT is used to transmit and receive signal both. Please refer to the user's manual for the details.

1.2 Test Methodology

For this E.U.T., the radiated emissions measurement performed according to the procedures illustrated in ANSI C63.4:2003 and other required were illustrated in separate sections of this test report for detail.

Some test

1.3 Requirement for Compliance

(1) Field strength of Fundametal

According to 15.225(a), the field strength of any emissions within the band 13.553 - 13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

(2) Band Edge

According to 15.225(b), Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters. According to 15.225(c), Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(3) Radiation emission

According to 15.225(d), the field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

(4) Frequency tolerance

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

(5) Radiated emission limits, general requirements.

According to 15.209, except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
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

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

(6) 20dB Bandwidth

According to 15.215(c) requires the device must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates.

(7) Restricted Band

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
² 1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(2)
13.36 - 13.41			

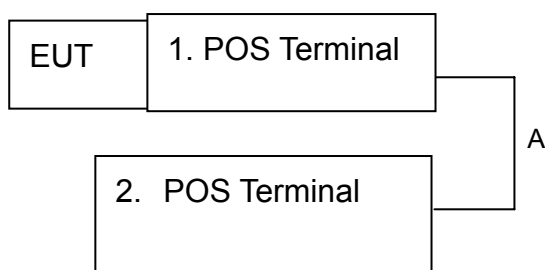
¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

1.4 The Support Units

No.	Unit	Model No./ Serial No.	FCC ID	Trade Name	Power Cord	Supported by lab.
1	POS Terminal	V ^x 810/ 303-026-747	NA	VeriFone		
2	POS Terminal	V ^x 570/ 209-205-886	NA	VeriFone	1.8m	

1.5 Layout of Setup



Connecting Cables

No.	Cable	Length	Shielded	Core	Shielded Backshell	Supported by lab.	Note
A	EUT connected cable	0.6m					

Justification:

For both conducted and radiated emission below 1GHz, the system was configured for typical fashion as a customer could use it normally.

For radiated emission, measurement of radiated emission from digital circuit is performed with normal transmitting.

1.6 Test Capability

Test Facility

The test facility used for evaluating the conformance of the EUT with each standard in the present report meets what required in CISPR16-1-4, CISPR16-2-3 and ANSI C63.4.

Test Room	Type of Test Room	Descriptions
TR1	10m semi-anechoic chamber (23m×14m×9m)	Complying with the NSA requirements in documents CISPR 22 and ANSI C63.4. For the radiated emission measurement.
TR10	3m semi-anechoic chamber (9m × 6m × 6m)	
TR11	3m semi-anechoic chamber (9m × 6m × 6m)	
TR300	3m fully-anechoic chamber (8m × 5m × 5m)	
TR13	Chamber	For the RF conducted emission measurement.
TR5	Shielding Room (8m×5m×4m)	For the conducted emission measurement.

Test Laboratory Competence Information

Central Research Technology Co. has been accredited/filed/authorized by the agencies listed in the following table.

Certificate	Nation	Agency	Code	Mark
Accreditation Certificate	USA	NVLAP	200575-0	ISO/IEC 17025
	R.O.C. (Taiwan)	TAF	0905	ISO/IEC 17025
	R.O.C. (Taiwan)	BSMI	SL2-IN-E-0033, SL2-IS-E-0033, SL2-R1/R2-E-0033, SL2-A1-E-0033	ISO/IEC 17025

Certificate	Nation	Agency	Code	Mark
Site Filing Document	USA	FCC	474046, TW1021	Test facility list & NSA Data
	Canada	IC	4699A-1,-2,-3	Test facility list & NSA Data
	Japan	VCCI	R-1527,C-1609,T-131,T-1441	Test facility list & NSA Data
Authorization Certificate	Germany	TUV	10021687-2007	ISO/IEC 17025
	Norway	Nemko	ELA212	ISO/IEC 17025

The copy of each certificate can be downloaded from our web site: www.crc-lab.com

Worldwide Testing Services(Taiwan) Co., Ltd. has been accredited/filed/authorized by the agencies listed in the following table.

Certificate	Nation	Agency	Code	Mark
Accreditation Certificate	USA	A2LA	2732.01	
Site Filing Document	USA	FCC	930600	Test facility list & NSA Data
	Canada	IC	5679A-1	Test facility list & NSA Data

1.7 Measurement Uncertainty

The assessed measurement uncertainty with a suitable coverage factor K to ensure 95% confidence level for the normal distribution are shown as below, the values are less than U_{CISPR} in table 1 of CISPR 16-4-2

Test Item	Measurement Uncertainty
Radiated Emission: (30MHz~200MHz)	Horizontal: 2.8dB ; Vertical: 3.5dB
Radiated Emission: (200MHz~1GHz)	Horizontal: 3.4dB ; Vertical: 2.8dB

2 Field Strength of fundamental

Result: Pass

2.1 Applied Standard

According to 15.225(a), The field strength of any emissions within the band 13.553 - 13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

According to 15.225(b), Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

According to 15.225(c), Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

2.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Test Receiver	R&S	ETSI 26/ 831438/001	2008/10/8	2009/10/7
Test Receiver	R&S	ETSI 40/ 832427/004	2008/9/22	2009/9/21
Loop Antenna	EMCO	6502/20558	2008/8/4	2011/8/3

2.3 Test Data

Field strength of fundamental

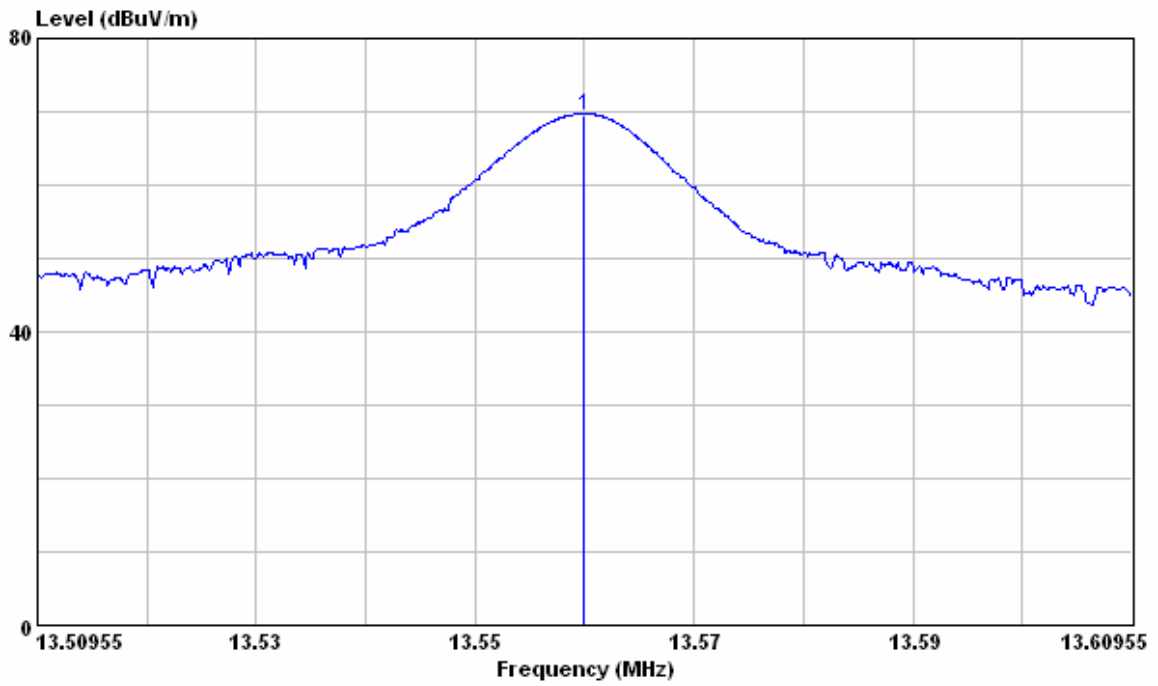
Test Mode : Continuous Transmitting
Test Distance : 3m **Tester** : Danny

Freq. (MHz)	Polarization	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
13.56	V	55.63	13.97	69.60	124	54.40
13.56	H	43.71	13.97	57.68	124	66.32

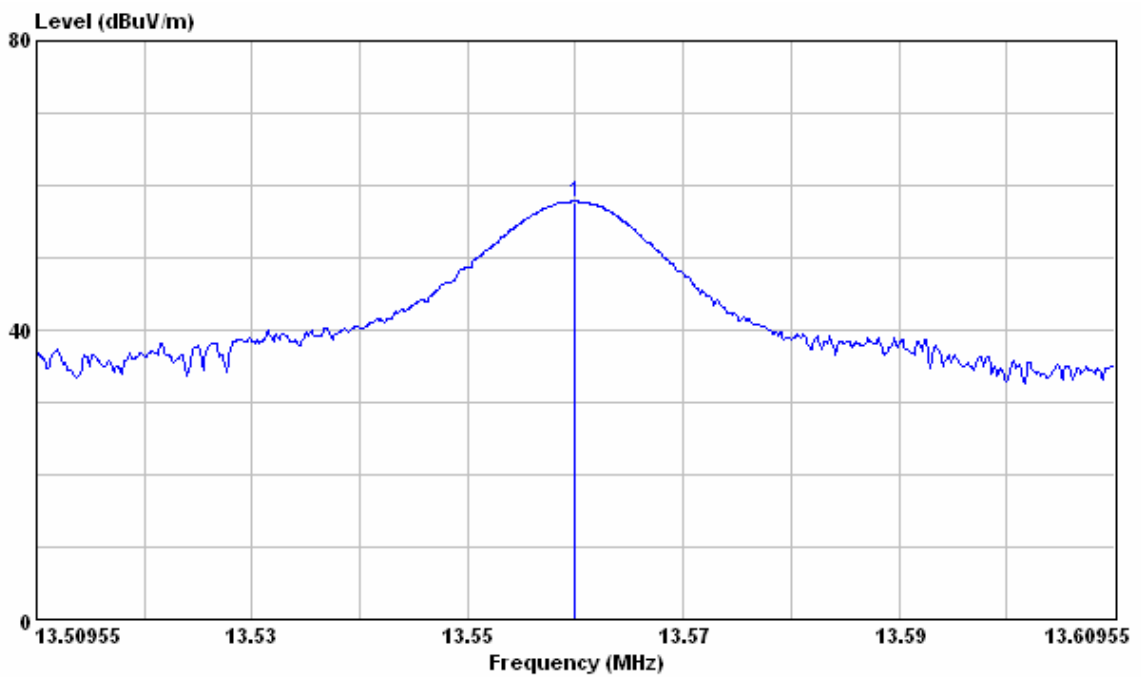
Note :

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor
2. Output Field Strength (dBuV/m) = Reading Data + Correction Factor
3. The limit is 15848 (uV/m)=84dBuV/m @ 30 m , The formula transfers the limit at 30 m to 3m is $L_3 = L_{30} \times (d_{30} / d_3)^2 = L_{30}(dBuV/m) + 40 = 124 \text{ dBuV/m}$
4. Margin (dB) = Limit – Output Field Strength

V Polarization



H Polarization



Band Edge

Test Mode : Continuous Transmitting

Test Distance : 3m Tester : Danny

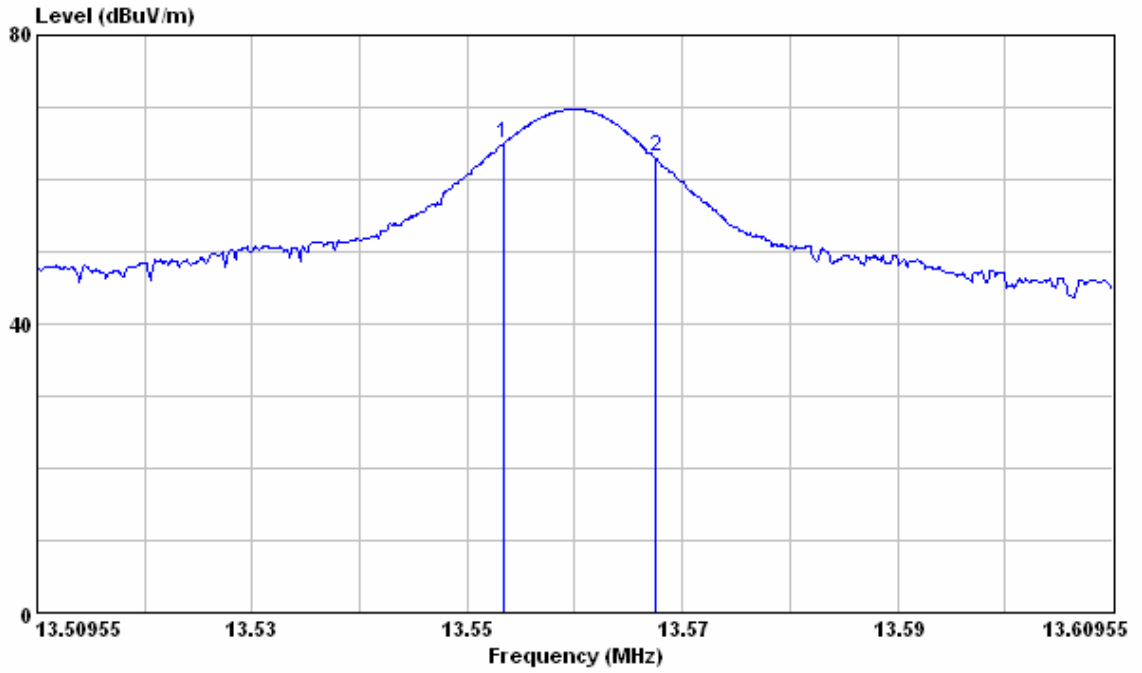
Emission Freq. (MHz)	Polarizortal	Reading Data (dBuV)	Correction Factor (dB/m)	Maximum Emission within the band (dBuV/m)	Limit (dBuV/m)	Margin (dB)
13.553	V	51.11	13.97	65.08	90.47	25.39
13.553	H	39.11	13.97	53.08	90.47	37.39
13.567	V	49.12	13.97	63.09	90.47	27.38
13.567	H	37.29	13.97	51.26	90.47	39.21
13.41	V	29.59	13.97	43.56	80.51	36.95
13.34	H	17.61	13.97	31.58	80.51	48.93
13.80	V	26.70	13.97	40.67	80.51	39.84
13.71	H	16.99	13.97	30.96	80.51	49.55

Note :

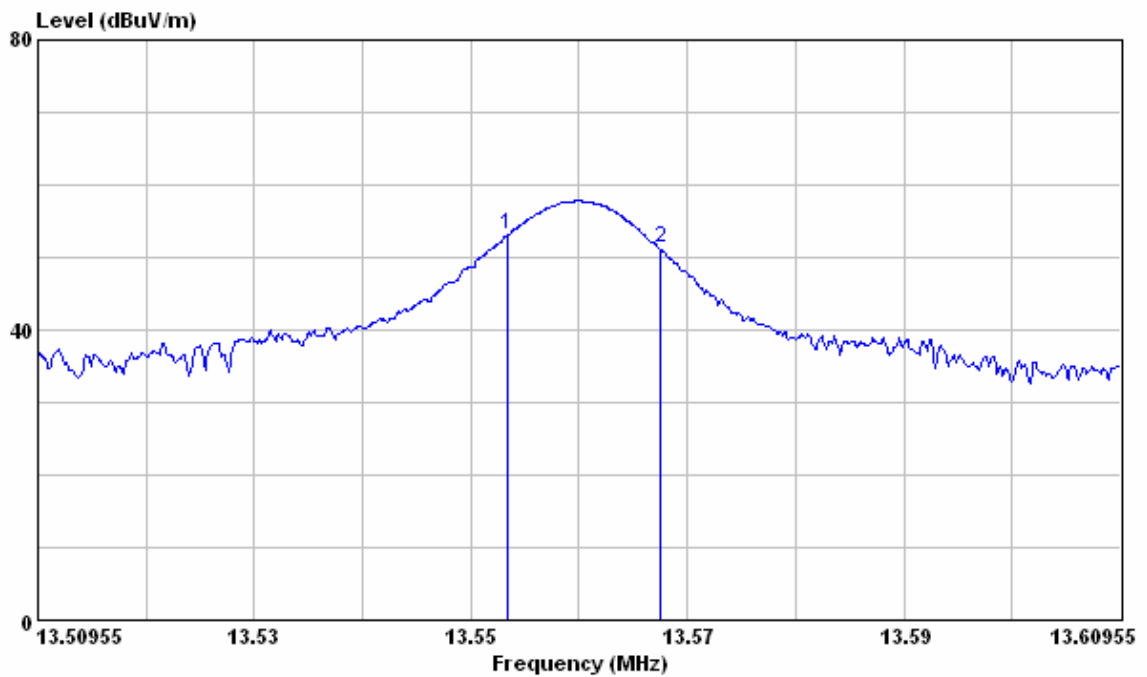
1. Correction Factor (dB/m) = Cable Loss + Antenna Factor
2. Output Field Strength (dBuV/m) = Reading Data + Correction Factor
3. The formula transfers the limit at 30 m to 3m is $L_3 = L_{30} \times (d_{30} / d_3)^2 = L_{30}(\text{dBuV/m}) + 40$
4. Margin (dB) = Limit – Output Field Strength

13.41~13.553MHz & 13.567~13.710MHz

V Polarization

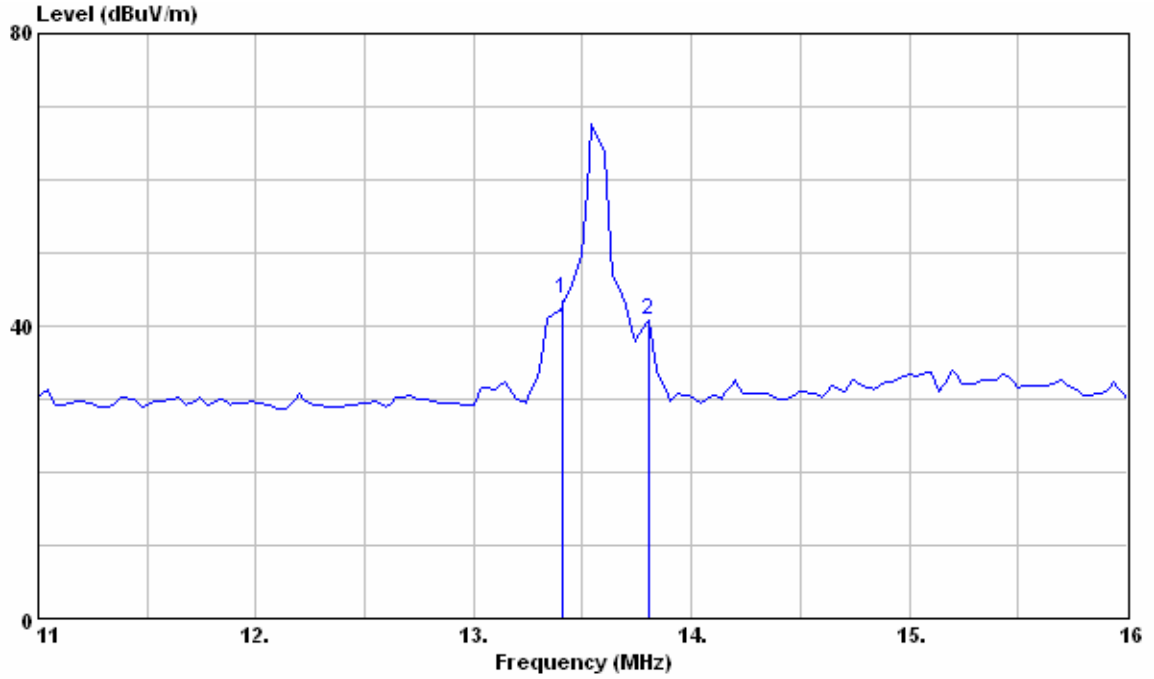


H Polarization

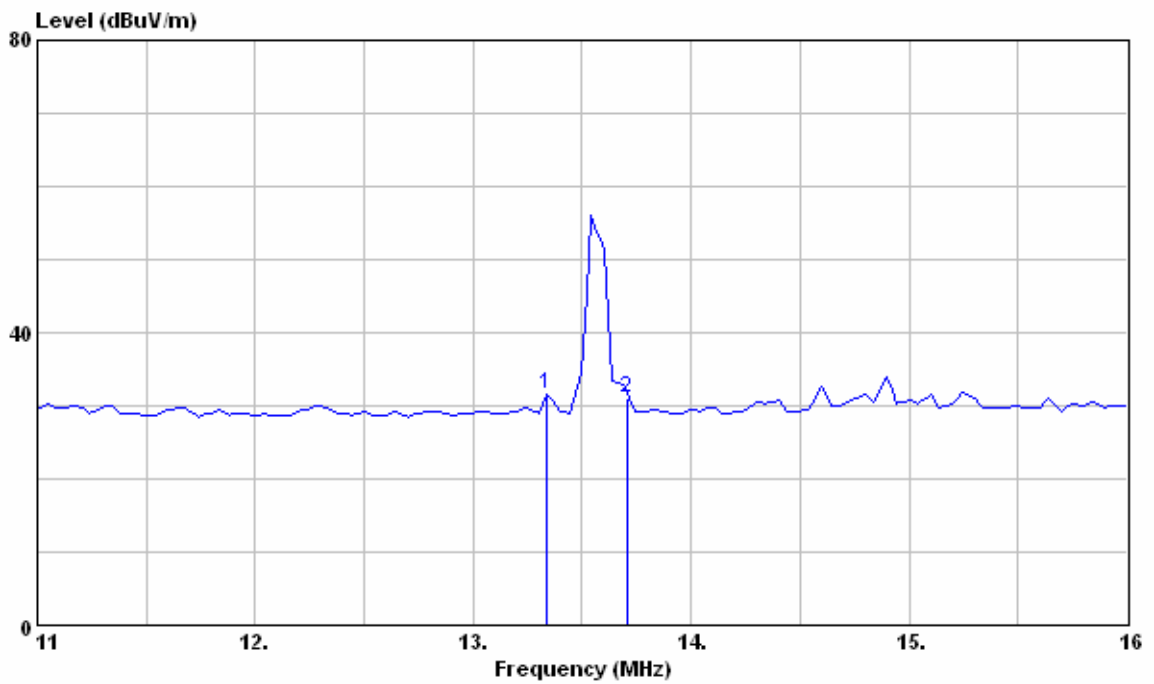


13.110 ~13.410MHz & 13.710~14.01MHz

V Polarization



H Polarization



3 Radiated Emission

Result: Pass

3.1 Applied Standard

According to 15.225(d), The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
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

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

3.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Test Receiver	R&S	ETSI 26/ 831438/001	2008/10/8	2009/10/7
Test Receiver	R&S	ETSI 40/ 832427/004	2008/9/22	2009/9/21
Loop Antenna	EMCO	6502/20558	2008/8/4	2011/8/3
Antenna	EMCO	3148/34429	2008/4/23	2009/4/22
Antenna	EMCO	3109/33524	2008/4/23	2009/4/22
Antenna	R&S	HK116/100172	2007/1/11	2009/1/10
Antenna	R&S	HL223/100166	2008/5/2	2009/5/1

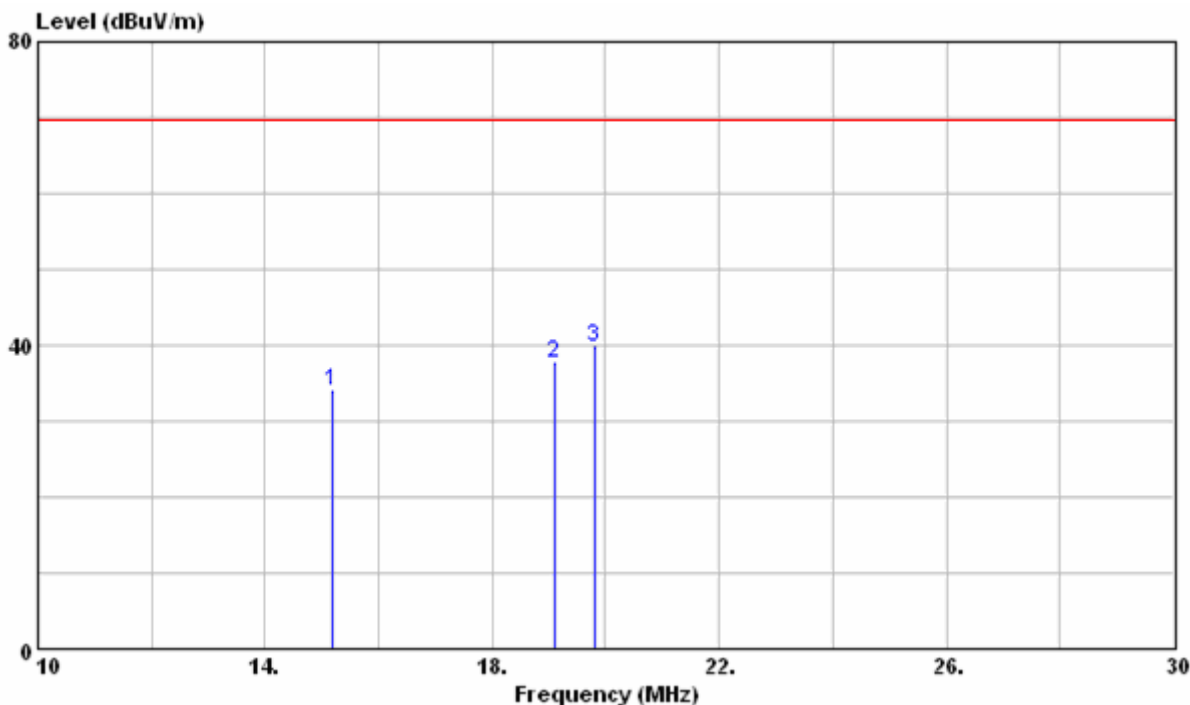
3.3 Test Data

Test Mode : Continuous Transmitting
Test Distance : 3m **Tester** : Danny
Polarization : Vertical **Frequency Range** : 10MHz~30MHz

	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	15.20	20.08	13.92	34.00	69.54	35.54
2	19.10	23.88	13.77	37.65	69.54	31.89
3	19.80	25.94	13.75	39.69	69.54	29.85

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level
4. The formula transfers the limit at 30 m to 3m is $L_3 = L_{30} \times (d_{30} / d_3)^2 = L_{30}(\text{dBuV/m}) + 40$

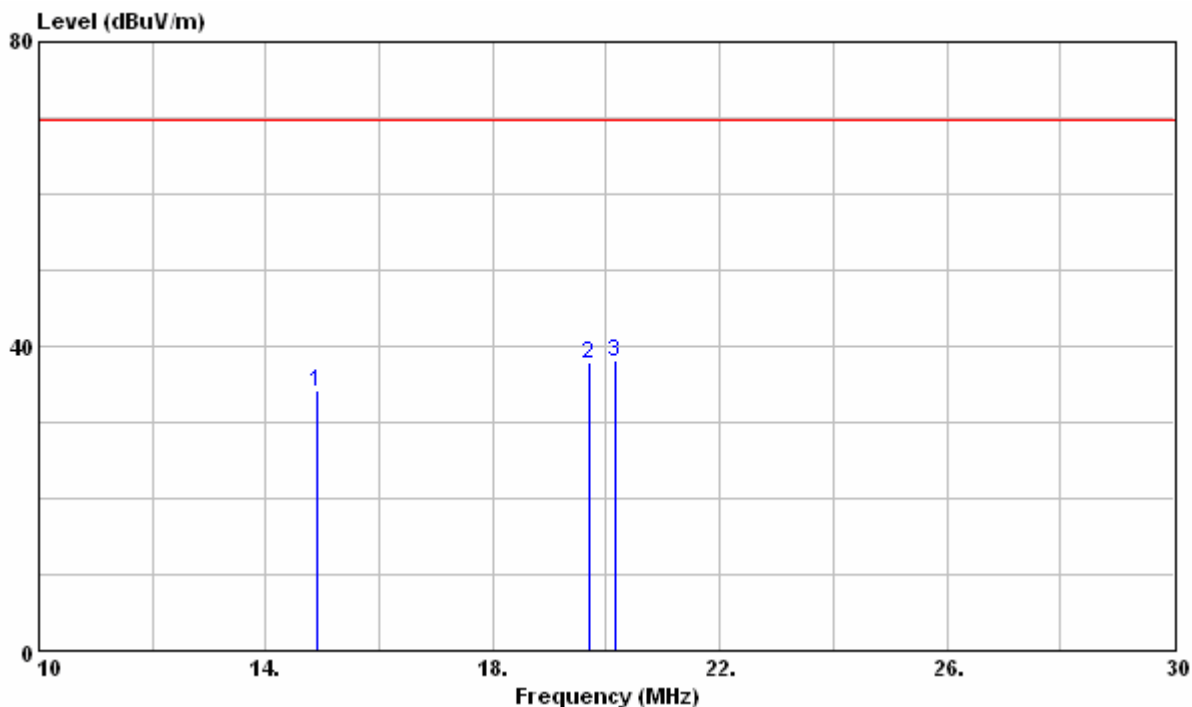


Test Mode : Continuous Transmitting
Test Distance :3m **Tester** : Danny
Polarization : Horizontal **Frequency Range** : 10MHz~30MHz

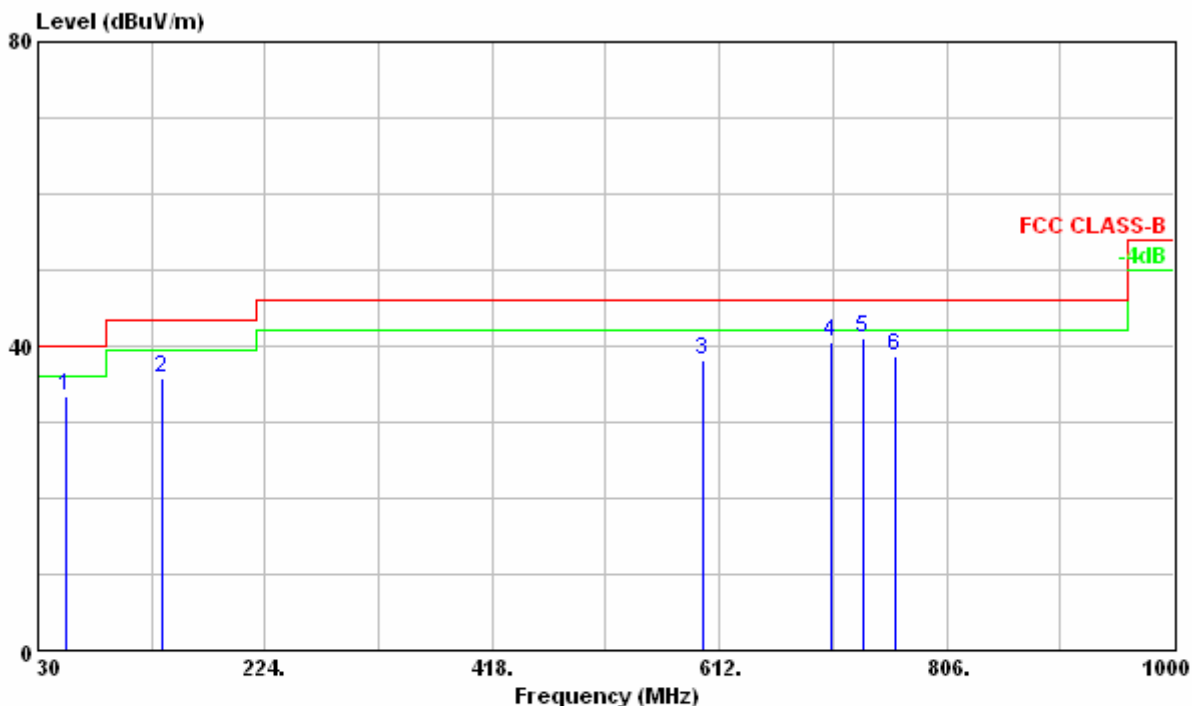
	Freq. (MHz)	Reading Data (dBuV)	Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	14.90	20.07	13.93	34.00	69.54	35.54
2	19.70	23.88	13.75	37.63	69.54	31.91
3	20.16	24.19	13.72	37.91	69.54	31.63

Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level
4. The formula transfers the limit at 30 m to 3m is $L_3 = L_{30} \times (d_{30} / d_3)^2 = L_{30}(\text{dBuV/m}) + 40$



Test Mode : Continuous Transmitting
 Test Distance : 3m Tester : Danny
 Polarization : Vertical Frequency Range : 30MHz~1000MHz

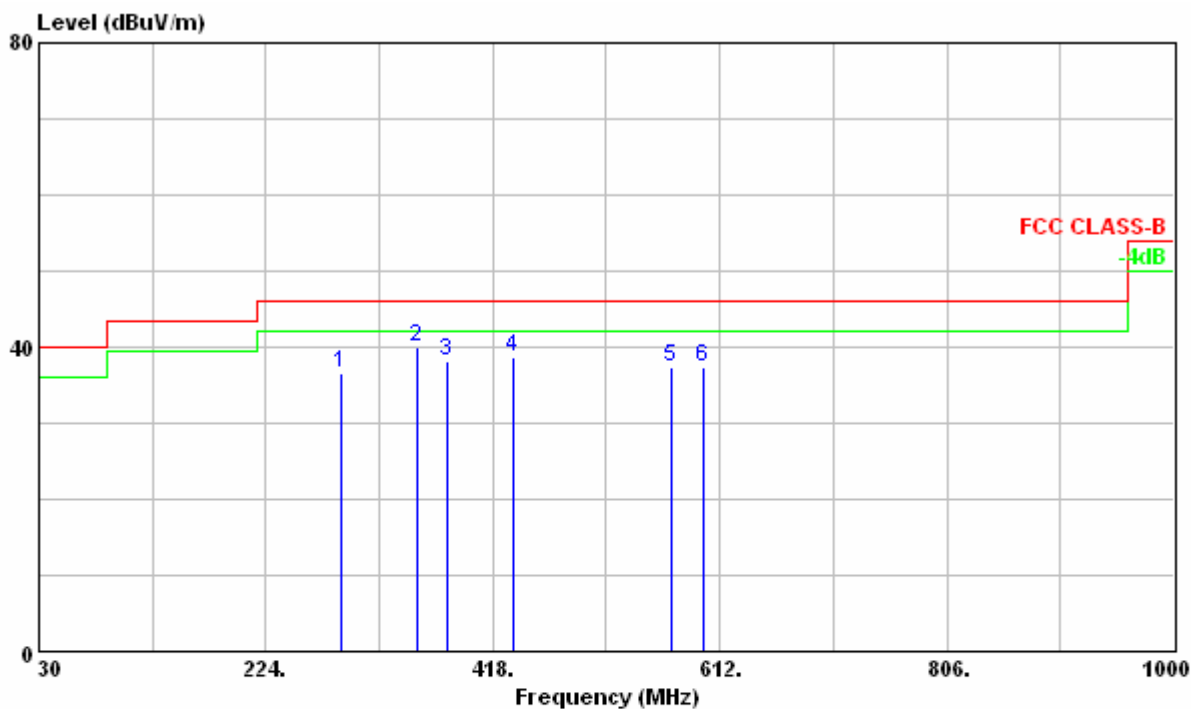


	Freq	Level	Read	Limit	Over	Ant	Table	Pol/Phase	Remark
	MHz	dBuV/m	Level	Factor	Line	Limit	Pos	Pos	
			dBuV	dB/m	dBuV/m	dB	cm	deg	
1	53.280	33.29	51.81	-18.52	40.00	-6.71	---	---	VERTICAL Peak
2	136.700	35.91	55.12	-19.21	43.50	-7.59	---	---	VERTICAL Peak
3	598.420	38.12	42.85	-4.73	46.00	-7.88	---	---	VERTICAL Peak
4	707.060	40.46	43.56	-3.10	46.00	-5.54	---	---	VERTICAL Peak
5	734.220	40.95	43.90	-2.95	46.00	-5.05	---	---	VERTICAL Peak
6	761.380	38.80	41.60	-2.80	46.00	-7.20	---	---	VERTICAL Peak

Note :

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor

Test Mode : Continuous Transmitting
 Test Distance :3m Tester : Danny
 Polarization : Horizontal Frequency Range : 30MHz~1000MHz



	Freq	Level	Read Level	Limit	Over	Ant	Table	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg	
1	288.990	36.64	49.76	-13.12	46.00	-9.36	---	---	HORIZONTAL Peak
2	353.010	40.10	50.57	-10.47	46.00	-5.90	---	---	HORIZONTAL Peak
3	379.200	38.27	47.96	-9.69	46.00	-7.73	---	---	HORIZONTAL Peak
4	435.460	38.63	47.25	-8.62	46.00	-7.37	---	---	HORIZONTAL Peak
5	571.260	37.47	42.72	-5.25	46.00	-8.53	---	---	HORIZONTAL Peak
6	598.420	37.39	42.12	-4.73	46.00	-8.61	---	---	HORIZONTAL Peak

Note :

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor

4 Frequency Tolerance

Result: Pass

4.1 Applied Standard

According to 15.225(e), the frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

4.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Data
Spectrum Analyzer	Agilent	E4405B/ MY45106706	2008/3/25	2009/3/24
Temperature Chamber	Terchy	MHG-800LF/ 920224	2008/8/7	2009/8/6
Chamber	N.A.	TR13	NCR	NCR

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

Instrument Setting

RBW	VBW	Detector	Trace	Comment
300Hz	1kHz	Peak	Maxhold	

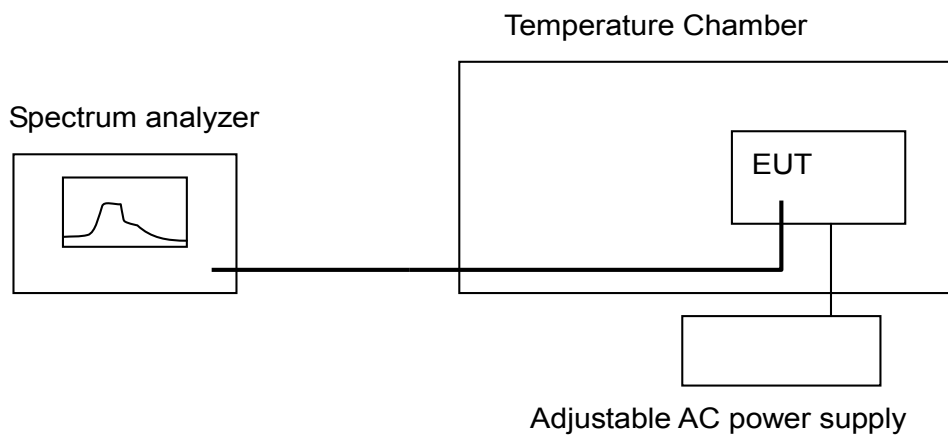
Climatic Condition

Ambient Temperature : 24°C; Relative Humidity : 55%

4.3 Measurement Procedure

- a. The EUT was set up per the test configuration figured in the next section of this chapter and to simulate the typical usage described in the user's manual supported by the manufacturer in chamber TR13.
- b. Measure the frequency tolerance by using the spectrum analyzer and following the test conditions described in FCC 15.225(e) to perform the normal and extreme test conditions tests.
- c. Record the level and compare with the required limit.

4.4 Test Configuration



4.5 Test Data

Test Mode : Continuous Transmitting

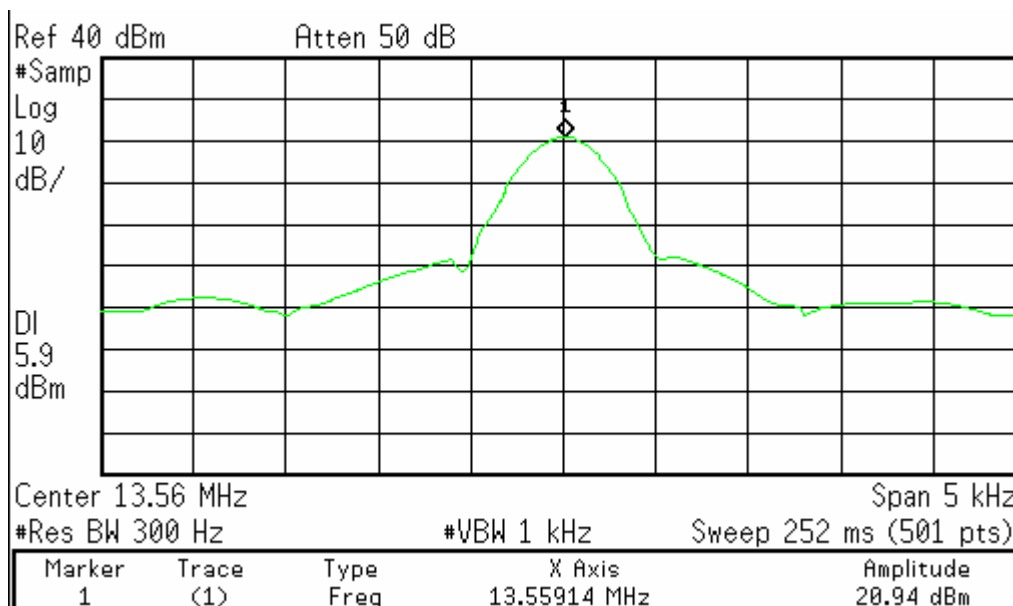
Tester : Bill

Temperature (°C)	AC Voltage (Volt)	Meas. Frequency (MHz)	Deviation (kHz)	Limit (kHz)	Margin (kHz)
20°C	120	13.55914	NA	1.356	NA
	138	13.55916	0.02	1.356	1.336
	102	13.55914	0.00	1.356	1.356
-20°C	120	13.55941	0.27	1.356	1.086
50°C	120	13.55915	0.01	1.356	1.346

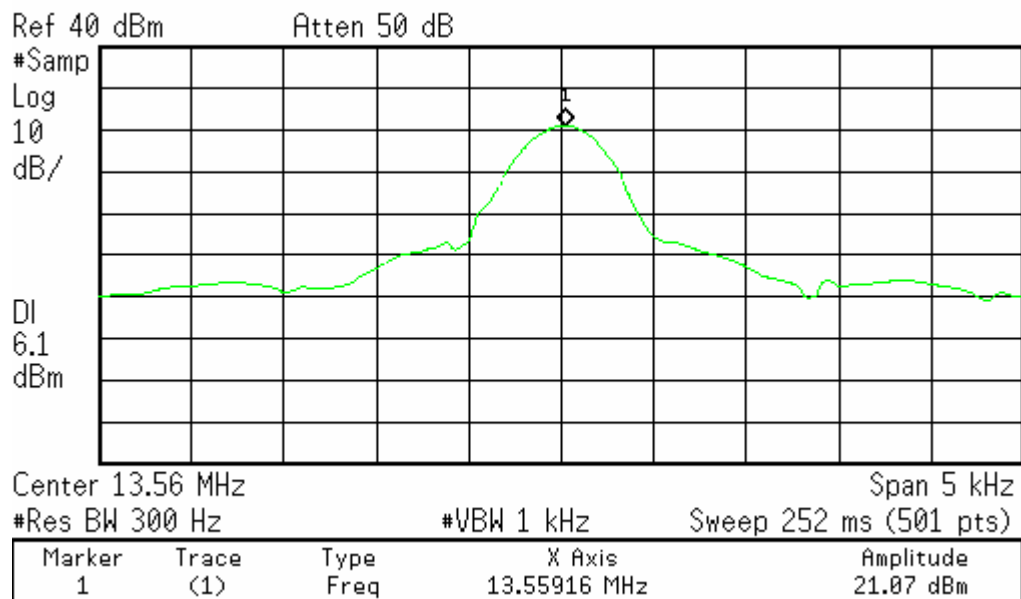
Note:

1. Deviation(kHz) = | Meas. Frequency – Meas. Frequency @20°C/120Vac |
2. Margin (kHz)= Limit – Deviation

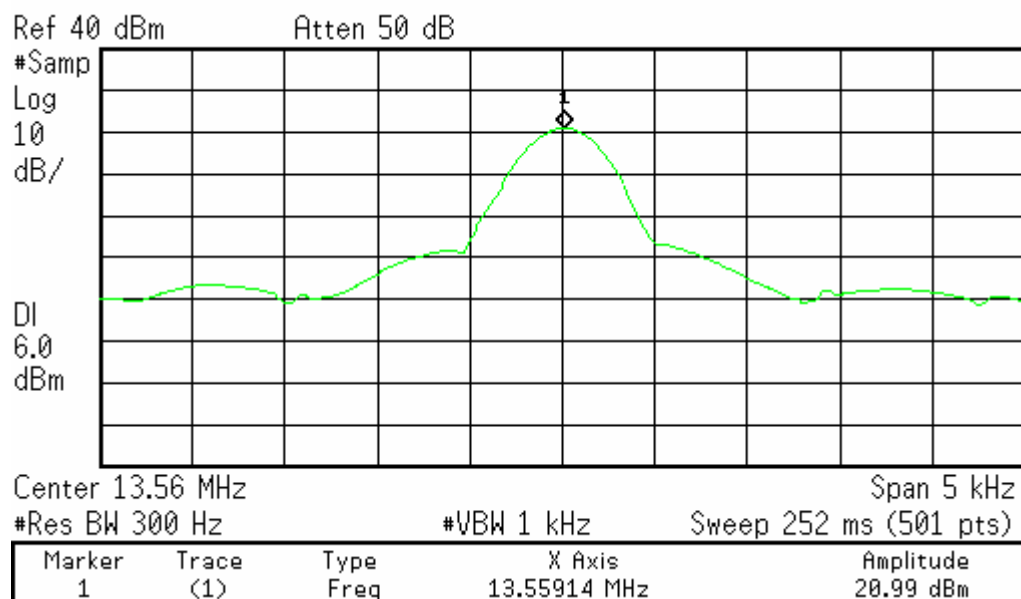
20°C, 120Vac



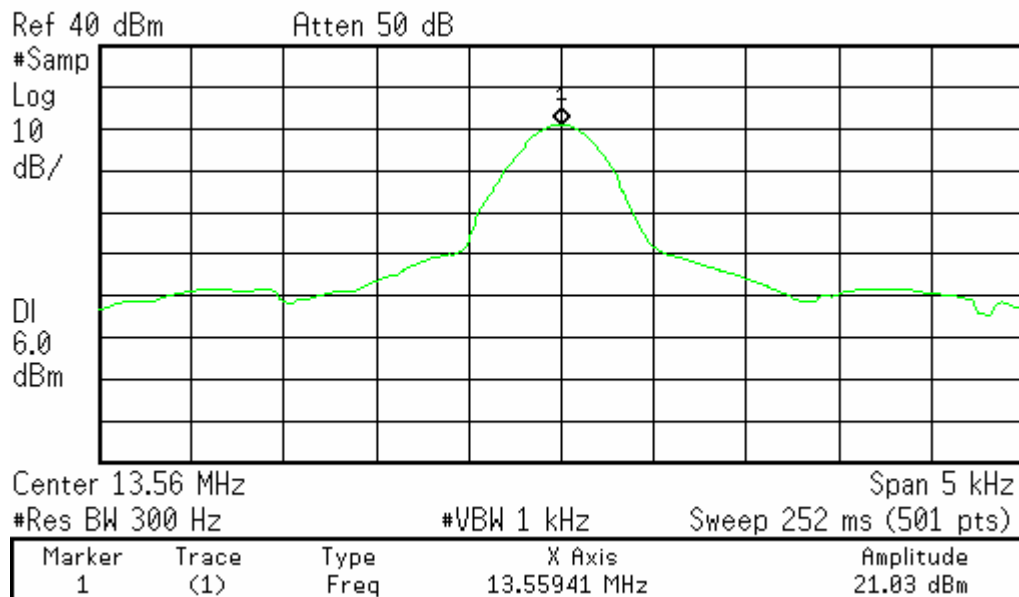
20°C, 138Vac



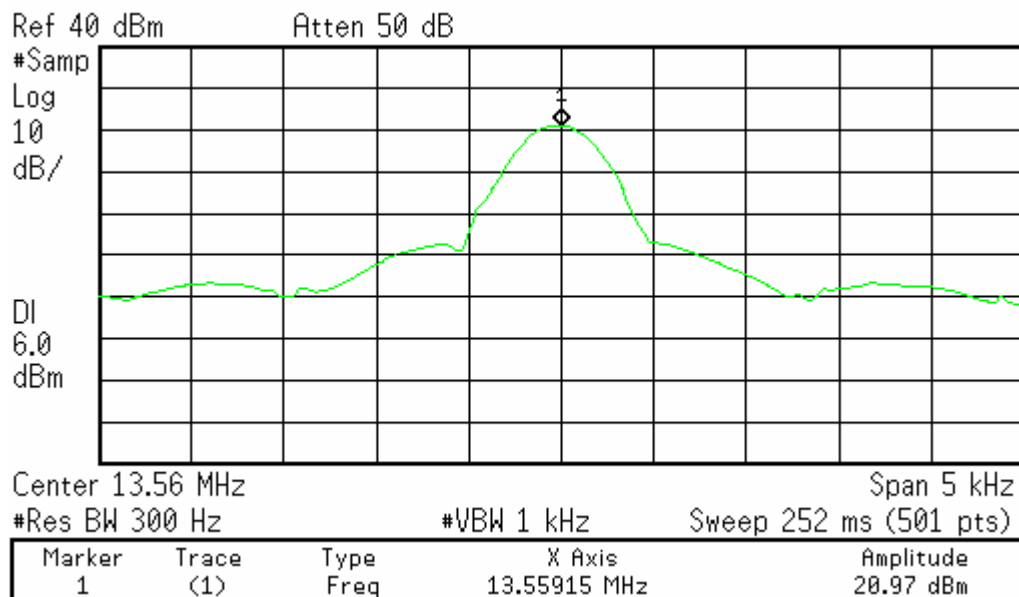
20°C, 102Vac



-20°C, 120Vac



50°C, 120Vac



5 20dB Bandwidth

Result: Pass

5.1 Applied Standard

According to 15.215(c) requires the device must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates.

According to 15.225, Operation within the band 13.110 – 14.010 MHz.

5.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Data
Spectrum Analyzer	Agilent	E4405B/ MY45106706	2008/3/25	2009/3/24
Chamber	N.A.	TR13	NCR	NCR

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

Instrument Setting

RBW	VBW	Detector	Trace	Comment
300Hz	1kHz	Sample	Maxhold	

Climatic Condition

Ambient Temperature : 24°C; Relative Humidity : 55%

5.3 Measurement Procedure

- a. The EUT was set up per the test configuration figured in the next section of this chapter and to simulate the typical usage described in the user's manual supported by the manufacturer in chamber TR13.
- b. Measure the 20dB bandwidth by using the spectrum analyzer and following the test conditions described in FCC 15.215.
- c. Record the frequency and compare with the required limit.

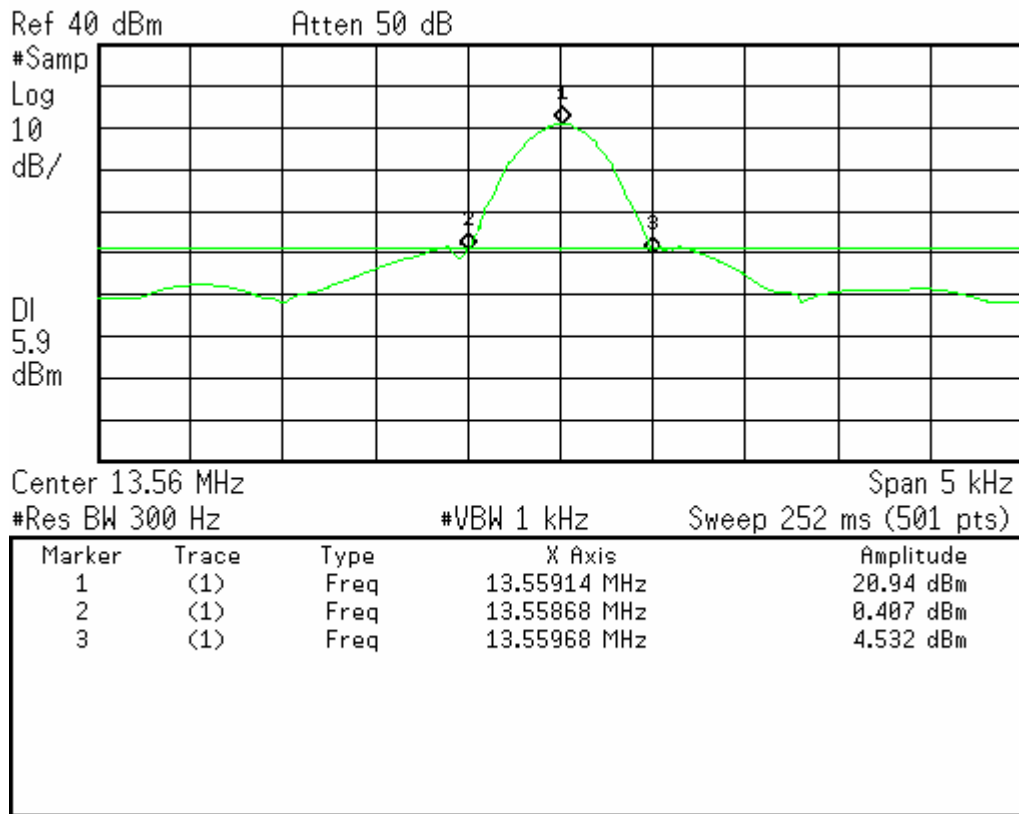
5.4 Test Configuration



5.5 Test Data

Test Mode : Continuous Transmitting
 Tester : Bill

Operating Frequency (MHz)	The latest frequency (MHz)	The highest frequency (MHz)	Limit (MHz)
13.56	13.55868	13.55968	13.110~14.01



6 Conducted Emission Measurement

Test Result: Pass

6.1 Limits for Emission Measurement

For intentional device, according to §15.207(a) line conduction emission limit is as below table.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 - 5	56	46
5 - 30	60	50

* Decreases with the logarithm of the frequency.

Note:

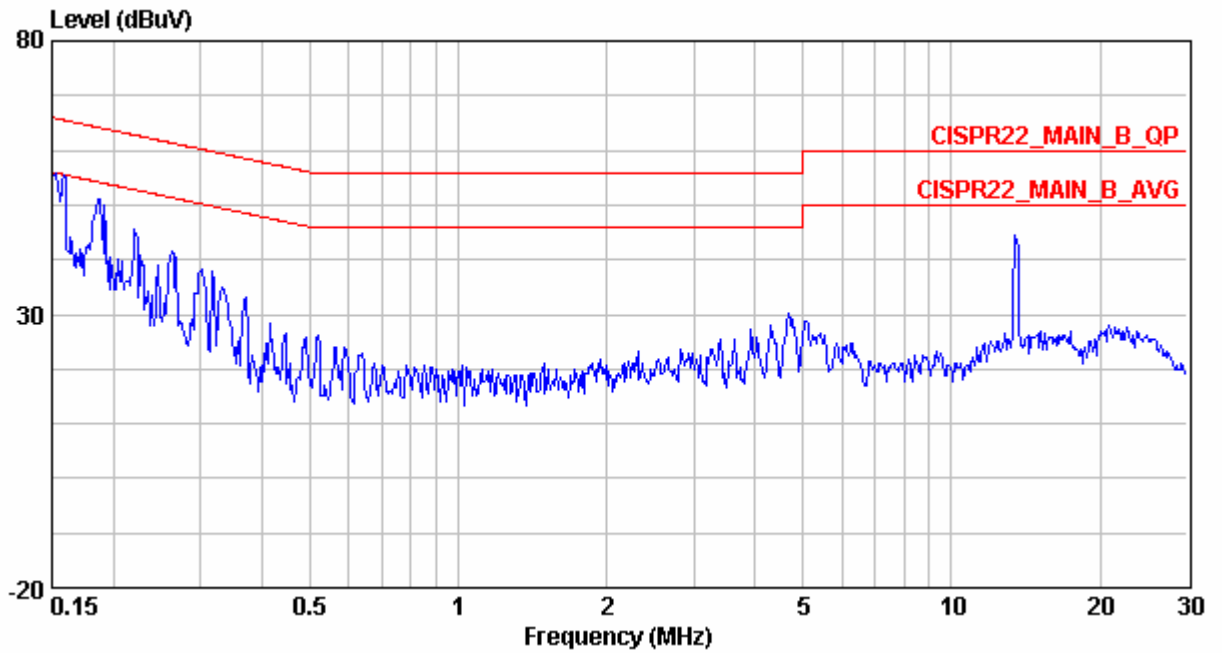
For a device with a permanent antenna operating at or below 30 MHz, the FCC will accept measurements done with a suitable dummy load, in lieu of the permanent antenna under the following conditions: (1) perform the AC line conducted tests with the permanent antenna to determine compliance with the Section 15.207 limits outside the transmitter's fundamental emission band; (2) retest with a dummy load in lieu of the permanent antenna to determine compliance with the Section 15.207 limits within the transmitter's fundamental emission band.

6.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Test Receiver	R&S	ESHS10/ 842121/013	2008/9/18	2009/9/17
AC Power Source	GW	APS-9102/D16113 7	Function Test	
LISN	R&S	ESH3-Z5/840731/ 011	2008/9/15	2009/9/14
Impulsbegrenzer Pulse Limiter	R&S	ESH3-Z2/100226	2008/5/10	2009/5/9

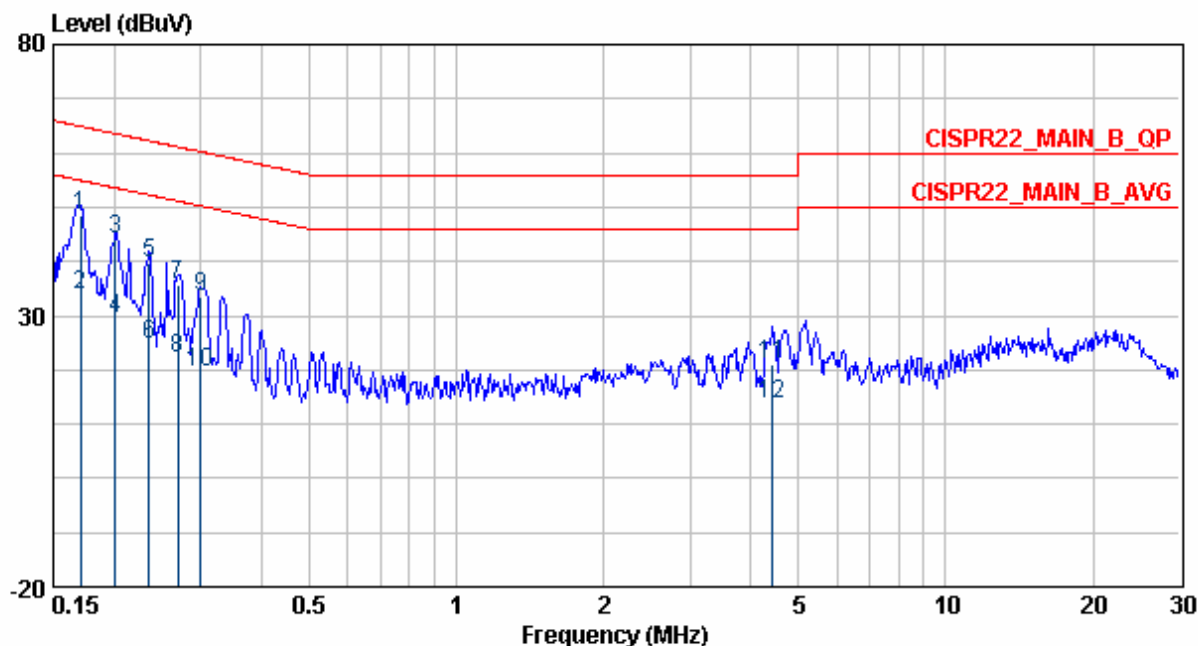
6.3 Test Results

Test Mode : Continuous Transmitting, with antenna
Tester : Danny Frequency Range : 150kHz~30MHz
Phase : Line



Note:
Tx Fundamental, for reference only. Please refer to next page.

Test Mode : Continuous Transmitting, with dummy load
 Tester : Danny Frequency Range : 150kHz~30MHz
 Phase : Line

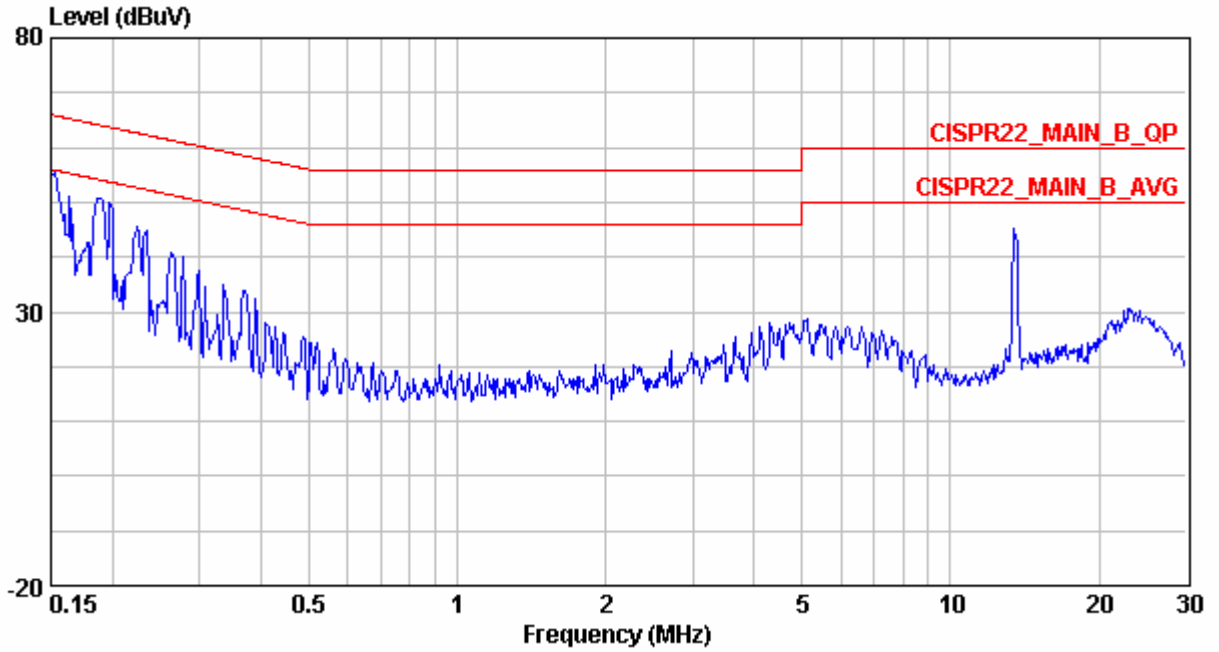


	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Ant Pos	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	cm		
1	0.17	48.55	0.14	48.41	64.94	-16.40	---	LINE	QP
2	0.17	33.69	0.14	33.55	54.94	-21.26	---	LINE	AVERAGE
3	0.20	44.27	0.15	44.12	63.58	-19.31	---	LINE	QP
4	0.20	29.53	0.15	29.38	53.58	-24.05	---	LINE	AVERAGE
5	0.24	39.74	0.15	39.59	62.26	-22.52	---	LINE	QP
6	0.24	24.77	0.15	24.62	52.26	-27.49	---	LINE	AVERAGE
7	0.27	35.56	0.15	35.41	61.12	-25.55	---	LINE	QP
8	0.27	22.10	0.15	21.95	51.12	-29.01	---	LINE	AVERAGE
9	0.30	33.33	0.16	33.17	60.24	-26.91	---	LINE	QP
10	0.30	19.62	0.16	19.46	50.24	-30.62	---	LINE	AVERAGE
11	4.43	21.18	0.40	20.78	56.00	-34.82	---	LINE	QP
12	4.43	13.85	0.40	13.45	46.00	-32.15	---	LINE	AVERAGE

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of LISN.
3. Q.P. is abbreviation of quasi-peak.

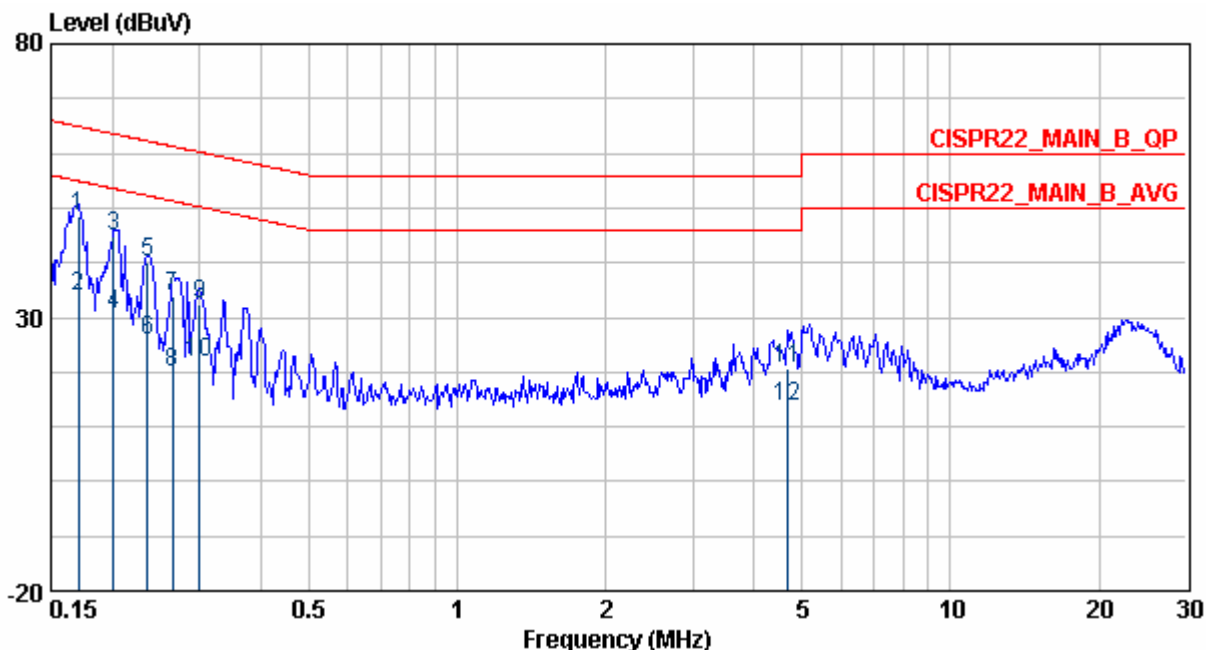
Test Mode : Continuous Transmitting, with antenna
Tester : Danny **Frequency Range** : 150kHz~30MHz
Phase : Neutral



Note:

Tx Fundamental, for reference only. Please refer to next page.

Test Mode : Continuous Transmitting, with dummy load
 Tester : Danny Frequency Range : 150kHz~30MHz
 Phase : Neutral



	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Ant Pos	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	cm		
1 @	0.17	48.50	0.15	48.35	64.94	-16.45	---	NEUTRAL	QP
2	0.17	33.96	0.15	33.81	54.94	-20.99	---	NEUTRAL	AVERAGE
3 @	0.20	44.76	0.16	44.60	63.58	-18.82	---	NEUTRAL	QP
4	0.20	30.53	0.16	30.37	53.58	-23.05	---	NEUTRAL	AVERAGE
5	0.24	39.92	0.16	39.76	62.26	-22.34	---	NEUTRAL	QP
6	0.24	25.73	0.16	25.57	52.26	-26.53	---	NEUTRAL	AVERAGE
7	0.26	33.74	0.16	33.58	61.29	-27.55	---	NEUTRAL	QP
8	0.26	20.06	0.16	19.90	51.29	-31.23	---	NEUTRAL	AVERAGE
9	0.30	32.30	0.17	32.13	60.24	-27.94	---	NEUTRAL	QP
10	0.30	21.66	0.17	21.49	50.24	-28.58	---	NEUTRAL	AVERAGE
11	4.67	20.69	0.44	20.25	56.00	-35.31	---	NEUTRAL	QP
12	4.67	13.53	0.44	13.09	46.00	-32.47	---	NEUTRAL	AVERAGE

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of LISN.
3. Q.P. is abbreviation of quasi-peak.