FCC Part 15 Subpart C

EMI TEST REPORT

of

E.U.T.: **Digital FM Transmitter**

Trade Name: N/A
Model Number: ST-26D

Prepared for

Jow Tong Technology Co., Ltd.

No. 46, Lane 337, Chung Cheng Rd., Yung Kang City, Tainan County 710 Taiwan R.O.C.
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Prepared by

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Remark:
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TEST REPORT CERTIFICATION

Applicant: Jow Tong Technology Co., Ltd.

Manufacturer: Jow Tong Technology Co., Ltd.

EUT Description: Digital FM Transmitter

Model No.: ST-26D

Serial No.: N/A

Tested Power Supply: 120Vac, 60Hz

Date of Final Test: Jan. 21, 2005

Measurement Procedures and Standards Used :

FCC Rules and Regulations Part 15 Subpart C-2004-11-5, AND ANSI C63.4-2003
(FCC CFR 47 Part 15C: §15.109, §15.203, §15.207, §15.209, §15.239)

I HEREBY CERTIFY THAT: The data shown in this report were made in accordance with the procedures given in ANSI C63.4, and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Note: 1. The result of the testing report relate only to the item tested.

2. The testing report shall not be reproduced expect in full, without the written approval of IETC

Report Issued: 2005/1/28

Test Engineer: Issac Lee 2005/1/28 Checked: Jam Cheng 2005/01/28

Approved: Mike Huang 2005/01/28

Table of Contents

1 General Information

1.1 Description of Equipment Under Test

Equipment Under Test	**:**	Digital FM Transmitter
Model Number	**:**	ST-26D
Serial Number	**:**	N/A
Type of Sample Tested	**:**	☒Proto-type ☐Pre-Production ☐Mass Production
Applicant	**:**	**Jow Tong Technology Co., Ltd.** No. 46, Lane 337, Chung Cheng Rd., Yung Kang City, Tainan County 710 Taiwan R.O.C.
Manufacturer	**:**	**Jow Tong Technology Co., Ltd.** No. 46, Lane 337, Chung Cheng Rd., Yung Kang City, Tainan County 710 Taiwan R.O.C.
Date of Receipt of Sample	**:**	Nov. 29, 2004
Date of Test	**:**	Dec. 1, 2004 ~ Jan. 21, 2005
Description of E.U.T.	**:**	1. The EUT is Digital FM Transmitter, the device operates within 88.1 MHz - 107.9 MHz (0.1 MHz / per step), where 4 FM channels 88.1 / 94.1 / 100.1 / 106.1 MHz (page 5) are preset, can applicable with MP3/iPod, for car use. 2. EUT Ports: ① Audio port *1 ② Connect port for I-POD power charge (output 5Vdc) ③ Power Port * 1.
Fundamental Frequency Range	**:**	FM 88.1MHz~107.9MHz
Radio Frequency Adjustment	**:**	0.1 MHz / per step.
Input Voltage & Current	**:**	12~16Vdc, 2A

1.2 Tested Supporting System Detail

- Speaker

Model Number	:	Power Max 300/iC
Serial Number	:	N/A
Manufacturer	:	TEAC
Data Cable	:	Shielded, Detachable, 1.5m
Power Cord	:	Shielded, Un-detachable, 1.3m

- D.C. Power supply

Model Number	:	GPC6030D
Serial Number	:	C691103
Manufacturer	:	N/A
Data Cable	:	Non-Shielded, Detachable, 1.8m

1.3 Test Methodology

For Digital FM Transmitter, both conducted and radiated emissions were performed according to the procedures illustrated in ANSI C63.4 (2003) and other required measurements were illustrated in separate sections of this test report for details.

1.4 Test Facility

Site Description : ☒OATS 1 ☐OATS 2 ☐OATS 3 ☐OATS 4

Name of Firm : Interocean EMC Technology Corp.

Site 1, 2 Location : No.5-2, Lin 1, Tin-Fu Tsun, Lin-Kou Hsiang,
Taipei County, Taiwan, R.O.C.

Site 3, 4 Location : No. 12, Ruei-Shu Valley, Ruei-Ping Tsuen, Lin-Kou Shiang,
Taipei County, Taiwan, R.O.C.

Site Filing :

- Federal Communication Commissions – USA
  Registration No.: 96399 (Site 1& 2)
  Registration No.: 518958 (Site 3 & 4)
- Voluntary Control Council for Interference by Information Technology Equipment (VCCI) – Japan
  Registration No. (Conducted Area 1): C-1094
  Registration No. (Conducted Area 3): C-1943
  Registration No. (Conducted Area 4): C-1944
  Registration No. (OATS 1): R-1040
  Registration No. (OATS 2): R-1041
  Registration No. (OATS 3): R-1812
  Registration No. (OATS 4): R-1813
- Industry Canada
  Submission: 44631

Site Accreditation :

- Bureau of Standards and Metrology and Inspection (BSMI) – Taiwan, R.O.C.
  Accreditation No.:
  SL2-IN-E-0026 for CNS13438 / CISPR22
  SL2-R1-E-0026 for CNS13439 / CISPR13
  SL2-R2-E-0026 for CNS13439 / CISPR13
  SL2-A1-E-0026 for CNS13783-1 / CISPR14
  SL2-L1-E-0026 for CNS14115 / CISPR15
- National Voluntary Laboratory Accreditation Program (NVLAP) - USA
  Lab Code: 200458-0
- Nemko AS
  Authorization No.: ELA 181-a
  Authorization No.: ELA 181-b
- CNLA
  Registration No.: 1113 / 1114
- TüV Rheinland
  Certificate No: 10006453-2003

1.5 Measurement Uncertainty

No.	Item	Value	
1.	Power Line Conducted Emission (Conduction 1)	+2.68dB	-2.69dB
2.	Power Line Conducted Emission (Conduction 2)	+2.62dB	-2.62dB
3.	Power Line Conducted Emission (Conduction 3)	+2.51dB	-2.51dB
4.	Power Line Conducted Emission (Conduction 4)	+2.51dB	-2.51dB
5.	Radiated Emission Test (OATS 1)	+3.13 dB	-3.26 dB
6.	Radiated Emission Test (OATS 2)	+2.69 dB	-2.69 dB
7.	Radiated Emission Test (OATS 3)	+3.15 dB	-3.15 dB
8.	Radiated Emission Test (OATS 4)	+3.20 dB	-3.20 dB
9.	Radio-frequency, Electromagnetic field Immunity Test (RS)	+1.47dB	-1.47dB
10.	Radio-frequency, Conducted Disturbances Immunity Test (CS)	+2.31dB	-2.34dB

2 PROVISIONS APPLICABLE

2.1 Definition

Unintentional radiator:
A device that intentionally generates and radio frequency energy for use within the device, or that sends radio frequency signals by conduction to associated equipment via connecting wiring, but which is not intended to emit RF energy by radiation or induction.

Class A Digital Device:
A digital device which is marketed for use in commercial or business environment; exclusive of a device which is market for use by the general public, or which is intended to be used in the home.

Class B Digital Device :
A digital device which is marketed for use in a residential environment not withstanding use in a
commercial, business of industrial environment. Example of such devices that are marketed for the general public.

Note : A manufacturer may also qualify a device intended to be marketed in a commercial, business, or industrial environment as a Class B digital device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B Digital Device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B Digital Device, Regardless of its intended use.

Intentional radiator:
A device that intentionally generates and emits radio frequency energy by radiation or induction.

2.2 Requirement for Compliance

(1) Conducted Emission Requirement

For intentional radiator, according to §15.207 Line Conducted Emission Limits

Frequency (MHz)	Quasi Peak (dBμV)	Average (dBμV)
0.15 - 0.5	66-56	56-46
0.5 - 5.0	56	46
5.0 - 30.0	60	50

Remark: For intentional radiator, according to CISPR Line Conducted Emission Limits is same as above table.

(2) Radiated Emission Requirement

Fundamental Frequency

Frequency (MHz)	Distance Meters (m)	Radiated (dBμV/m)	Radiated (dBμV/m)	
			Average	Peak
Fundamental Frequency	3	250	48	68

Remark:
* Emission level (dBμV/m)=20 log Emission level (μV/m)
* For limiting peak emission apply according to FCC Part 15 section 15.35 (b).

Spurious Frequency

For unintentional radiator, according to §15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following table.

For intentional radiator, according to §15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed following table.

Frequency (MHz)	Distance Meters (m)	Radiated (μV/m)	Radiated (dBμV/m)
30 - 88	3	100	40.0
88 - 216	3	150	43.5
216 - 960	3	200	46.0
Above 960	3	500	54.0
1000~2000	3	---	54 (AV)
1000~2000	3	---	74 (QP)

Remark:
* Emission level (dBμV/m)=20 log Emission level (μV/m)
* The tighter limit applies at the edge between two frequency bands.
* Frequency above 1GHz, FCC limit is used according to CFR 47 Part 15.35 (b), 15.205 (b), and Part 15, 209(e).

(3) 26dB Bandwidth Measurement

Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108MHz.

2.3 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42-16.423	399.9-410	4.5-5.25
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	2655-2900	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
12.51975-2.52025	240-285	3345.8-3358	36.43-36.5
12.57675-2.57725	322-335.4	3360-4400	Above 38.6
13.36-13.41			

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

2.4 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2.5 User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual.

The Federal Communications Commission Radio Frequency Interference Statement includes the following paragraph.

This equipment has been tested and found to comply with the limits for a Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio / TV technician for help.

3 SYSTEM TEST CONFIGURATION

3.1 Justification

For radiated emissions, the system was configured for testing in a typical fashion, as a customer would normally use it. The peripherals other than EUT were connected in normally standing by situation. Measurement was performed under the condition that a computer program was exercised to simulate data communication of EUT, and the transmission rate was set to maximum allowed by EUT. Three highest emissions were verified with varying placement of the transmitting antenna connected to EUT to maximize the emission from EUT.

For radiated emissions, whichever RF channel is operated, the digital circuits function identically. As the reason, measurement of radiated emissions from digital circuits is only performed with channel 88.1MHz, 98MHz, and 107.9MHz by transmitting mode.

During the preliminary test, select the worse case 107.9MHz mode, and data presented in this test report just show the worse case.

4 Power Line Conducted Emission Measurement

The conducted limits are not required for the device, which only employ battery power for operation not from the AC power lines according to FCC Part 15 section 15.207.

5 RADIATED EMISSION MEASUREMENT

5.1 Instrument

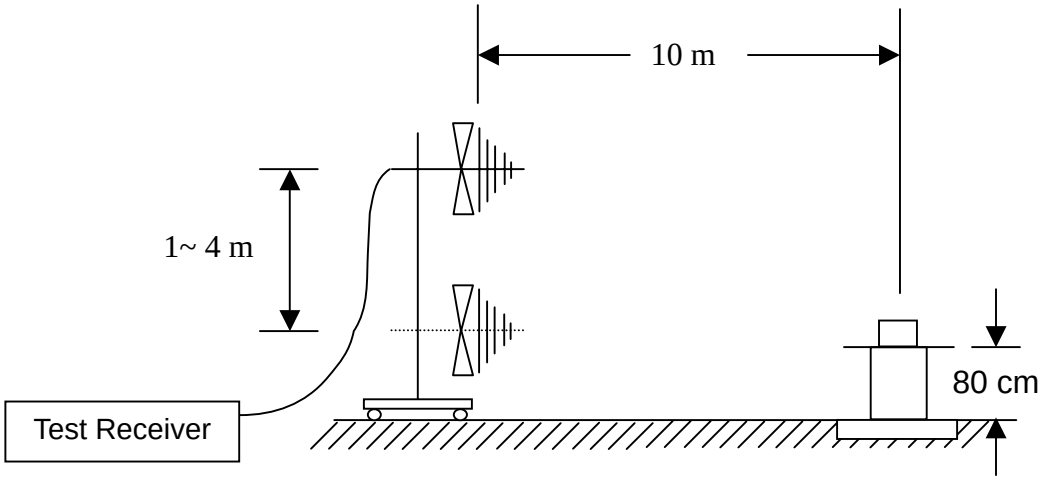
☒OATS 1

Instrument	Manufacturer	Model	Serial No.	Last Calibration
EMI Test Receiver	Rohde & Schwarz	ESI 07	830154/002	2004/08/27
Antenna	Schaffner	CBL6112B	2610	2004/02/24
Pre-Amplifier	Schaffner	CA30100	2	2004/09/01
RF Cable	IETC	CBL01	N/A	2004/06/23
HORN Antenna	COM-POWER	AH-118	10081	2004/04/30
RF Preamplifier	Agilent Technologies	8449B	3008A01434	2004/04/16
Cable	Insulated Wire Incorporated	NPS-2251-7880-NPR	CBL06	2004/05/25

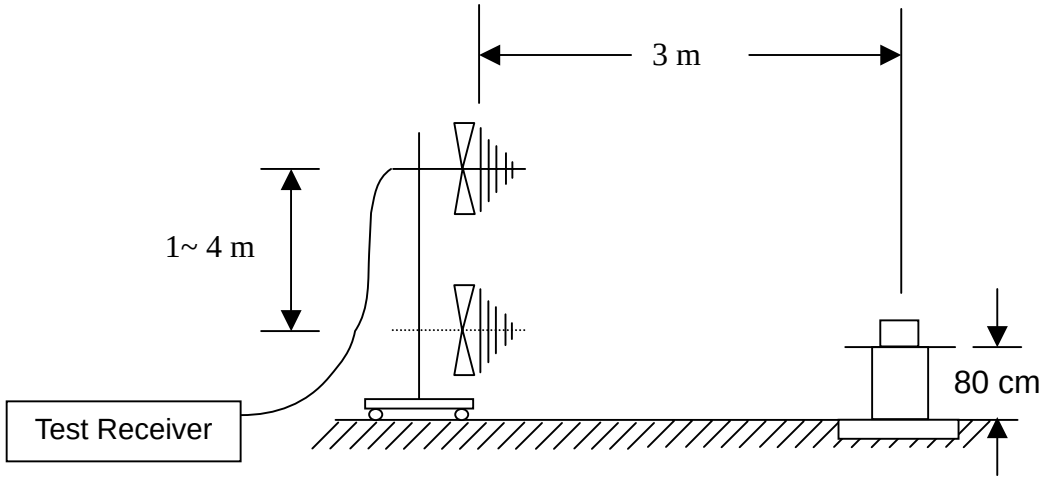
Note: All instrument upon which need to be calibrated are within calibration period of 1 year.

5.2 Block Diagram of Test Configuration

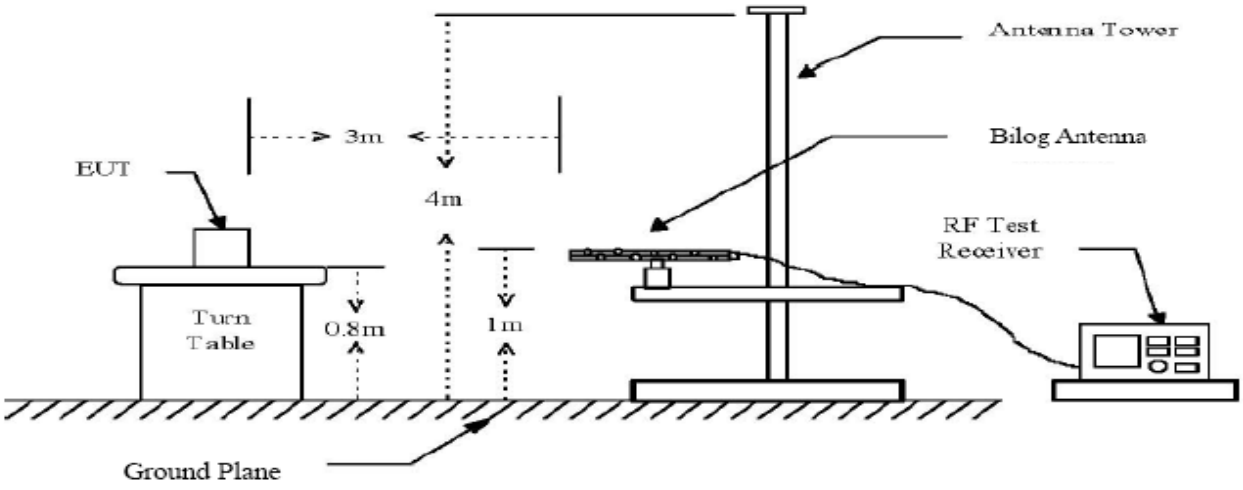
For unintentional radiators
(Frequencies measured under 1 GHz configuration)



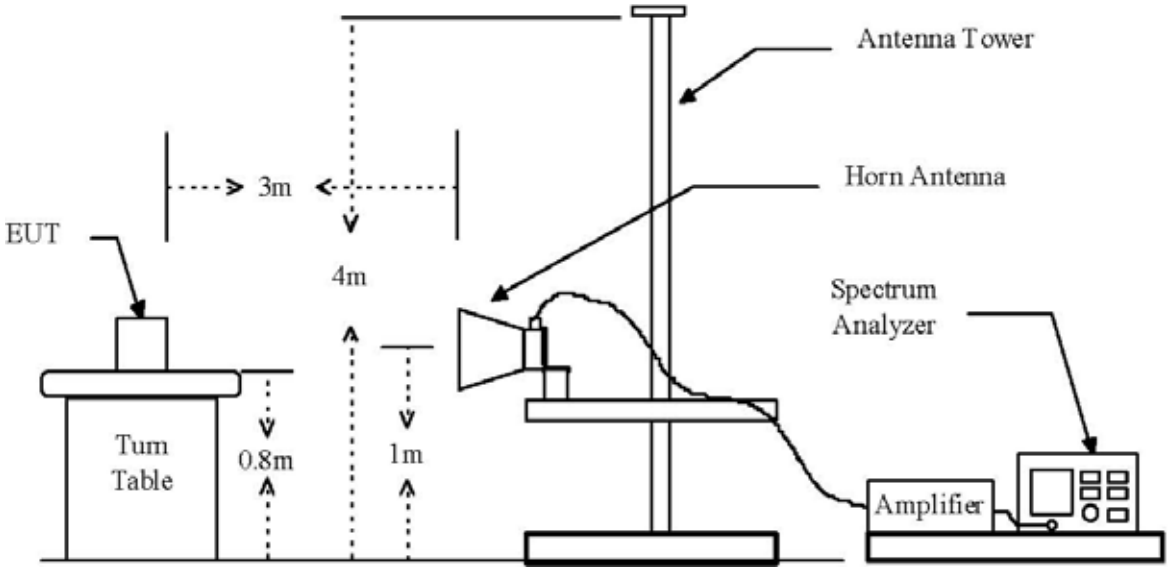
For unintentional radiators
(Frequencies measured above 1 GHz configuration)



For intentional radiators
(Frequencies measured under 1 GHz configuration)



For intentional radiators
(Frequencies measured above 1 GHz configuration)



5.3 Applicable Standard

For unintentional radiator, the radiated emission shall comply with §15.109(a).

For intentional radiator, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall comply with §15.209(a), &15.239.

5.4 Radiated Limit

For unintentional radiator

☒ CISPR 22

	☐ Class A	☒ Class B
Frequency (MHz)	Quasi-Peak dB(μ V/m)	Quasi-Peak dB(μ V/m)
30 ~ 230	40.0	30.0
230 ~ 1000	47.0	37.0

☒ FCC Part C 15.109 (a) (above 1000MHz) (3m)

	☒ Class B
Frequency (MHz)	Average dB(μ V/m)
Above 1000	43.52

Note: The limits are extrapolated to the new measurement distance using an inverse linear distance extrapolation factor (20dB/decade) with FCC Part 15 Limit of this section.

For intentional radiator

Frequency (MHz)	Distance	Field Strengths Limits	
		(μ V/m)	dB (μV/m)
Fundamental Freq.	3	250	48.0 (Average)
Fundamental Freq.	3	250	68.0 (Peak)

Note: (1) Emission Level (dBμV/m)= 20 log Emission Level (μ V/m)
(2) The provision in section 15.35 for limiting peak emission apply.

Frequency (MHz)	Distance	Field Strengths Limits	
		(μ V/m)	dB (μV/m)
30 – 88	3	100	40.0
88 – 216	3	150	43.5
216 – 960	3	200	46.0
Above 96-	3	500	54.0
1000 - 2000	3	--	48.0 (Average)
1000 - 2000	3	--	68.0 (Peak)

Note: (1) Emission Level (dBμV/m)= 20 log Emission Level (μ V/m)
(2) The tighter limit applies at the edge between two frequency bands.
(3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
(4) The cover 1 GHz limit, FCC limit is used based on CFR 47 Part 15.35 (b) and 15.205 (b) & Part 15. 209 (e).

5.5 Measurement Procedure

For unintentional radiator

5.4.1 The EUT was placed on a non-conductive table whose total height equaled 80cm. The turntable can rotate 360 degree to determine the position of the maximum emission level.

5.4.2 The EUT was set 10 meters away from the receiving antenna that was mounted on a non-conductive mast. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level.

5.4.3 The initial testing identified the frequency that has the highest disturbance relative to the limit while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration.

5.4.4 The identification of the frequency of highest emission with respect to the limit was found by investigating emissions at a number of significant frequencies. The probable frequency of maximum emission had been found and that the associated cable and EUT configuration and mode of operation had been identified

For intentional radiator

5.4.5 Setup the configuration per 5.2 for frequencies measured below and above 1 GHz respectively.

5.4.6 For emission frequencies measured below 1 GHz, a pre-scan is performed in a Anechoic chamber to determine the accurate frequencies of higher emissions will be checked on a open test site. As the same purpose, for emission frequencies measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.

5.4.7 For emission frequencies measured below 1GHz, set the spectrum analyzer on a 120 kHz (RB) and 100 kHz (RB); and above 1 GHz, set the spectrum analyzer on a 1 MHz (RB) and 1 MHz (VB) resolution bandwidth respectively for each frequency measured in section 5.4.2.

5.4.8 The search antenna was moved up and down over a range from 1 to 4 meter in horizontal polarity orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0° to 360° with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading. A RF test receiver is also used to confirm emissions measured.

5.4.9 Section 5.4. 4 until all frequencies need to be measured were complete.

5.4.10 Section 5.4. 5 with search antenna in vertical polarized orientations.

5.4.11 Check the three frequencies of highest emission with varying the placement of cables associated with EUT to obtain the worse case and record the result.

5.4.12 The frequency range is from 30MHz to 2000MHz.

5.4.13 Measurement test data was shown on Appendix 2.

5.6 Measuring Instrument

For unintentional radiator

- Set the EMI test receiver frequency range from 30 MHz to 1000 MHz.
- Set the EMI test receiver bandwidth at 120 kHz.
- Set the EMI test receiver detector as Quasi-Peak (Q.P.).

For intentional radiator

Measuring instrument setup in measured frequency band when specified detector function is used:

Frequency Band (MHz)	Instrument	Function	Resolution bandwidth	Video Bandwidth
0.01 to 30	RF Test Receiver	Quasi-Peak	9 kHz	N/A
	Spectrum Analyzer	Peak	100 kHz	100 kHz
30 to 1000	RF Test Receiver	Quasi-Peak	120 kHz	N/A
	Spectrum Analyzer	Peak / Average	100 kHz	100 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz
	Spectrum Analyzer	Average	1 MHz	300 Hz

5.7 Measured Mode

The test modes for preliminary test are as following:

- Mode 1: 88.1MHz mode
- Mode 2: 98 MHz mode
- Mode 3: 107.9 MHz mode

For emission test, selected the worst-case mode 3 after preliminary test for final test.

5.8 Test Step of EUT

1. Setup the EUT and peripheral as shown in section 5.2.
2. Inserted EUT with test module, connected with speaker and D.C. power supply.
3. Turn on the power of all equipment.
4. Selected the channels from EUT (low, middle, high).
5. Measured the horizontal polarization and record the value.
6. Changed into vertical polarization measure and record the value.

Radiated Emission Measurement Data – For unintentional radiator – (Under 1GHz)

Date of Tested : Jan. 21, 2005 Polarization : Horizontal

Temperature : 26°C Humidity : 61%

Tested Mode : Mode 3: 107.9 MHz mode at 10m

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level dB(uV/m)	Limits dB(uV/m)	Margin (dB)
116.990 **	-16.88	38.06	21.19	30.00	-8.82
147.485 **	-17.95	37.24	19.29	30.00	-10.71
192.791 **	-15.80	37.52	21.72	30.00	-8.28
213.032 **	-13.43	34.26	20.83	30.00	-9.17
243.994 **	-11.95	34.95	23.00	37.00	-14.00

Remark:
1. " * " Mark means readings are Peak Values.
2. " ** " Mark means readings are Quasi-Peak values.
3. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
4. The worst emission was detected at 192.791 MHz with corrected signal level of 21.72 dB(uV/m) (limit is 30 dB(uV/m)) when the antenna was at horizontal polarization and was at 4 m high and the turntable was at 218°.
5. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Radiated Emission Measurement Data – For unintentional radiator - (Above 1GHz)

Date of Tested : Jan. 21, 2005 Polarization : Horizontal

Temperature : 26°C Humidity : 61%

Tested Mode : Mode 3: 107.9 MHz mode at 10m

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level dB(uV/m)	Limits dB(uV/m)	Margin (dB)
1091.214	-5.88	39.62	33.74	43.52	-9.78
1169.210	-5.08	38.24	33.16	43.52	-10.36
1413.620	-3.01	37.77	34.76	43.52	-8.76
1724.241	-0.44	36.14	35.70	43.52	-7.82

Remark:
1. All readings are Average values.
2. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Radiated Emission Measurement Data – For unintentional radiator – (Under 1GHz)

Date of Tested : Jan. 21, 2005 Polarization : Vertical

Temperature : 26°C Humidity : 61%

Tested Mode : Mode 3: 107.9 MHz mode at 10m

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level dB(uV/m)	Limits dB(uV/m)	Margin (dB)
125.284 **	-18.86	36.74	17.88	30.00	-12.12
146.527 **	-16.22	42.12	25.90	30.00	-4.10
184.302 **	-15.46	38.75	23.29	30.00	-6.71
215.465 **	-13.63	37.98	24.35	30.00	-5.65
262.158 **	-12.04	35.12	23.08	37.00	-13.92

Remark:
1. " * " Mark means readings are Peak Values.
2. " ** " Mark means readings are Quasi-Peak values.
3. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
4. The worst emission was detected at 146.527 MHz with corrected signal level of 25.9 dB(uV/m) (limit is 30 dB(uV/m)) when the antenna was at vertical polarization and was at 1 m high and the turntable was at 290°.
5. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Radiated Emission Measurement Data – For unintentional radiator - (Above 1GHz)

Date of Tested : Jan. 21, 2005 Polarization : Vertical

Temperature : 26°C Humidity : 61%

Tested Mode : Mode 3: 107.9 MHz mode at 10m

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level dB(uV/m)	Limits dB(uV/m)	Margin (dB)
1090.984	-5.88	42.14	36.26	43.52	-7.26
1170.623	-5.08	40.21	35.13	43.52	-8.39
1414.667	-3.01	38.28	35.27	43.52	-8.25
1725.613	-0.44	36.24	35.80	43.52	-7.72

Remark:
1. All readings are Average values.
2. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Radiated Emission Measurement Data – For intentional radiator- (Under 30MHz)

Results for the radiated measurements below 30MHz according §15.33

Frequency	Measured Values	Remarks
10KHz-30MHz	No emission found, caused by the EUT	This is valid for all the test channels

Remark:
1. Results for the radiated measurements below 30MHz according §15.33

Radiated Emission Measurement Data – For intentional radiator - (Under 1GHz)

Date of Tested	:	Dec. 2, 2004	Polarization	:	Horizontal
Temperature	:	25°C	Humidity	:	53%
Tested Mode	:	Mode 3: 107.9 MHz mode	Distance	:	3m

(For Fundamental Frequency)

Frequency	Factor	Meter Reading (dBuV)		Emission Level (dBuV)		Limits (dBuV)		Margin (dB)	
(MHz)	(dB)	Peak	Average	Peak	Average	Peak	Averag	Peak	Average
107.900	-18.47	52.16	48.23	33.69	29.76	68.00	48.00	-34.31	-18.24

(For Spurious Frequency)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level dB(uV/m)	Limits dB(uV/m)	Margin (dB)
76.075 *	-20.64	40.45	19.81	40.00	-20.19
219.150 *	-13.74	44.74	31.00	46.00	-15.00
267.650 *	-10.79	39.59	28.80	46.00	-17.20
291.900 *	-11.86	44.77	32.91	46.00	-13.09
316.500 *	-10.18	41.94	31.76	46.00	-14.24
556.250 *	-3.42	35.38	31.96	46.00	-14.04
842.375 *	2.03	34.70	36.73	46.00	-9.27

Remark:
1. " * " Mark means readings are Peak Values.
2. " ** " Mark means readings are Quasi-Peak values.
3. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Radiated Emission Measurement Data – For intentional radiator - (Above 1GHz)

Date of Tested	:	Dec. 2, 2004	Polarization	:	Horizontal
Temperature	:	25°C	Humidity	:	53%
Tested Mode	:	Mode 3: 107.9 MHz mode	Distance	:	3m

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level dB(uV/m)	Limits dB(uV/m)	Margin (dB)
1084.121	-3.84	43.36	39.52	54.00	-14.48
1152.562	-398.24	436.78	38.54	54.00	-15.46
1231.859	-4.55	44.22	39.67	54.00	-14.33
1617.642	-1.32	45.11	43.79	54.00	-10.21

Remark:
1. " * " Mark means readings are Peak Values.
2. " ** " Mark means readings are Quasi-Peak values.
3. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Radiated Emission Measurement Data – For intentional radiator - (Under 1GHz)

Date of Tested	:	Dec. 2, 2004	Polarization	:	Vertical
Temperature	:	25°C	Humidity	:	53%
Tested Mode	:	Mode 3: 107.9 MHz mode	Distance	:	3m

(For Fundamental Frequency)

Frequency	Factor	Meter Reading (dBuV)		Emission Level (dBuV)		Limits (dBuV)		Margin (dB)	
(MHz)	(dB)	Peak	Average	Peak	Average	Peak	Averag	Peak	Averag
107.900	-15.97	44.01	39.64	28.04	23.67	68.00	48.00	-39.96	-24.33

(For Spurious Frequency)

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level dB(uV/m)	Limits dB(uV/m)	Margin (dB)
97.900 *	-17.74	46.21	28.47	40.00	-11.53
131.850 *	-14.08	39.65	25.57	43.50	-17.93
219.150 *	-13.59	42.19	28.60	46.00	-17.40
289.475 *	-13.97	39.01	25.04	46.00	-20.96
313.725 *	-9.05	39.19	30.14	46.00	-15.86
447.100 *	-6.72	35.20	28.48	46.00	-17.52
483.475 *	-5.94	34.50	28.56	46.00	-17.44
793.875 *	0.25	36.50	36.75	46.00	-9.25
842.375 *	0.29	37.01	37.30	46.00	-8.70

Remark:
1. " * " Mark means readings are Peak Values.
2. " ** " Mark means readings are Quasi-Peak values.
3. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Radiated Emission Measurement Data – For intentional radiator - (Above1GHz)

Date of Tested	:	Dec. 2, 2004	Polarization	:	Vertical
Temperature	:	25°C	Humidity	:	53%
Tested Mode	:	Mode 3: 107.9 MHz mode	Distance	:	3m

Frequency (MHz)	Factor (dB)	Meter Reading (dBuV)	Emission Level dB(uV/m)	Limits dB(uV/m)	Margin (dB)
1084.286	-5.83	42.95	37.12	54.00	-16.88
1152.857	-5.24	46.61	41.37	54.00	-12.63
1231.429	-4.55	45.91	41.36	54.00	-12.64
1617.143	-1.33	46.73	45.40	54.00	-8.60

Remark:
1. " * " Mark means readings are Peak Values.
2. " ** " Mark means readings are Quasi-Peak values.
3. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

5.9 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor, High Pass Filter Loss(if used) and Cable Loss, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss + High Pass Filter Loss - Amplifier Gain

6 ANTENNA REQUIREMENT

6.1 Standard Applicable

For intentional radiator, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

6.2 Antenna Construction

This device antenna. Please see photo of EUT (**Page 44**).

7 26dB Bandwidth Measurement

7.1 Standard Applicable

According to 15.239, 26dB Bandwidth of fundamental emission from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108MHz.

7.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in page 41. Turn on the EUT power, and connect antenna to spectrum analyzer RF input. Then set to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 10 kHz with a convenient frequency span including 200kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display to read the actual bandwidth.

7.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Serial NO.	Next Calibration
Spectrum Analyzer	R&S	FSP-B3	100215	2004/11/02

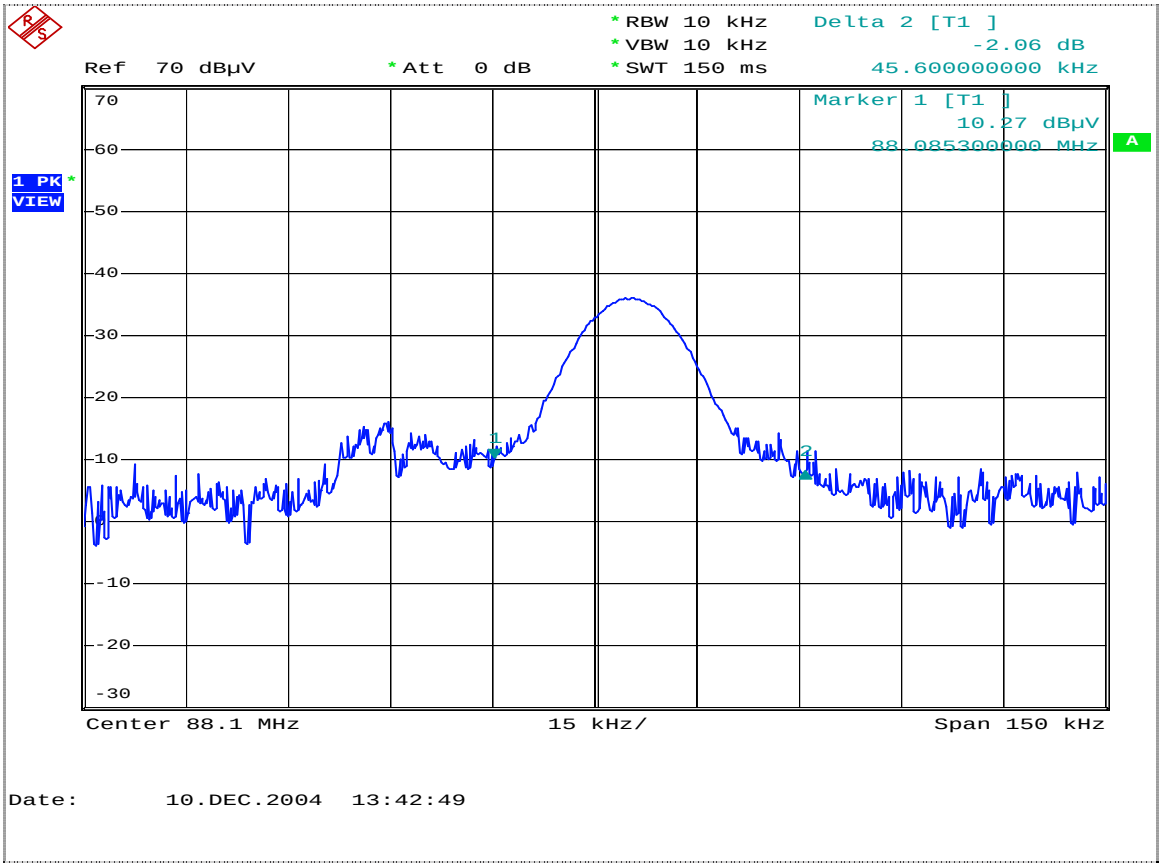
7.4 Measurement Data

Test Date: Dec 1, 2004. Temperature: 25 ℃ Humidity: 58 %

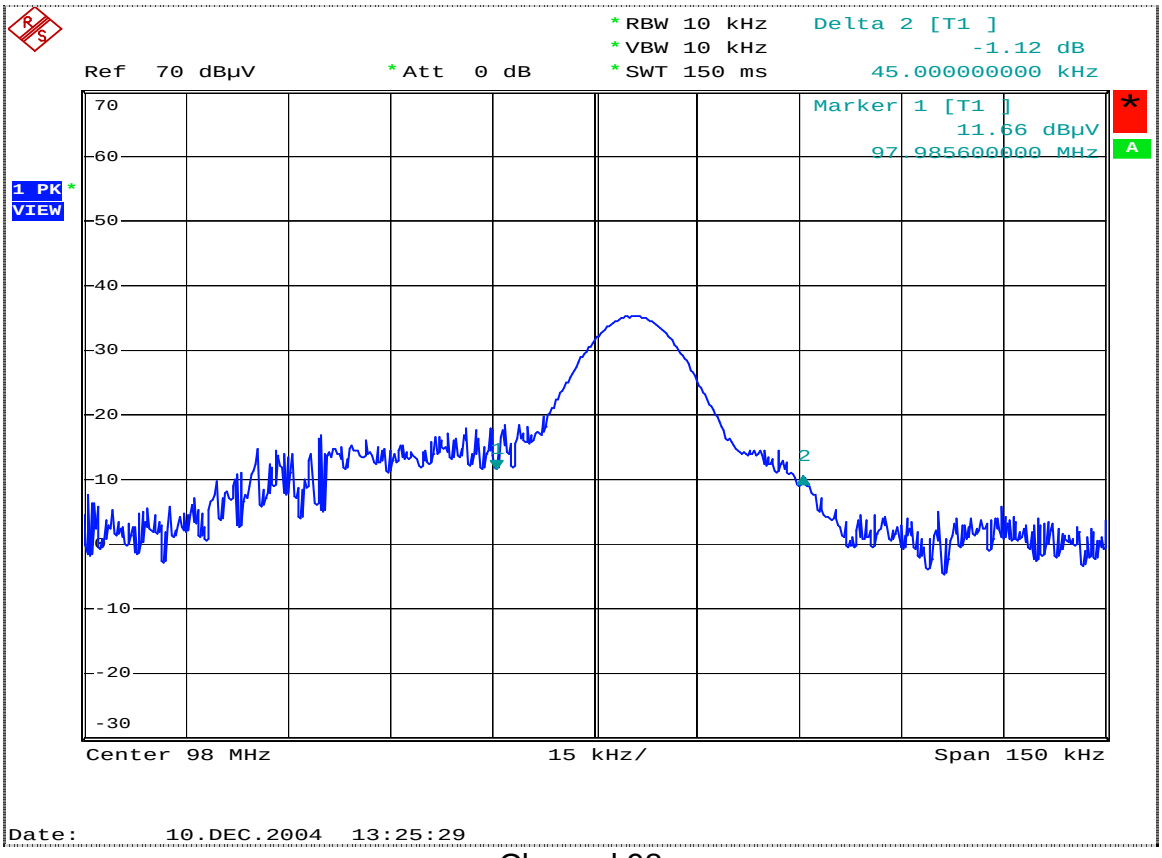
Center Frequency	26dB Bandwidth	Limits
88.1071	45.6 kHz	200kHz
98.0069	45.0 kHz	200kHz
107.9007	44.1 kHz	200kHz

Note: 1. Measurement data were shown on page 46~47.

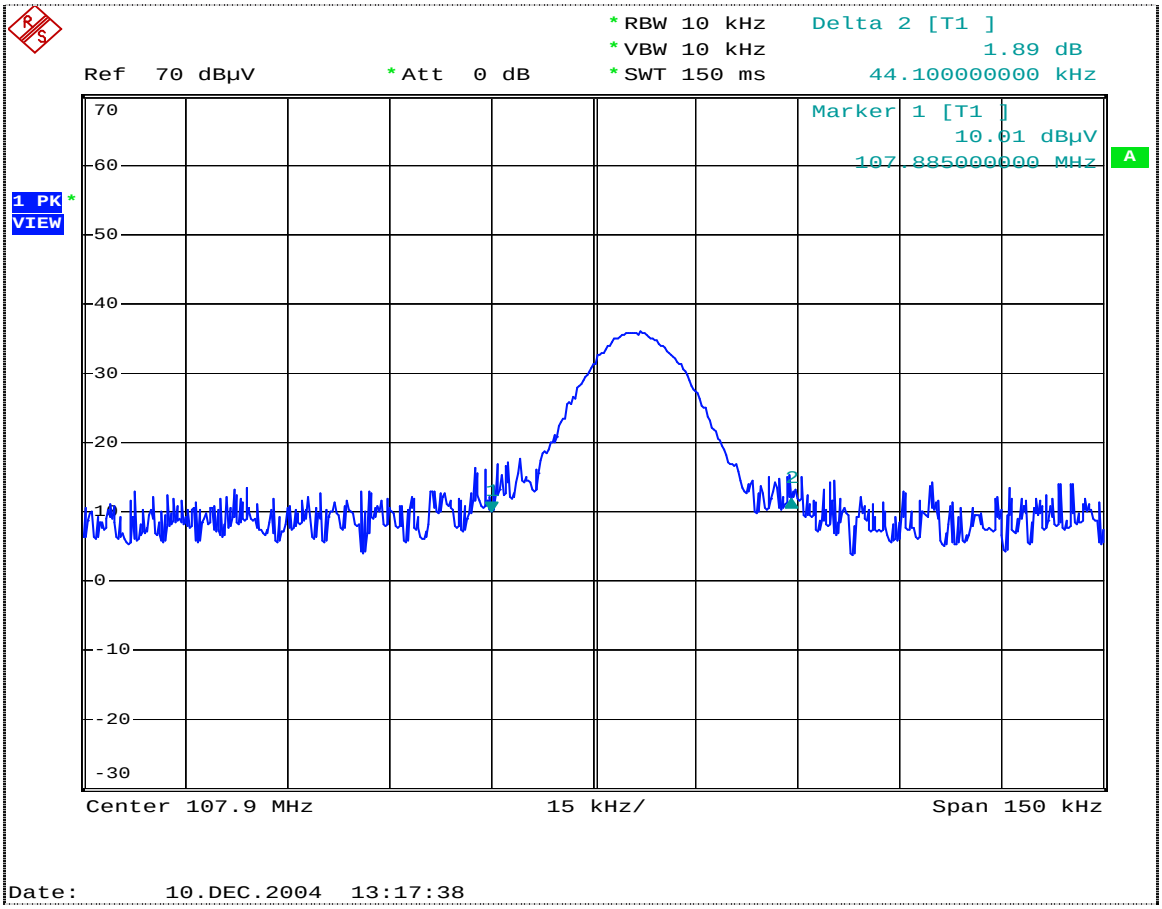
Appendix 1: 200 kHz BANDWIDTH OF BAND EDGES MEASUREMENT



Channel 88.1



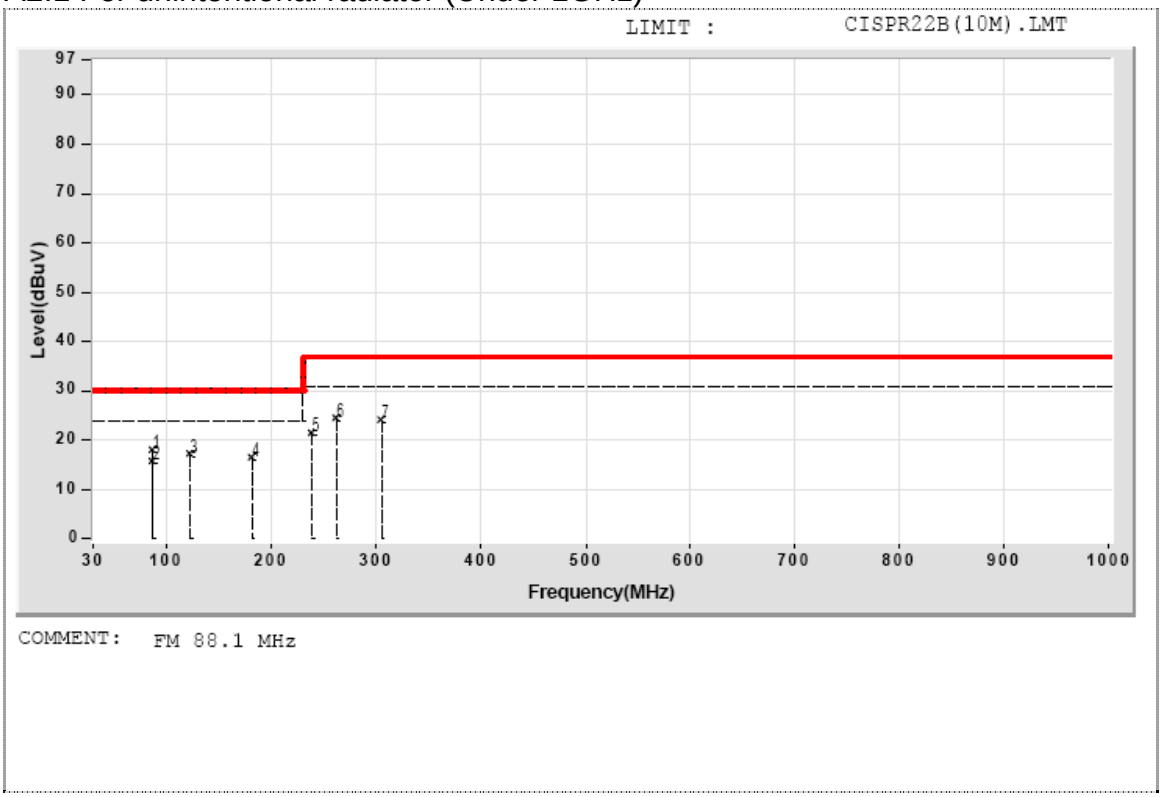
Channel 98



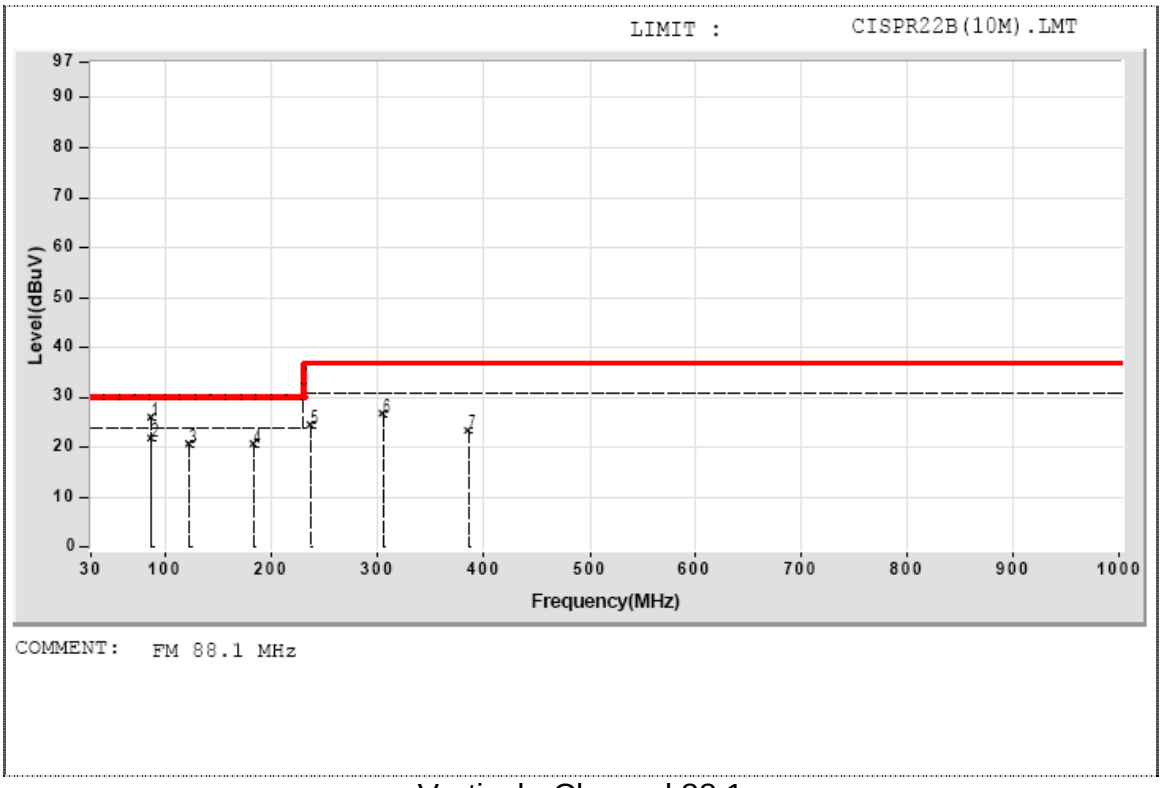
Channel 107.9

Appendix 2: Radiated Measurement Waveform

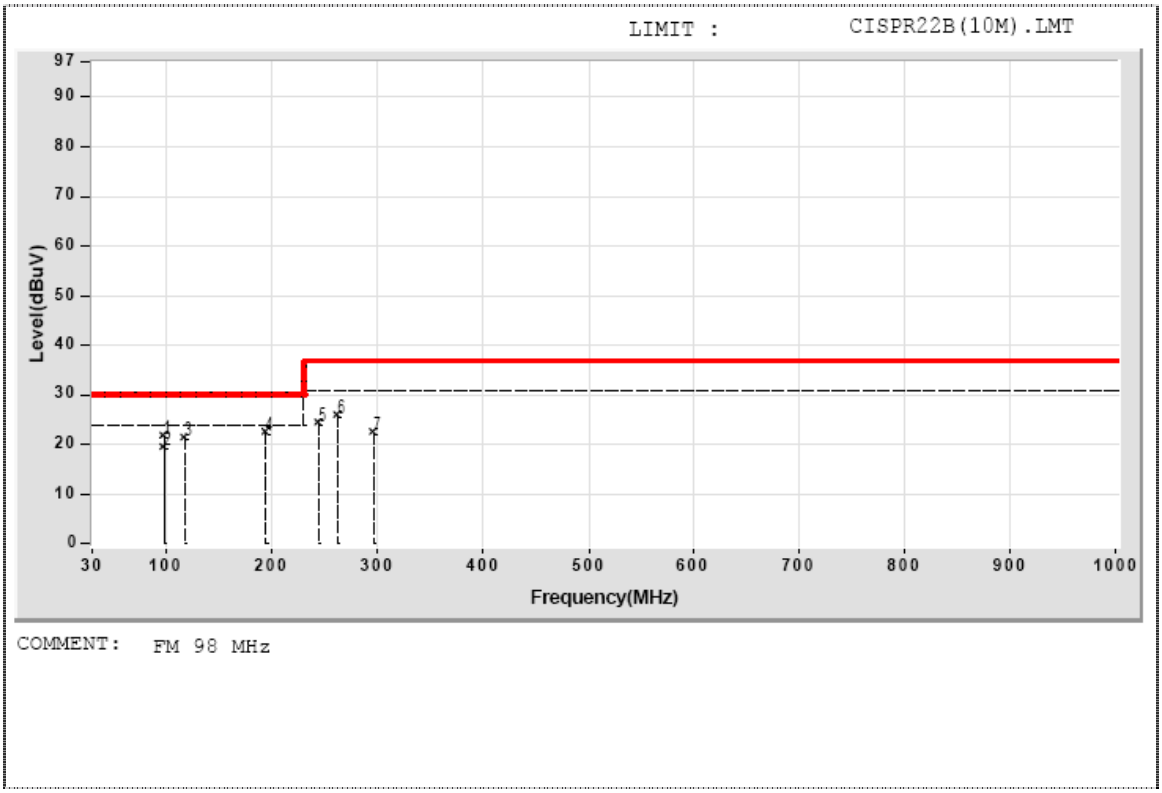
A2.1 For unintentional radiator (Under 1GHz)



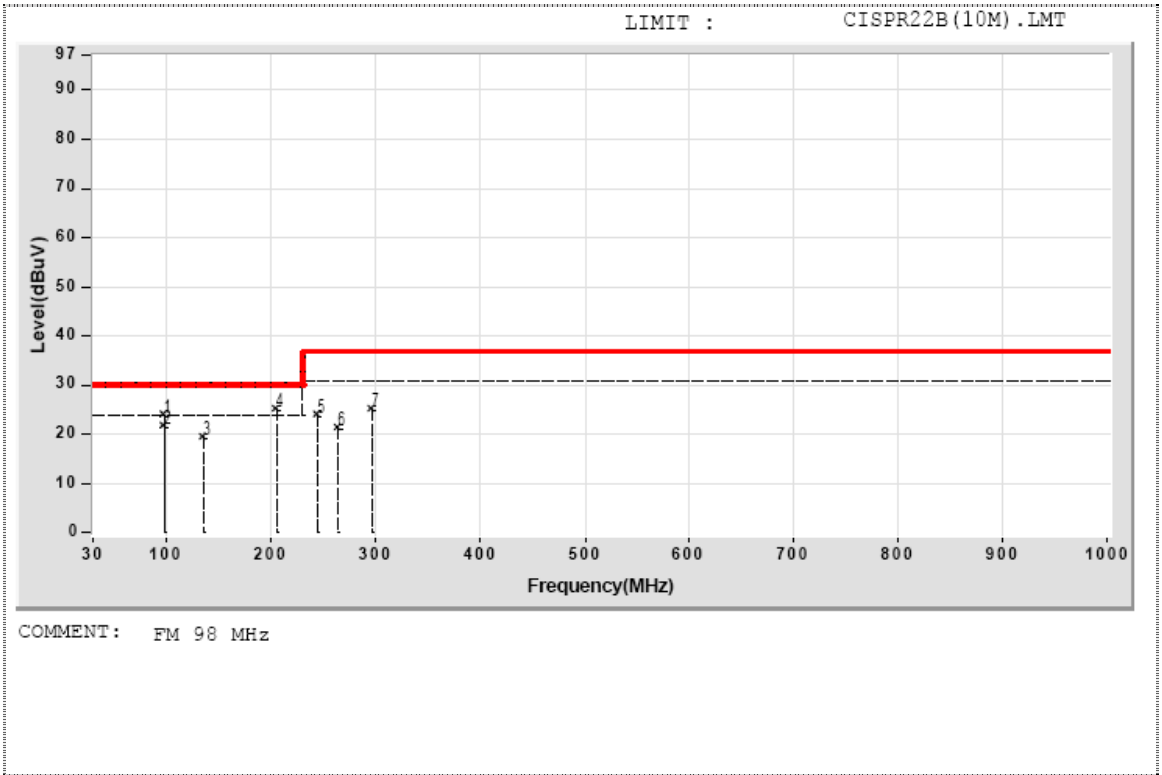
Horizontal - Channel 88.1



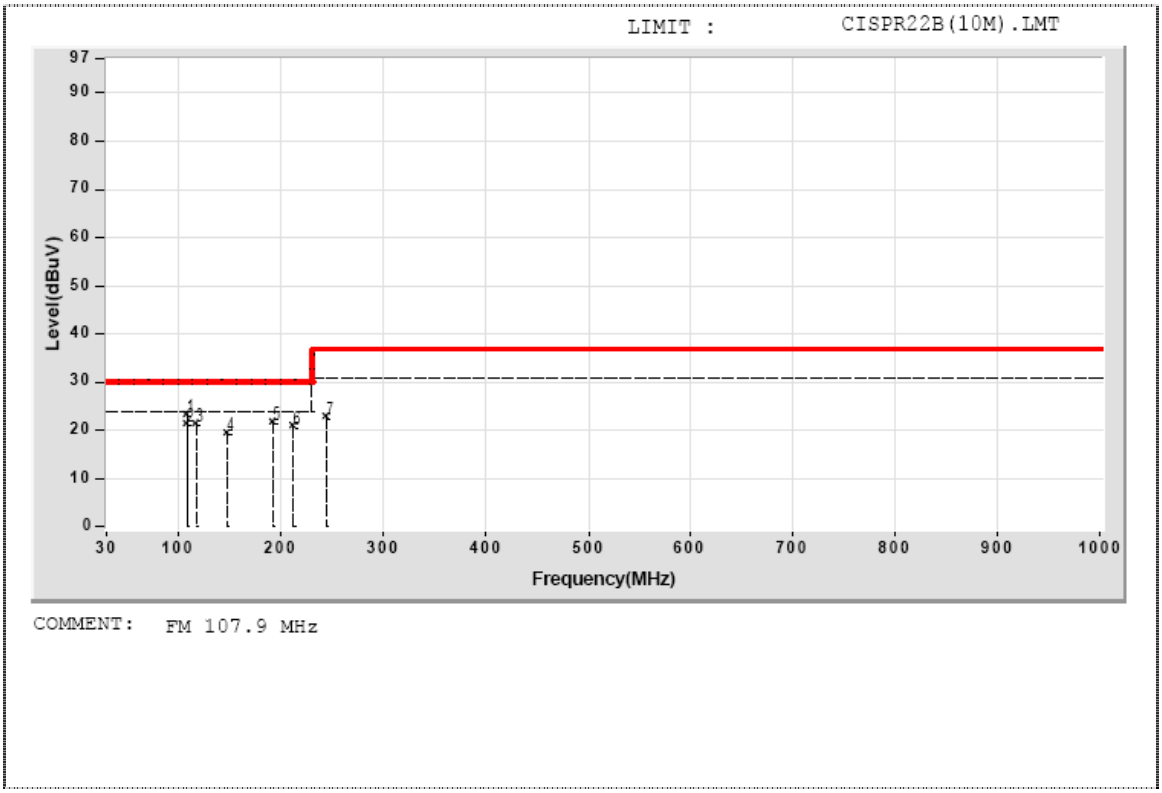
Vertical - Channel 88.1



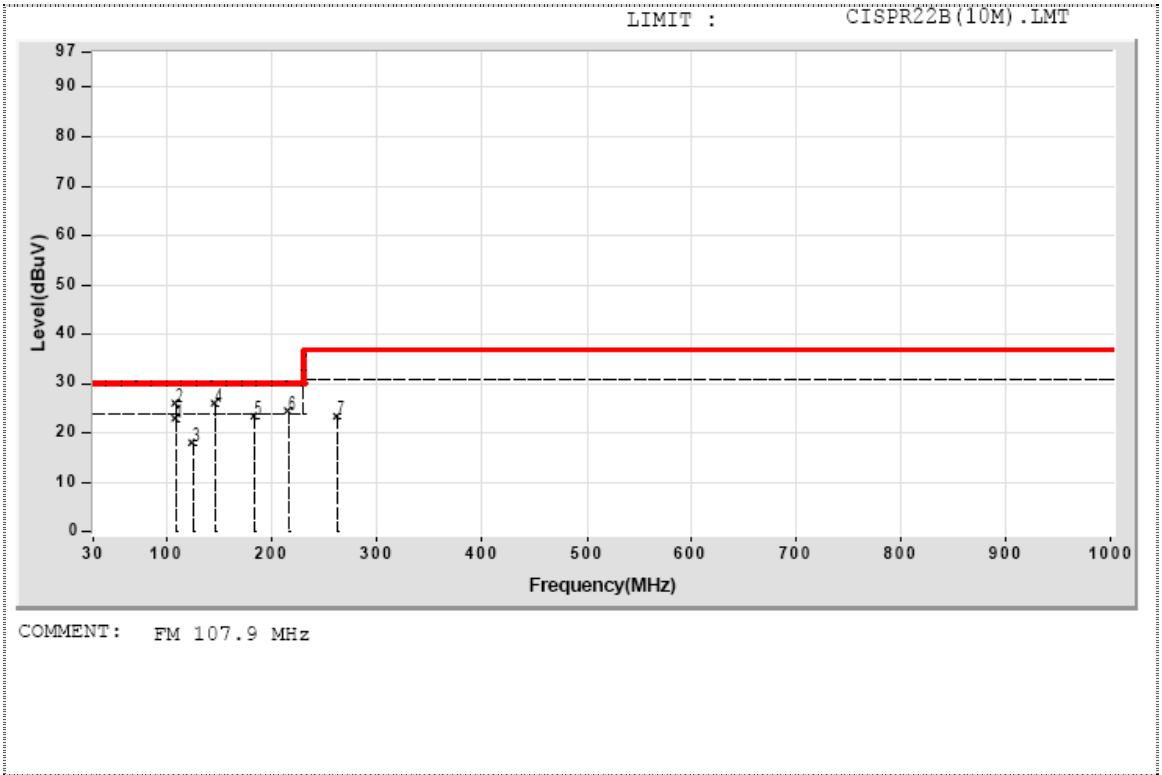
Horizontal - Channel 98



Vertical - Channel 98

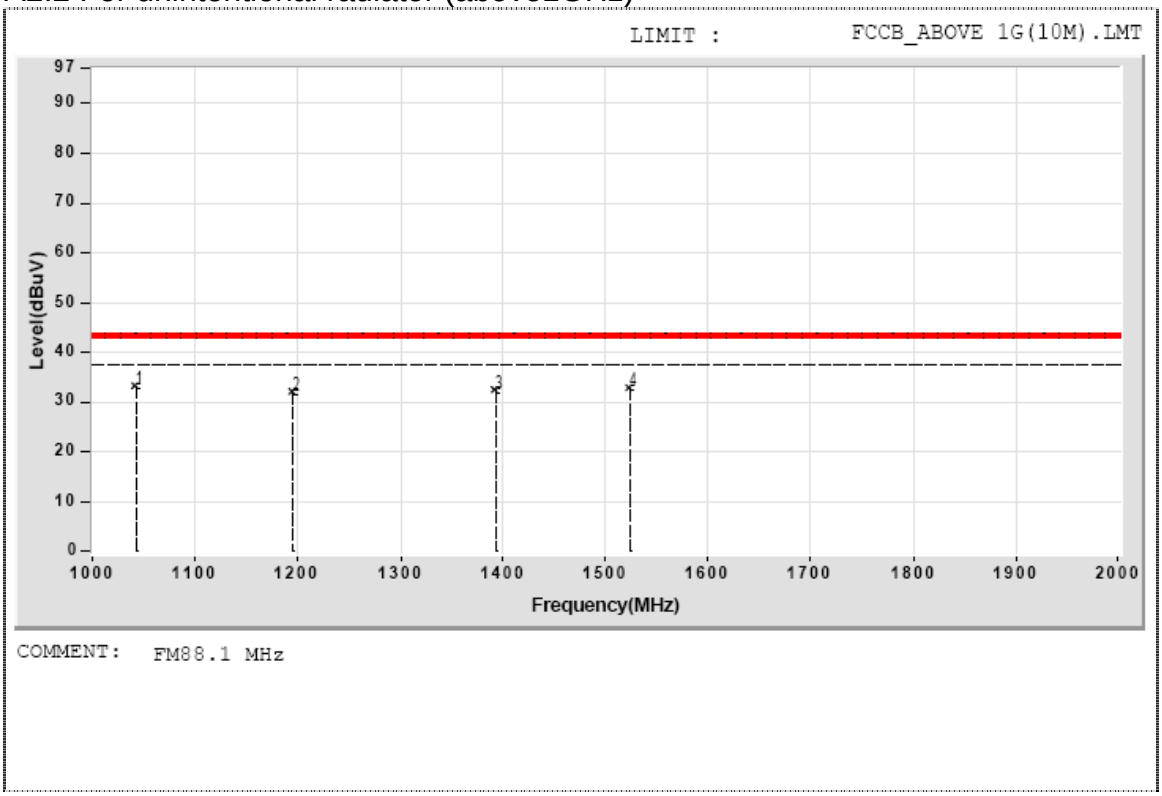


Horizontal - Channel 107.9

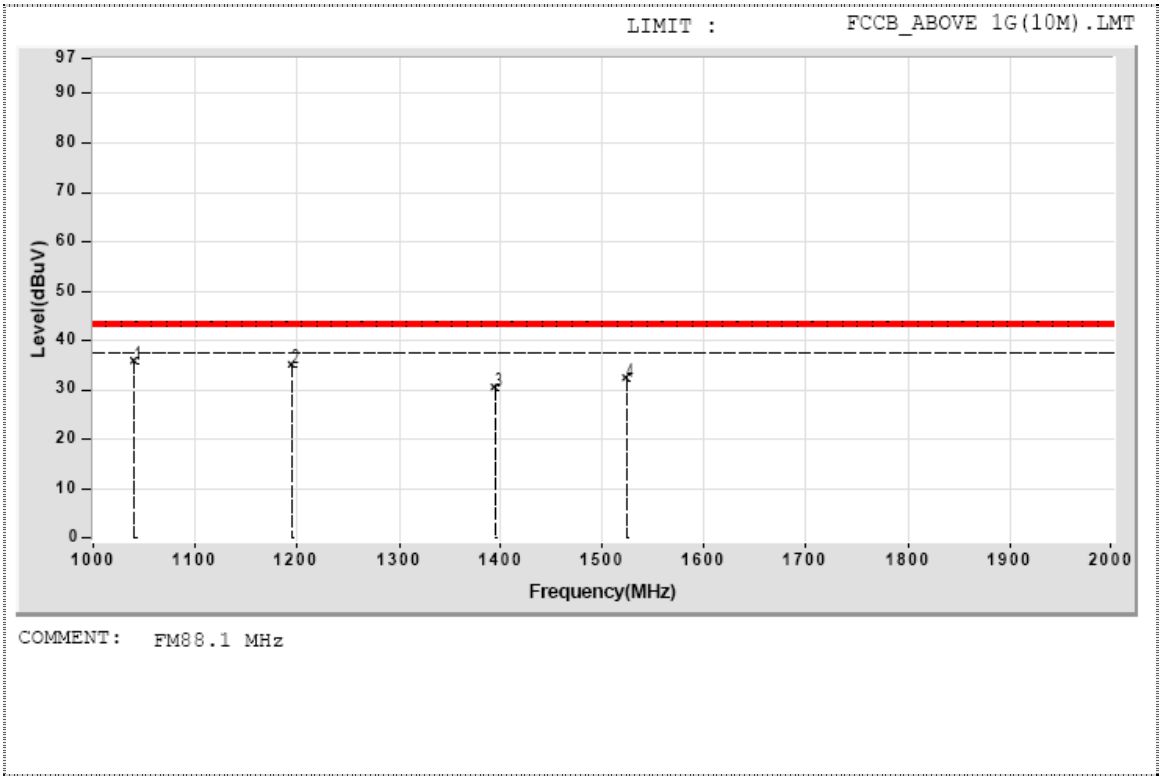


Vertical - Channel 107.9

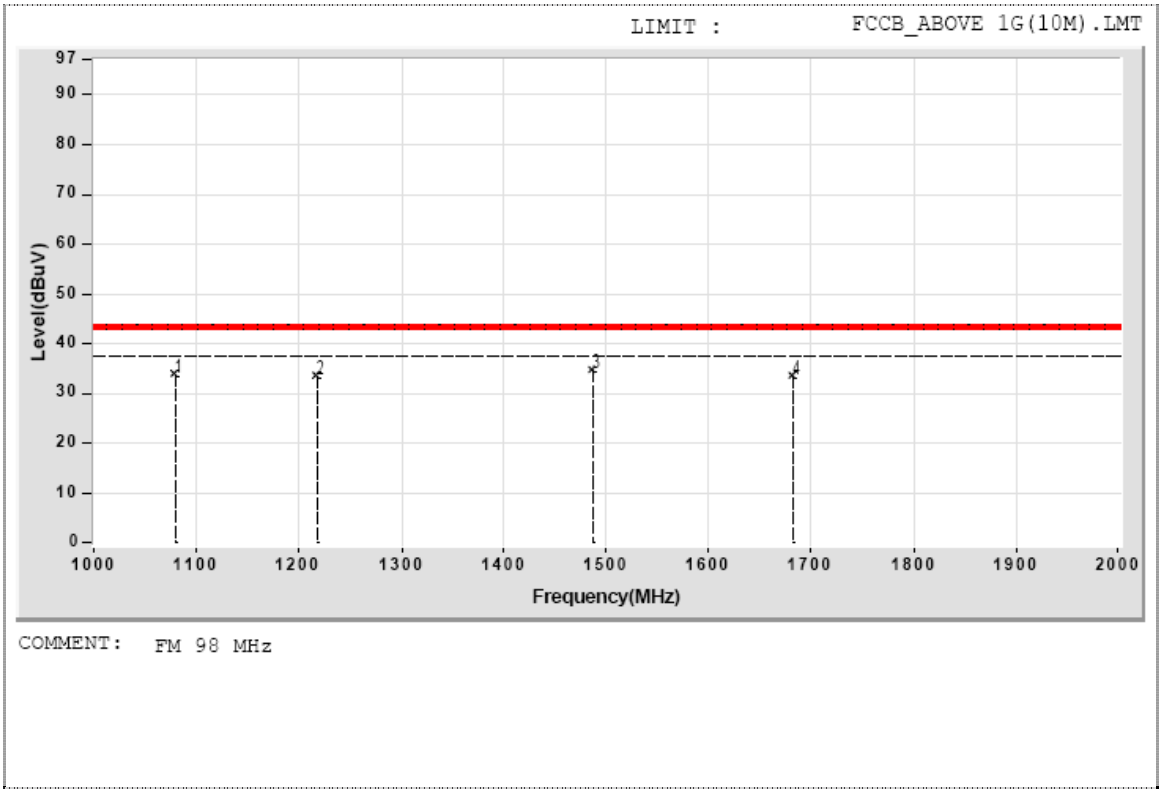
A2.2 For unintentional radiator (above1GHz)



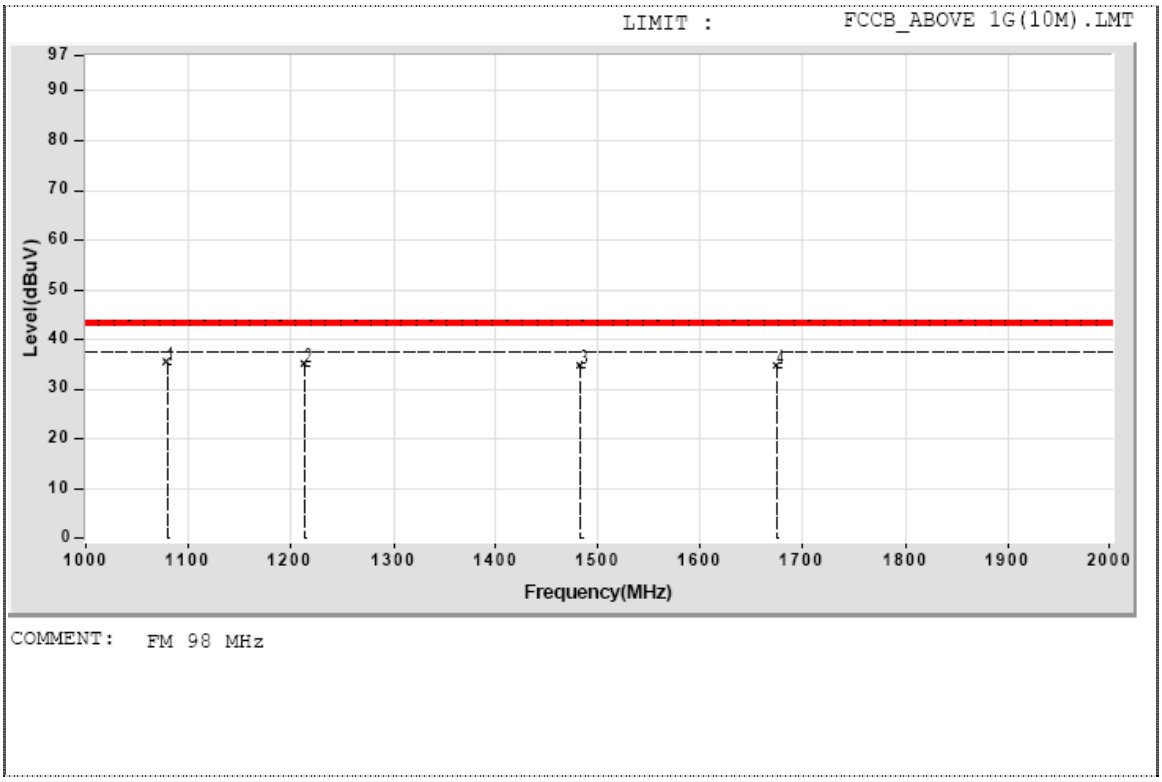
Horizontal - Channel 88.1



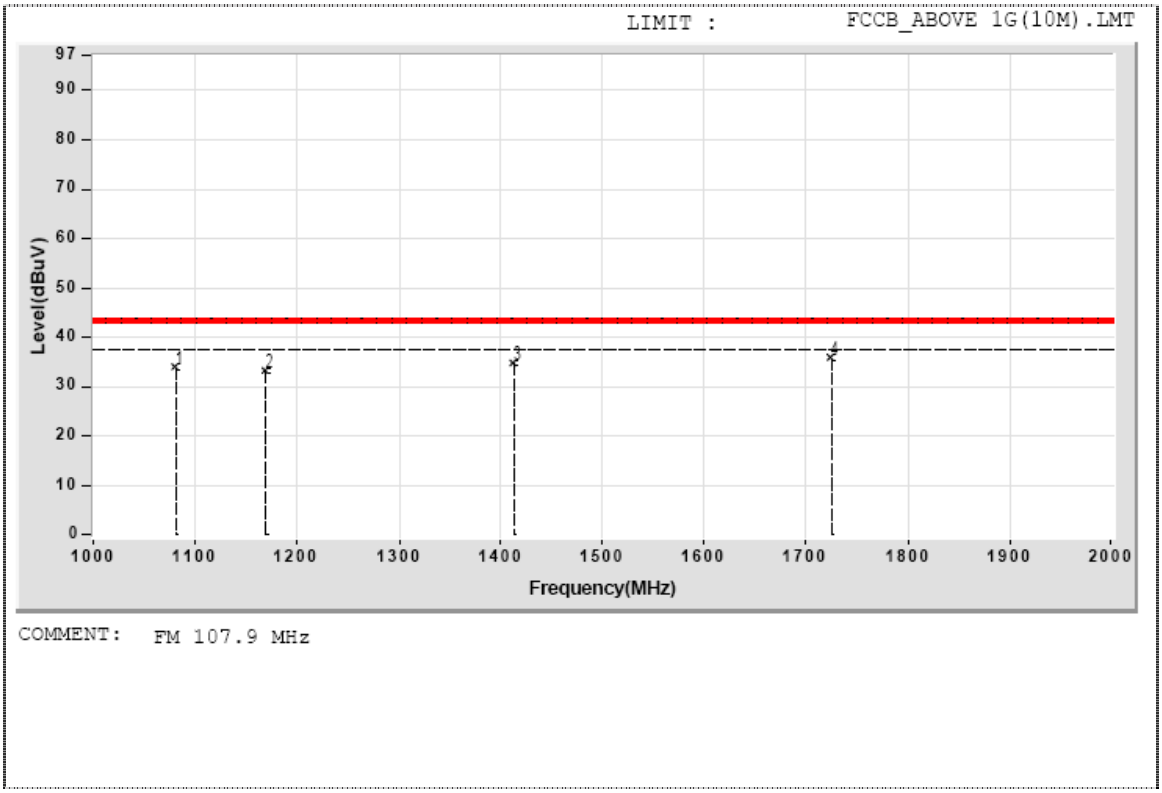
Vertical - Channel 88.1



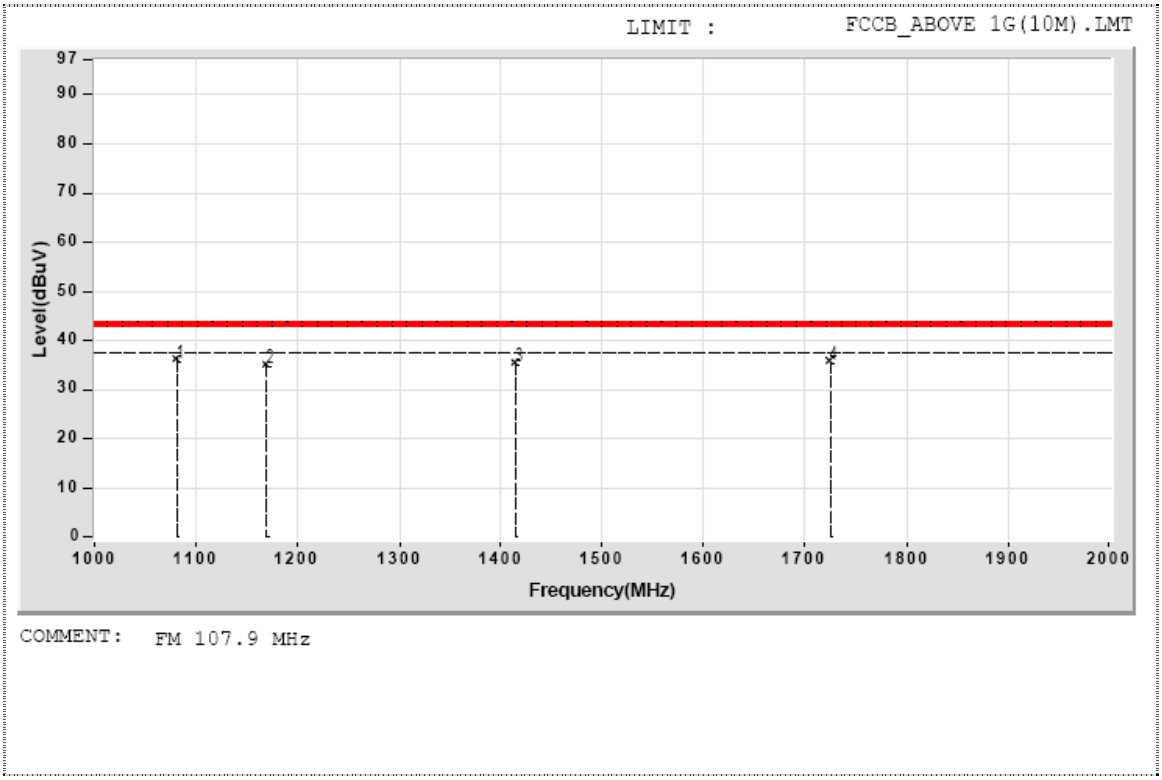
Horizontal - Channel 98



Vertical - Channel 98

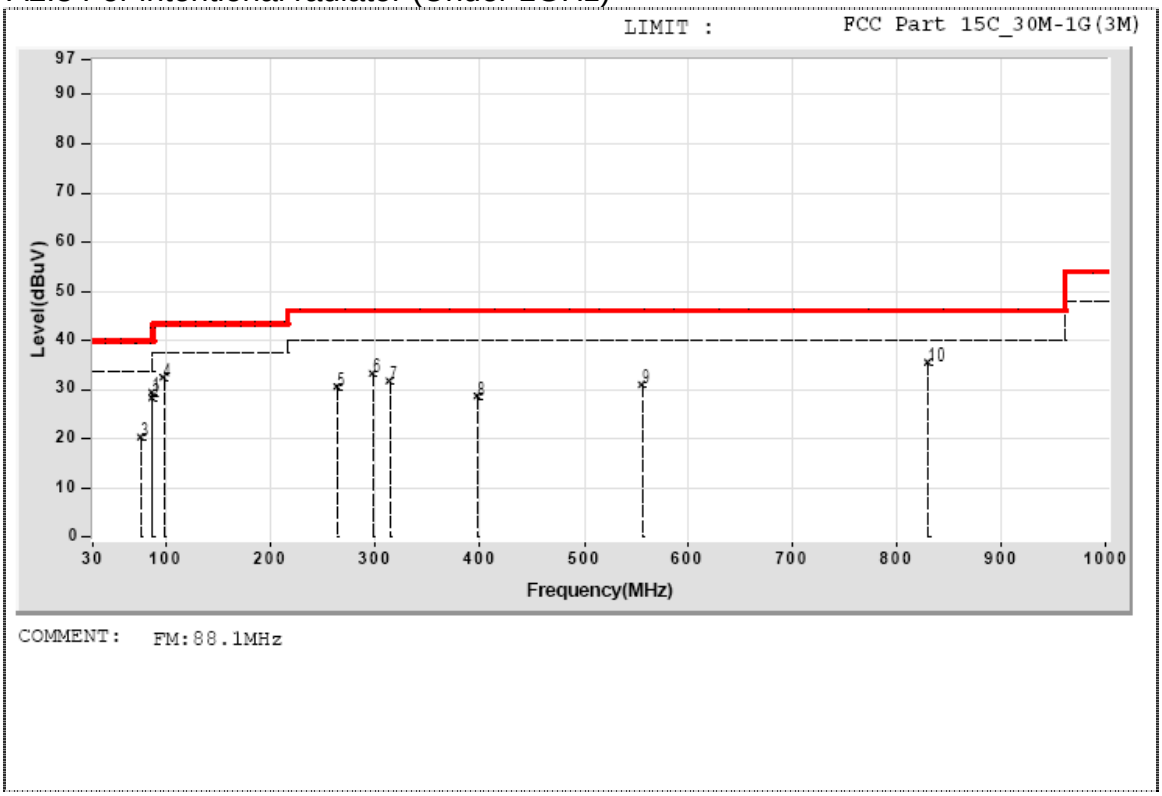


Horizontal - Channel 107.9

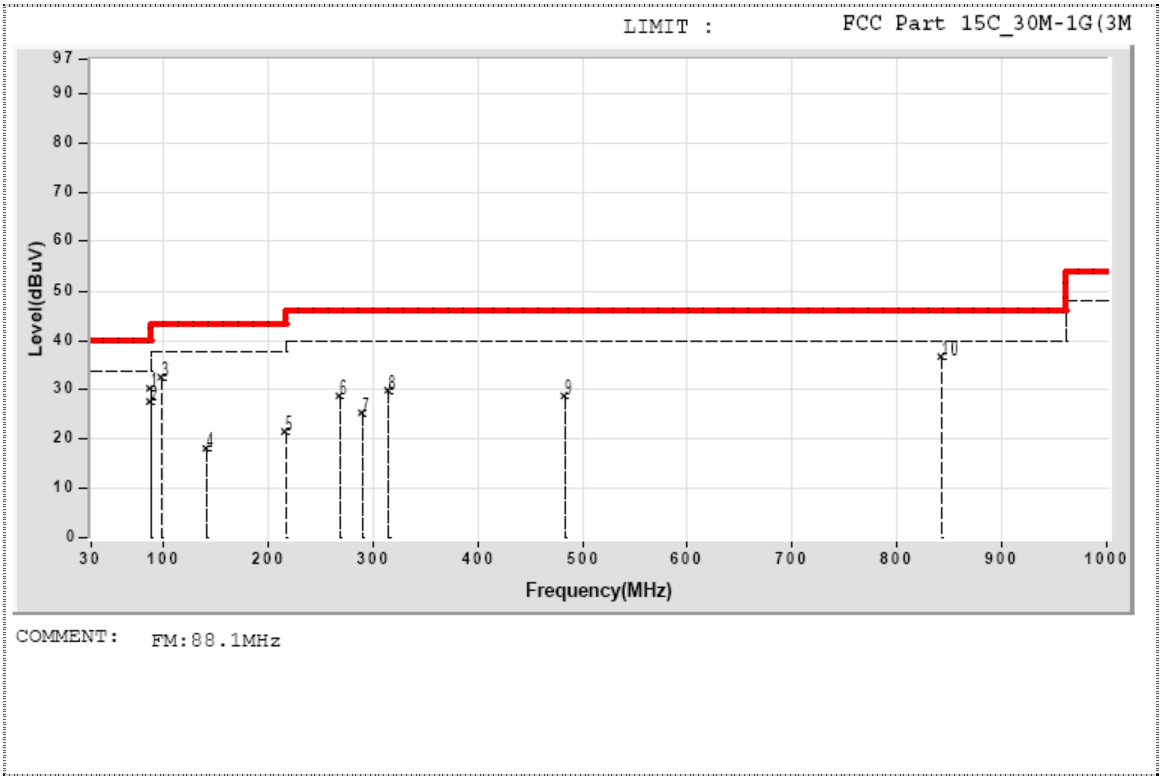


Vertical - Channel 107.9

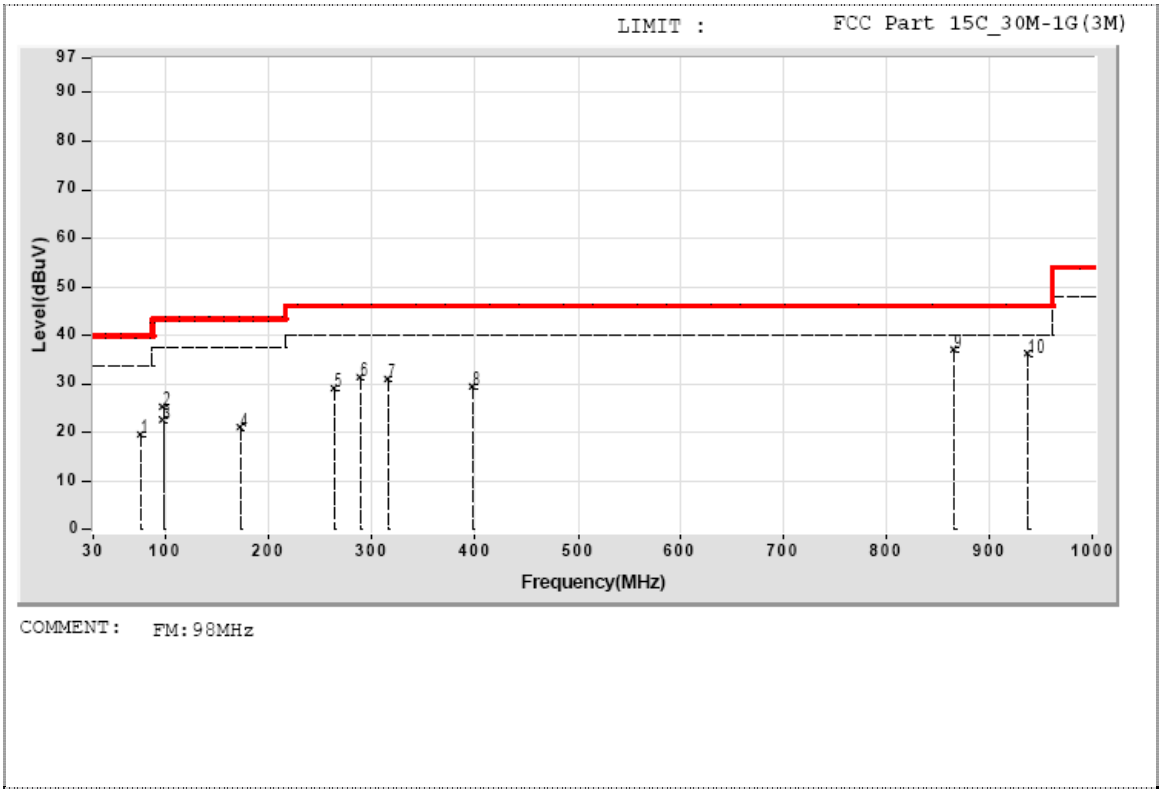
A2.3 For intentional radiator (Under 1GHz)



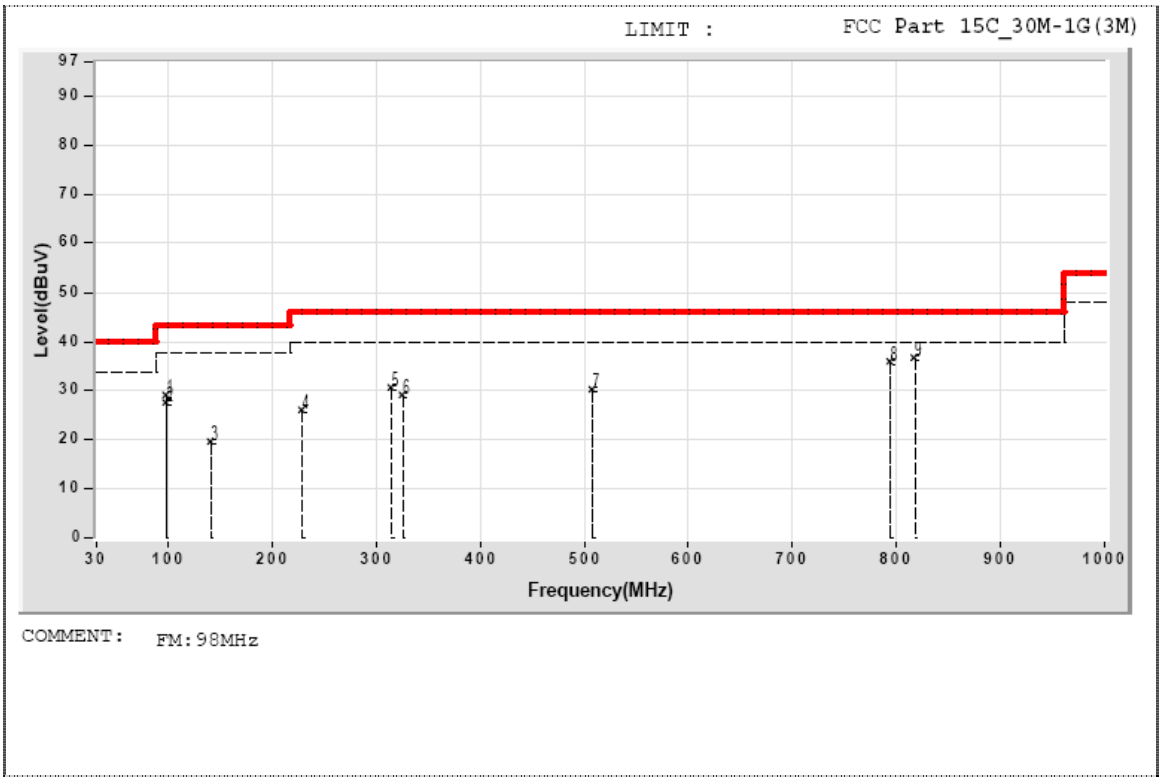
Horizontal - Channel 88.1



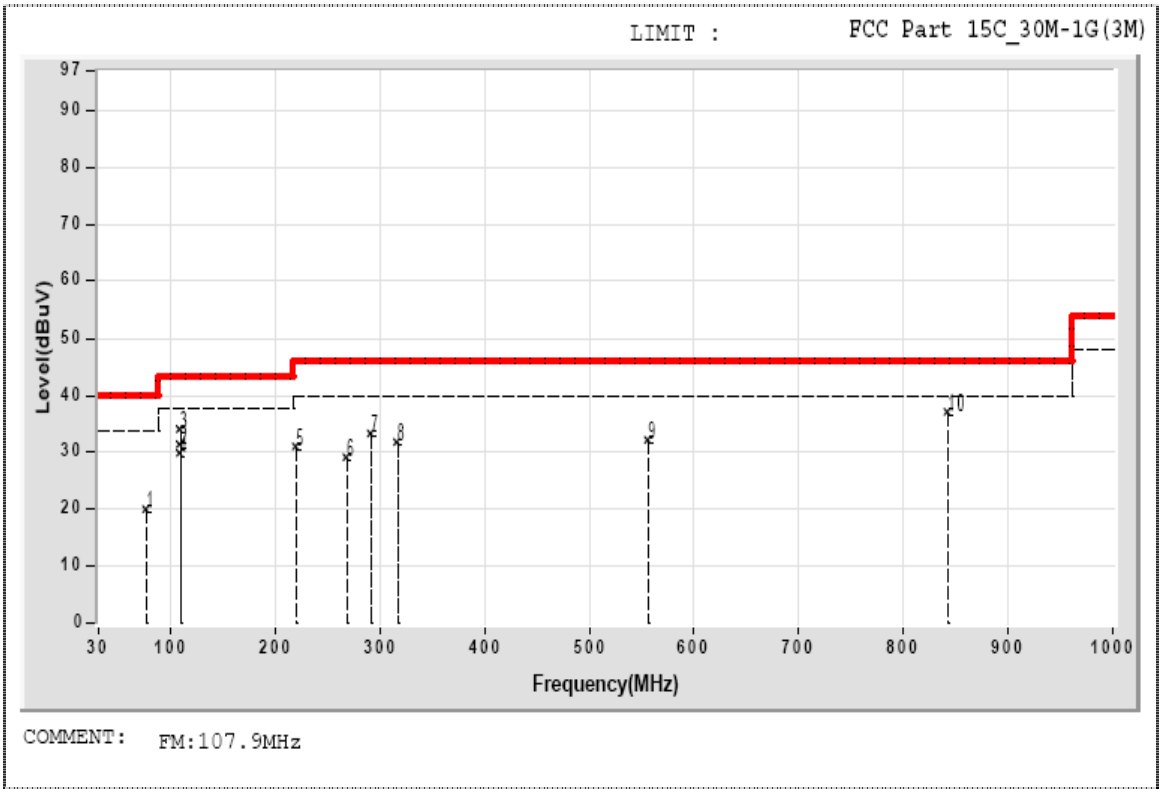
Vertical - Channel 88.1



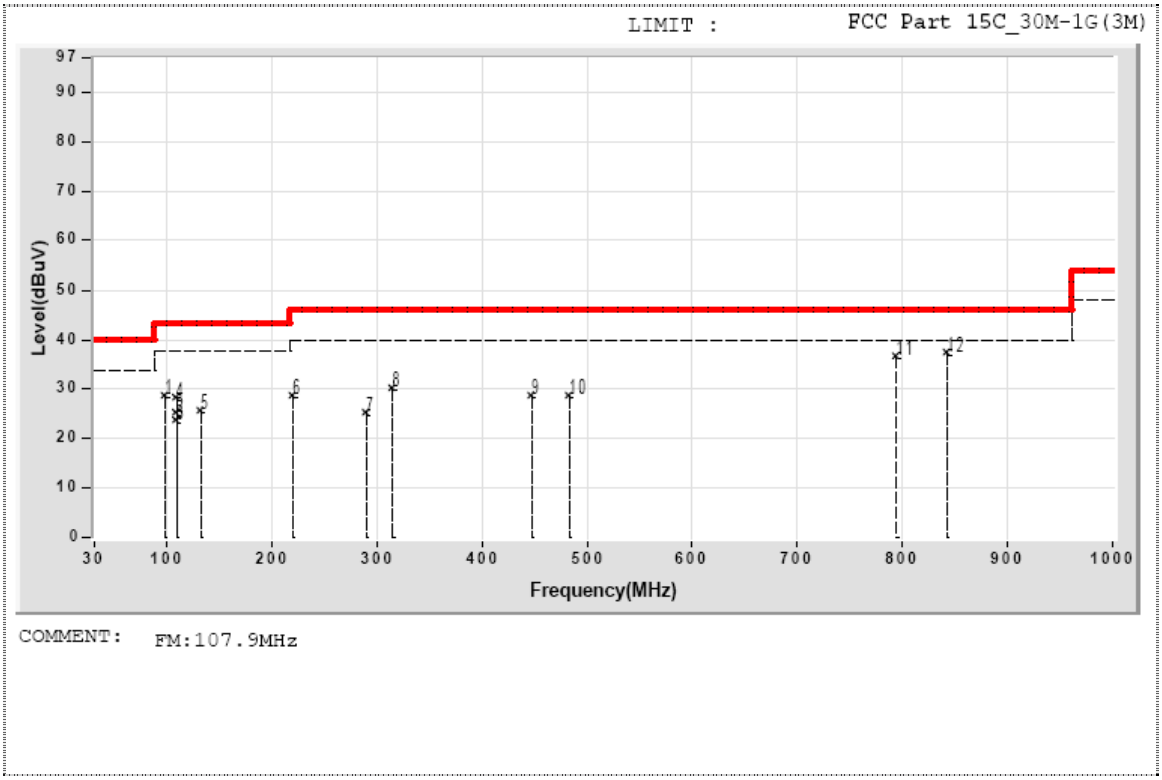
Horizontal - Channel 98



Vertical - Channel 98

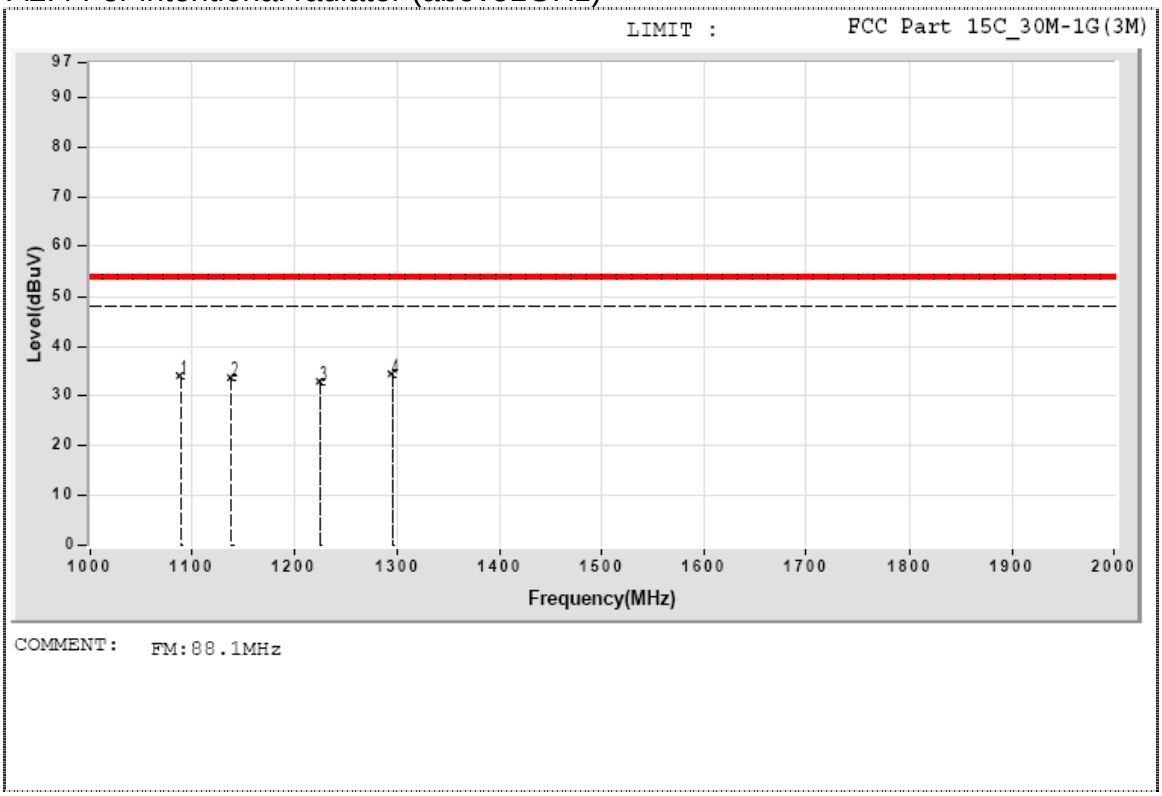


Horizontal - Channel 107.9

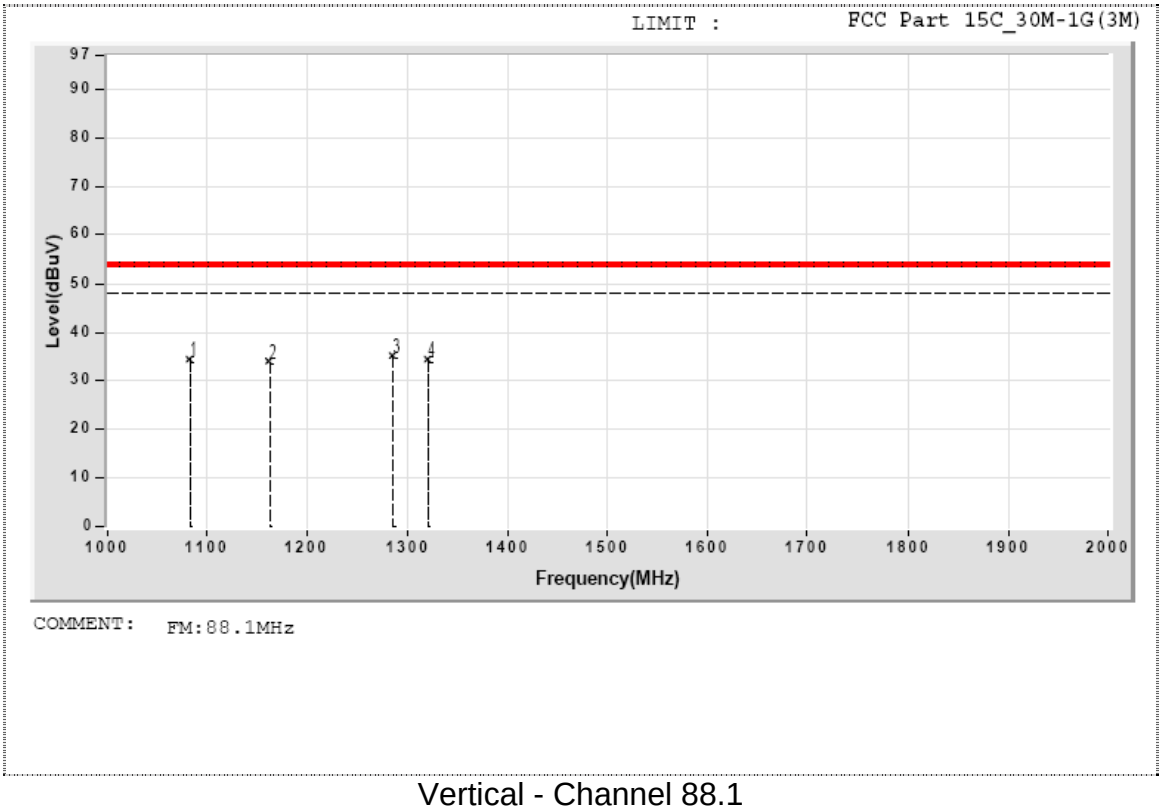


Vertical - Channel 107.9

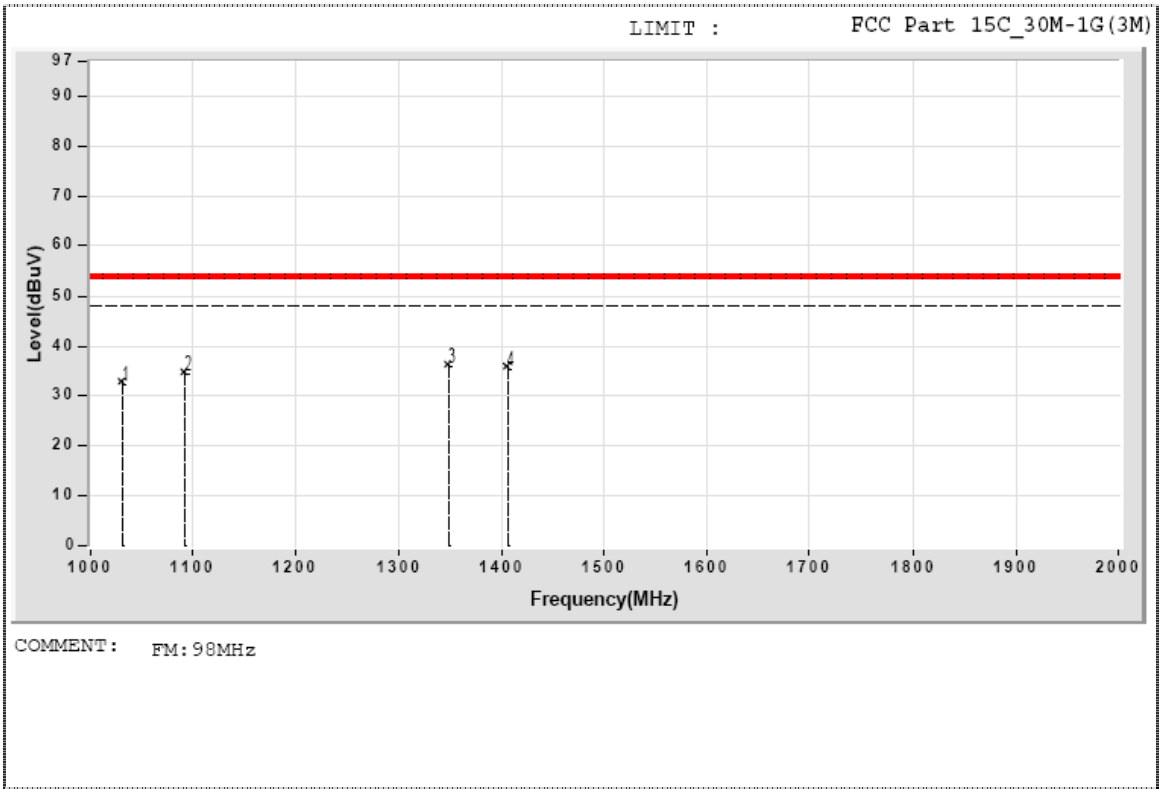
A2.4 For intentional radiator (above1GHz)



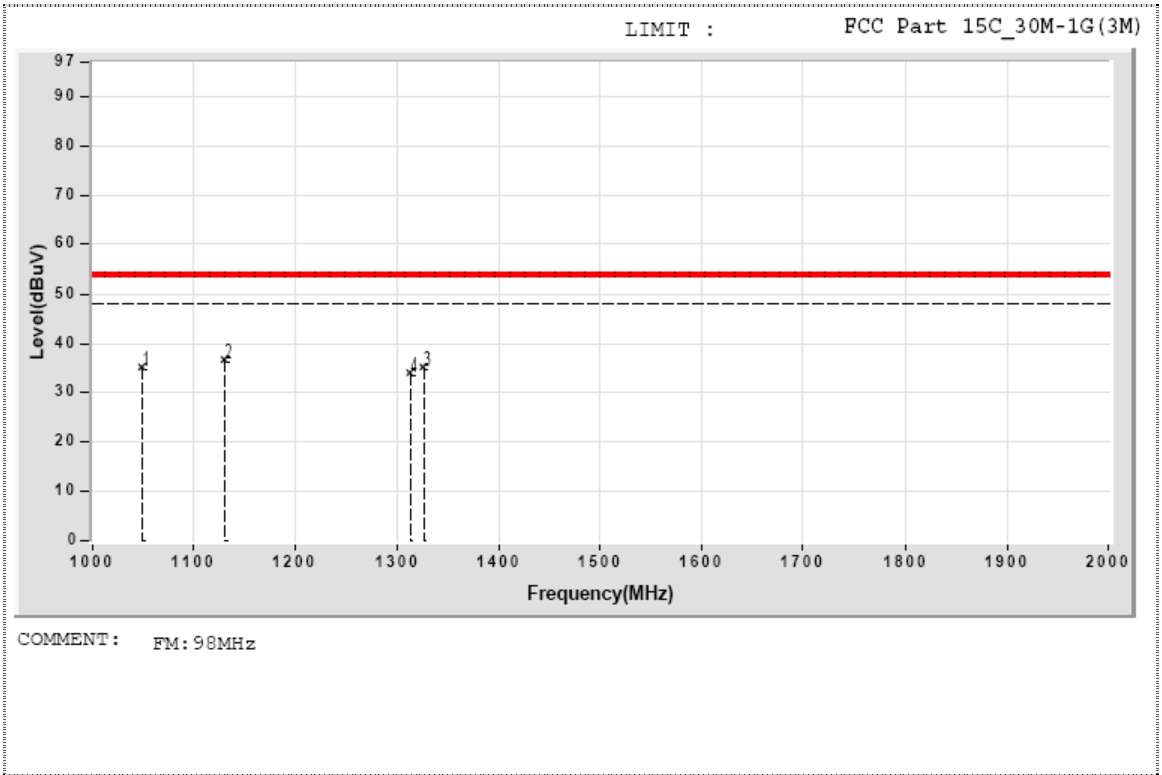
Horizontal - Channel 88.1



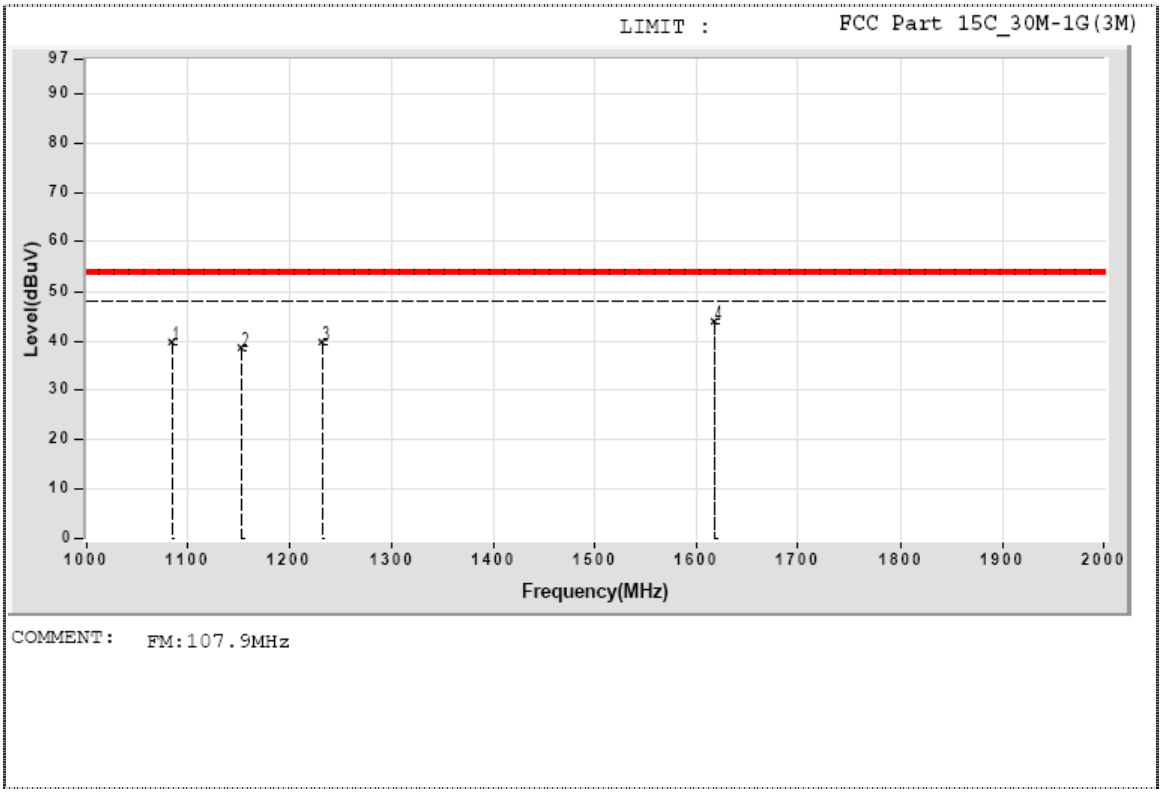
Vertical - Channel 88.1



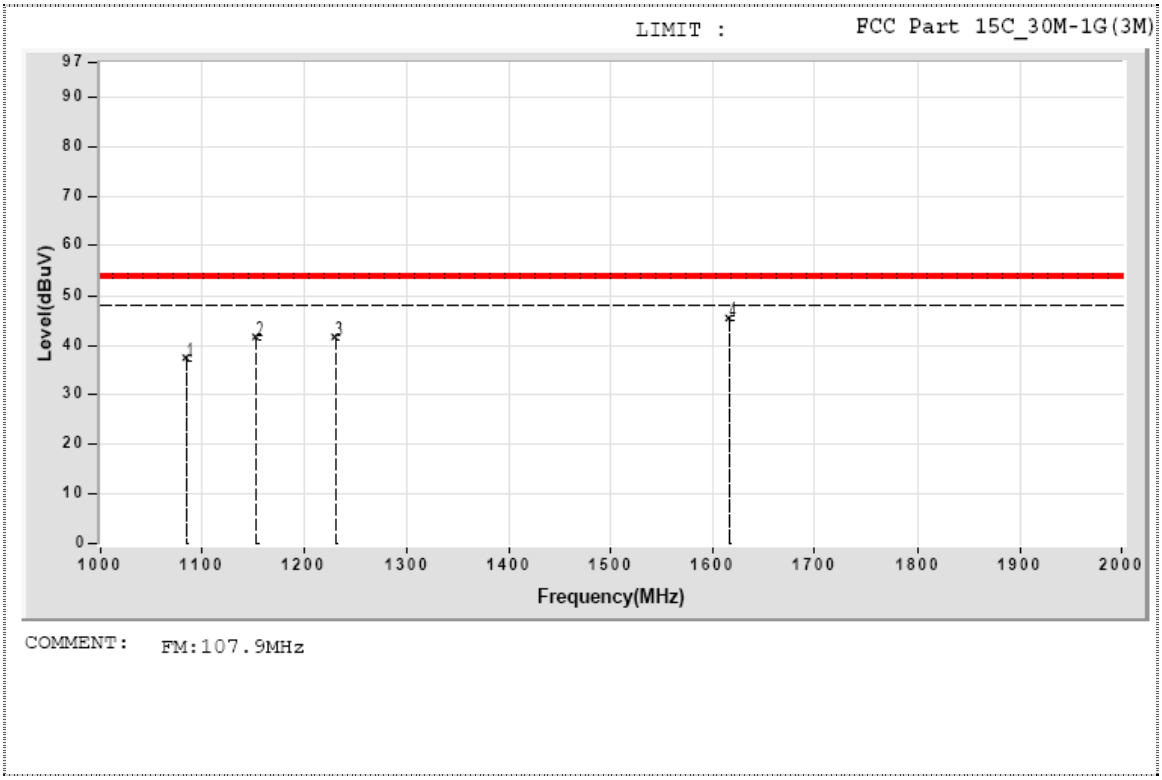
Horizontal - Channel 98



Vertical - Channel 98



Horizontal - Channel 107.9



Vertical - Channel 107.9