



FCC Test Report

FCC Part 15.407 for UNII Devices/ CANADA RSS-210 issue 5 for Lelean Devices

FOR:

NOTEBOOK PC

MODEL #: PCG-6J1L

SONY CORPORATION
6-7-35, KITASHINAGAWA, SHINAGAWA-KU
TOKYO 141-0001
JAPAN

FCC ID: AK8PCG6J1L
IC ID: 409-BPCG6J1L

TEST REPORT #: SONYE_004_05002_15.407A
DATE: JANUARY 24, 2006



TTI-P-G 081/94-A0

Accredited according to ISO/IEC 17025



Bluetooth Qualification
Test Facility
(BQTF)



FCC listed # 101450

IC recognized # 3925

CETECOM Inc.

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Board of Directors: Dr. Harald Ansorge, Dr. Klaus Matkey, Hans Peter May



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1 Assessment

The following is in compliance with the applicable criteria specified in FCC rules Part 15.407 of the Code of Federal Regulations and in compliance with the applicable criteria specified in Industry Canada rules RSS210.

Company	Description	Model #
SONY CORP.	NOTEBOOK PC	PCG-6J1L

2006-01-24
Neelesh Raj
Project Leader

2006-01-24
Lothar Schmidt
Test Lab Manager

The test results of this test report relate exclusively to the test item specified in Identification of the Equipment under Test. The CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM Inc USA.



2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	CETECOM Inc.
Department:	EMC
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Responsible Test Lab Manager:	Lothar Schmidt
Responsible Project Leader:	Neelesh Raj
Date of test:	2006-01-17 to 2006-01-24

2.2 Identification of the Client

Applicant's Name:	SONY Corporation
Street Address:	6-7-35, Kitashinagawa, Shinagawa-ku,
City/Zip Code	Tokyo 141-0001
Country	Japan
Contact Person:	Takumi Ozawa
Phone No.	81-3-5795-8716
Fax:	81-3-5795-8981
e-mail:	ozawa@sm.sony.co.jp

2.3 Identification of the Manufacturer

Manufacturer's Name:	Sony EMCS Corporation
Manufacturers Address:	5432 Toyoshima, Azumino-shi,
City/Zip Code	Nagano 399-8282,
Country	Japan



3 Equipment under Test (EUT)

3.1 Identification of the Equipment under Test

Marketing Name:	VAIO-VGN SZ
Description:	NOTEBOOK PC
Model No:	PCG-6J1L
FCC ID:	AK8PCG6J1L
IC ID:	409-BPCG6J1L
Frequency Range:	5150-5250MHz, 5250-5350MHz
*Type(s) of Modulation:	Ofdm
Number of Channels:	29
Antenna Type:	λ/monopole (Inverted F Antenna)
Output Power:	a mode: 0.05754W EIRP@5180MHz a mode: 0.12218W EIRP@5260MHz a mode: 0.14060W EIRP@5320MHz

***This report contains data for FCC15.407 “a” mode for all “b” and “g” mode data please see report SONYE_004_05002_15.247BG and for FCC15.247 “a” mode data please see report SONYE_004_05002_15.247A.**

3.2 Identification of Accessory equipment

TYPE	MANF.	MODEL
AC ADAPTER	SONY	VGP-AC19V10



4 Subject Of Investigation

All testing was performed on the PCG-6J1L referred to as EUT. The EUT carries a pre-certified WLAN module with FCC ID# PD9WM3945ABG. This test report contains full radiated testing as per FCC15.407 on the EUT with the pre-certified WLAN module. All conducted measurements are covered under *test report# INTEL-051020F*

During the testing process the EUT was tested in “a” mode with 1Mbps data rate which yielded the worst case results. All testing was performed on main antenna which yielded the highest gain, all data in this report shows the worst case between horizontal and vertical polarization for above 1GHz.

The objective of the measurements done by Cetecom Inc. was to measure the performance of the EUT as specified by requirements listed in FCC rules Part 15.407 of Title 47 of the Code of Federal Regulations and Industry Canada rules RSS210.



5 Measurements

5.1 MAXIMUM PEAK OUTPUT POWER § 15.407 (RADIATED)

5.1.1 LIMIT SUB CLAUSE § 15.407 (a)

Frequency range	RF power output
5180MHz	17.68 dBm EIRP
5260MHz	24.68 dBm EIRP
5320MHz	25.04 dBm EIRP

*limit is based upon 26dB bandwidth from report# # INTEL-051020F

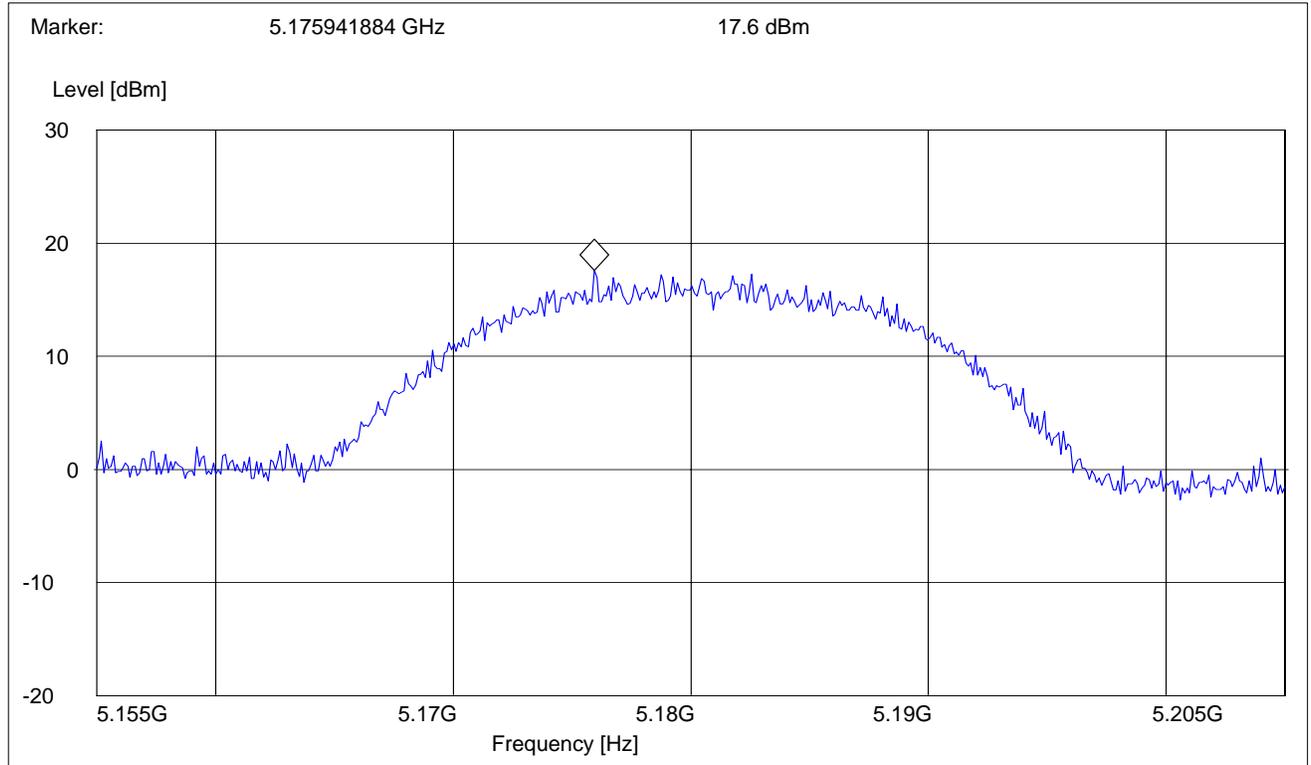
5.1.2 EIRP a MODE:

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		5180	5260	5320
T _{nom} (23)°C	V _{nom} VDC	17.60	20.87	21.48
Measurement uncertainty		±0.5dBm		



EIRP a Mode (5180)

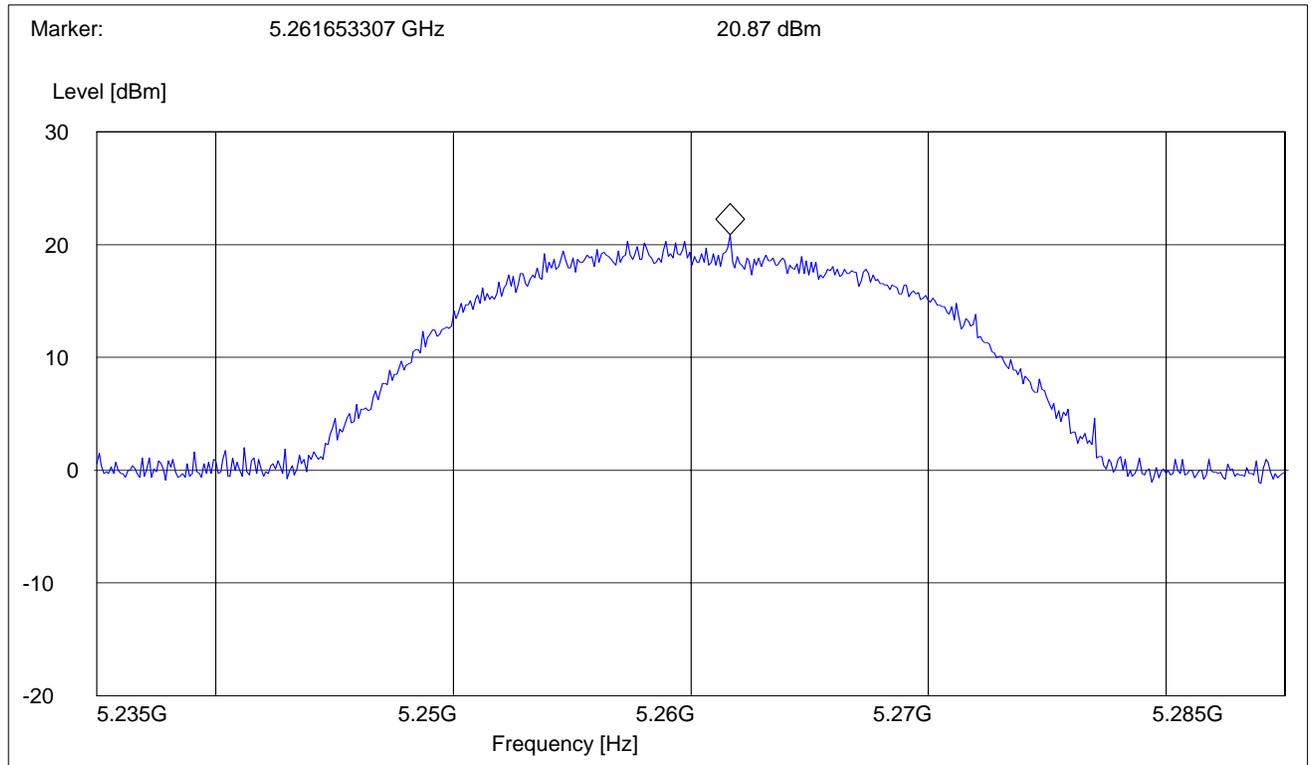
Start Frequency	Stop Frequency	Detector	Meas. Time	IF BW
5155 MHz	5205 MHz	Max Peak	Coupled	10 MHz





EIRP a Mode (5260MHz)

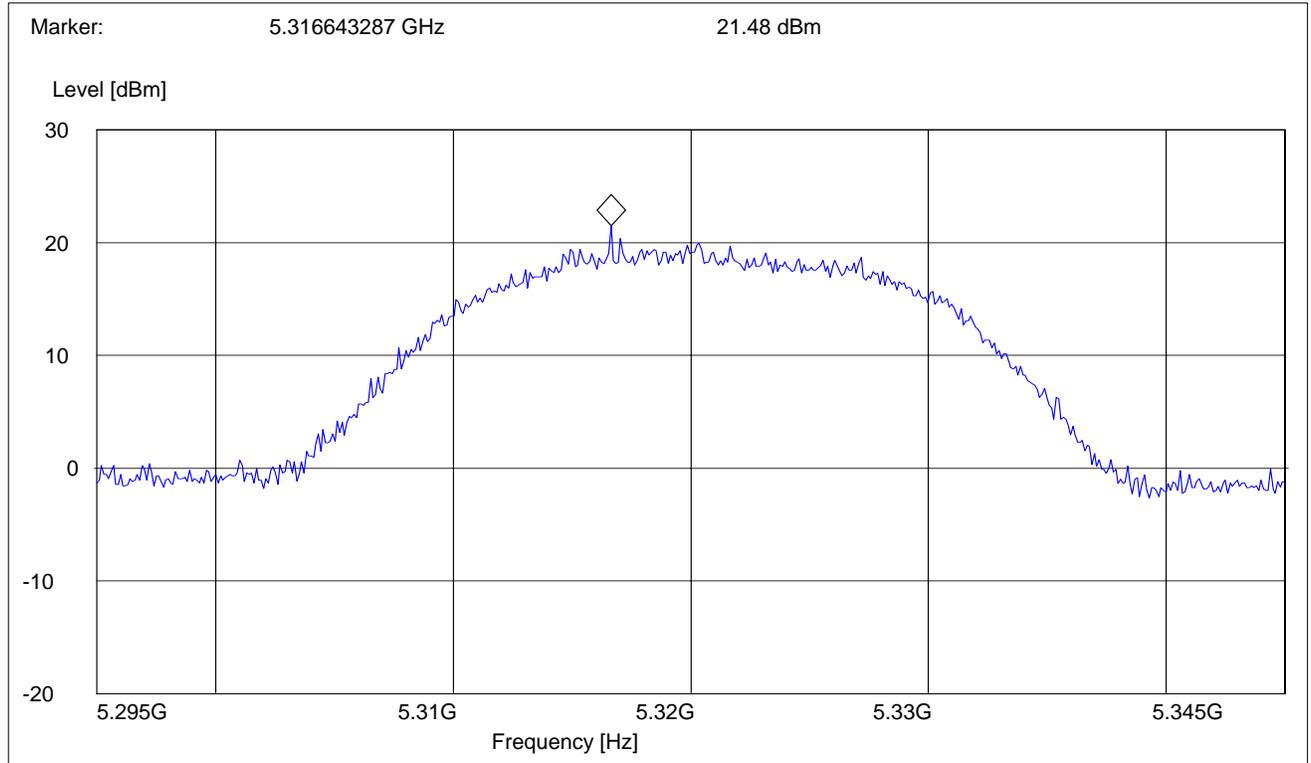
Start Frequency	Stop Frequency	Detector	Meas. Time	IF BW
5235MHz	5285 MHz	Max Peak	Coupled	10 MHz





EIRP a Mode (5320MHz)

Start Frequency	Stop Frequency	Detector	Meas. Time	IF BW
5295 MHz	5345 MHz	Max Peak	Coupled	10 MHz





5.2 RESTRICTED BAND EDGE COMPLIANCE RADIATED §15.407(b)/15.205

5.2.1 LIMITS

(a) Except as shown in paragraph (d) of this section, 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 - 5.15
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			

***PEAK LIMIT= 74dBuV/m**

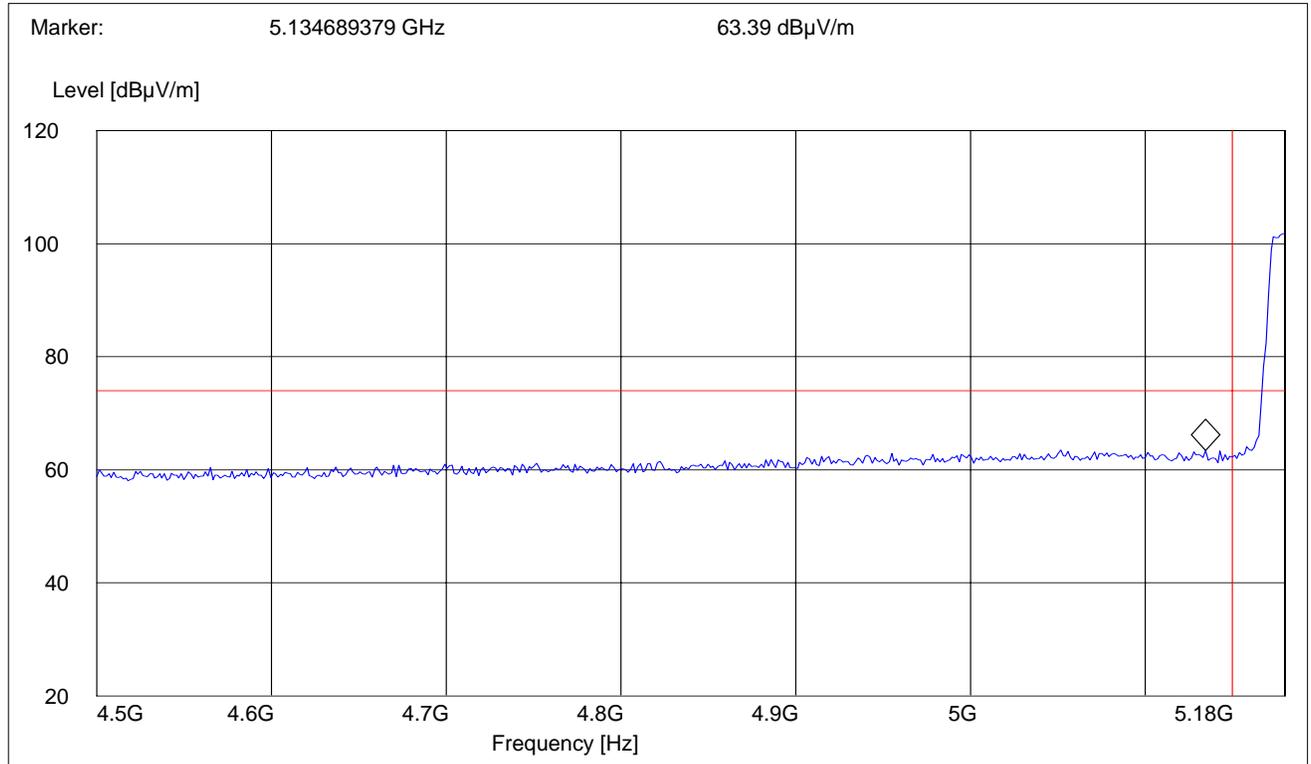
***AVG. LIMIT= 54dBuV/m**



5.2.2 a MODE (5180MHz)

PEAK

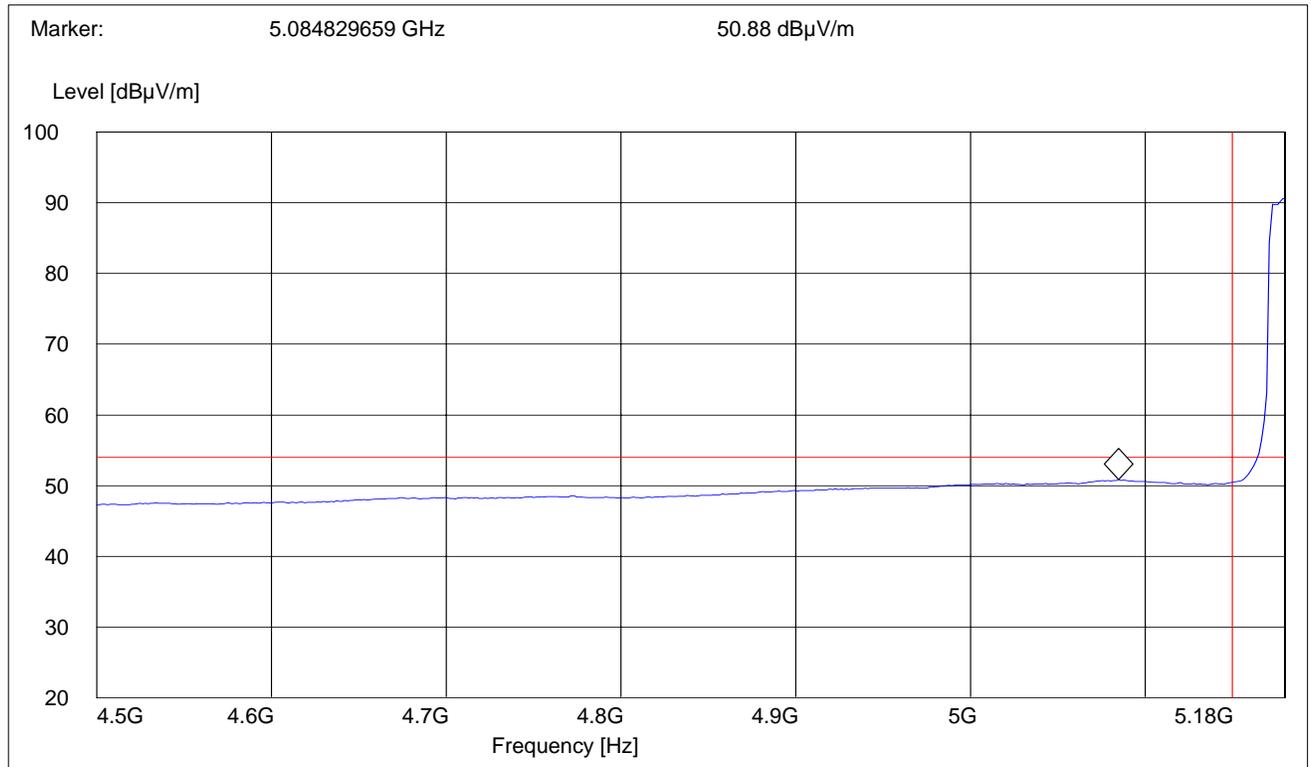
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
4500 MHz	5180 MHz	Max Peak	Coupled	1 MHz	1 MHz





AVG

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
4500 MHz	5180 MHz	Max Peak	Coupled	1 MHz	10 Hz

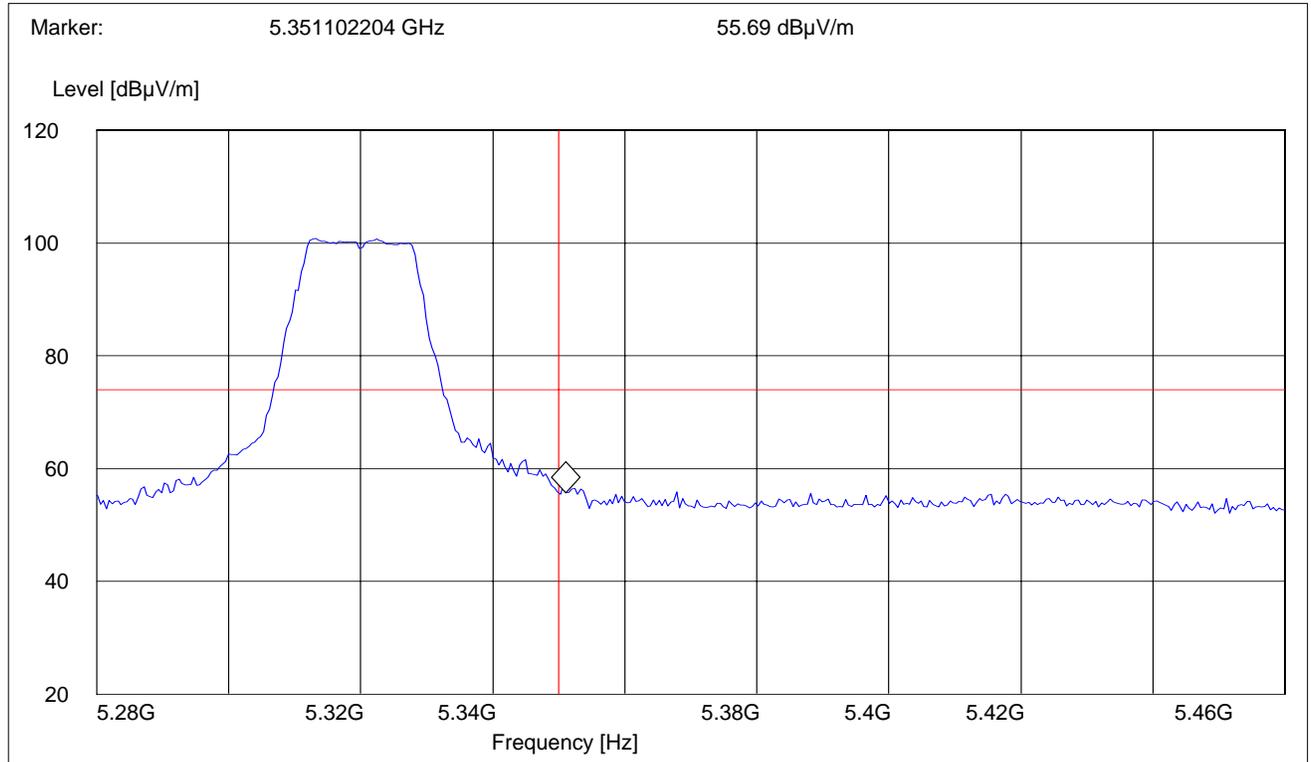




5.2.3 a MODE (5320MHz)

PEAK

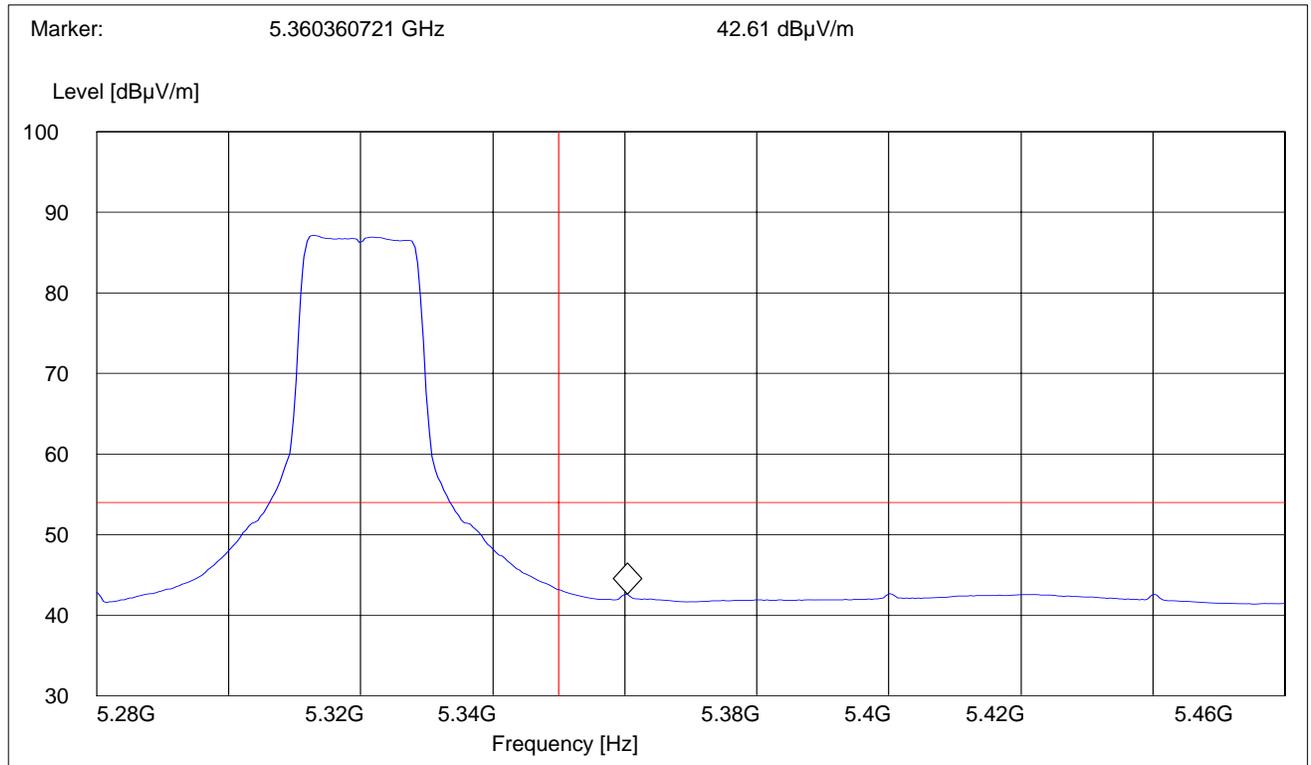
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
5280 MHz	5460 MHz	Max Peak	Coupled	1 MHz	1 MHz





AVG

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
5280 MHz	5460 MHz	Max Peak	Coupled	1 MHz	10 Hz





5.3 TRANSMITTER SPURIOUS EMISSIONS RADIATED § 15.407(b)/15.205/15.209

5.3.1 LIMITS

(a) Except as shown in paragraph (d) of this section, 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 - 5.15
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			

- *PEAK LIMIT= 74dBuV/m for spurious in restricted bands
- *AVG. LIMIT= 54dBuV/m for spurious in restricted bands
- *PEAK LIMIT= 68.2dBuV/m for spurious NOT in restricted bands

NOTE:

1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.
2. All measurements are done in peak mode using an average limit , unless specified with the plots.

Results for the radiated measurements below 30MHz according § 15.33

Frequency	Measured values	Remarks
9KHz – 30MHz	No emissions found, caused by the EUT	This is valid for all the tested channels



5.3.2 RESULTS a MODE

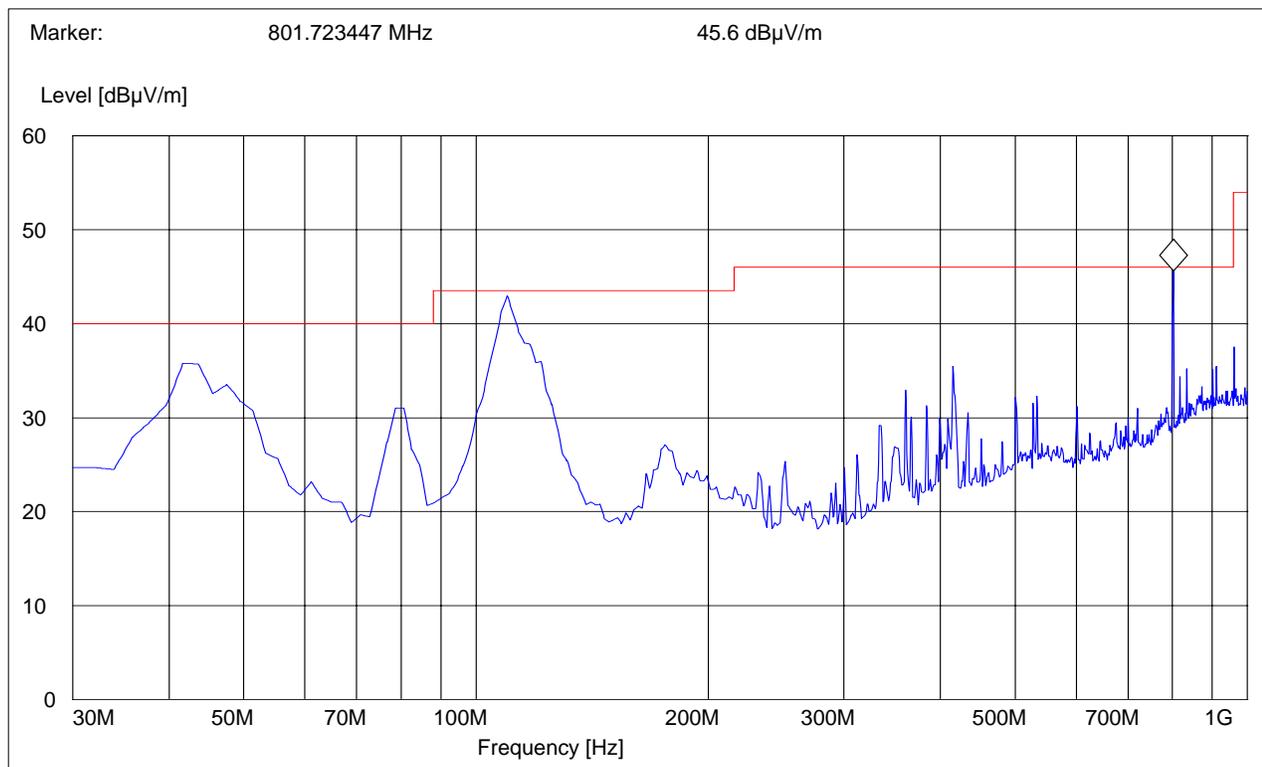
30MHz – 1GHz

Antenna: vertical

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
30MHz	1GHz	Max Peak	Coupled	100 KHz	100 KHz

Note: This plot is valid for low, mid, high channels (worst-case plot)

Note: Peak reading vs. Quasi-peak limit





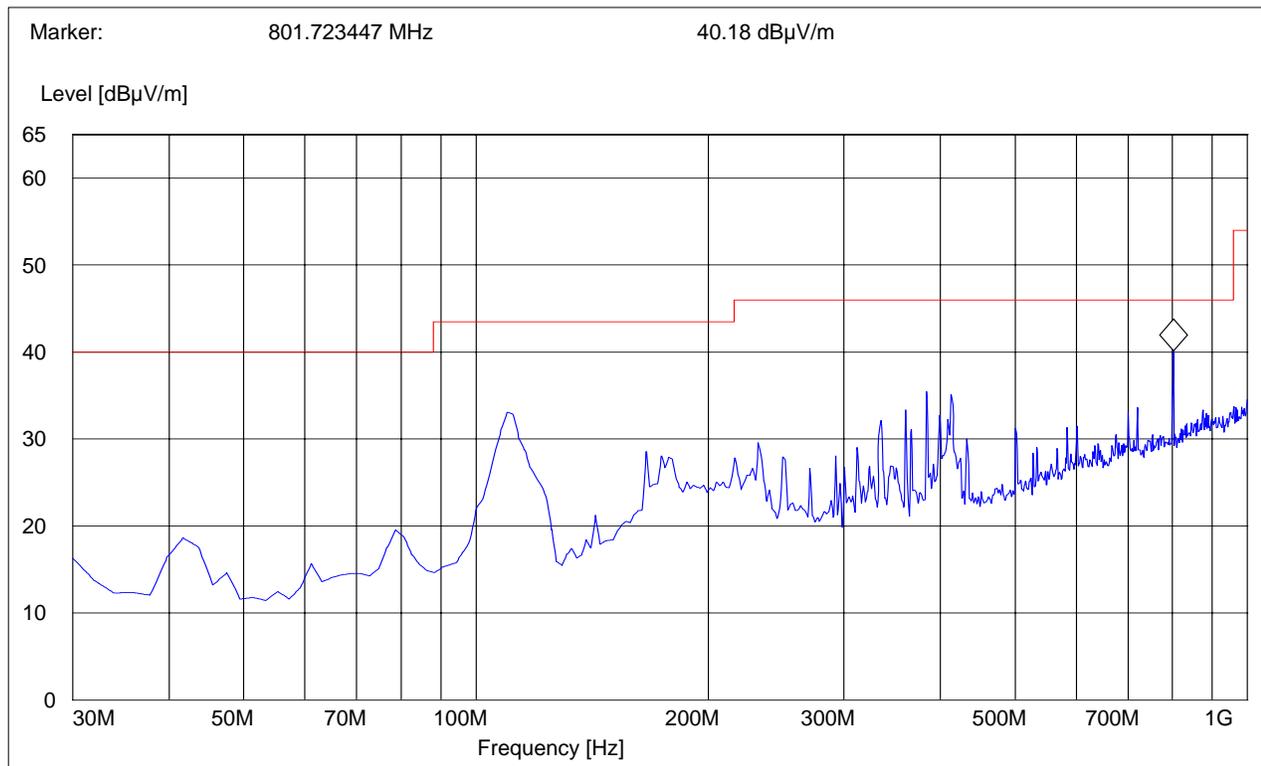
30MHz – 1GHz

Antenna: horizontal

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
30MHz	1GHz	Max Peak	Coupled	100 KHz	100 KHz

Note: This plot is valid for low, mid, high channels (worst-case plot)

Note: Peak reading vs. Quasi-peak limit



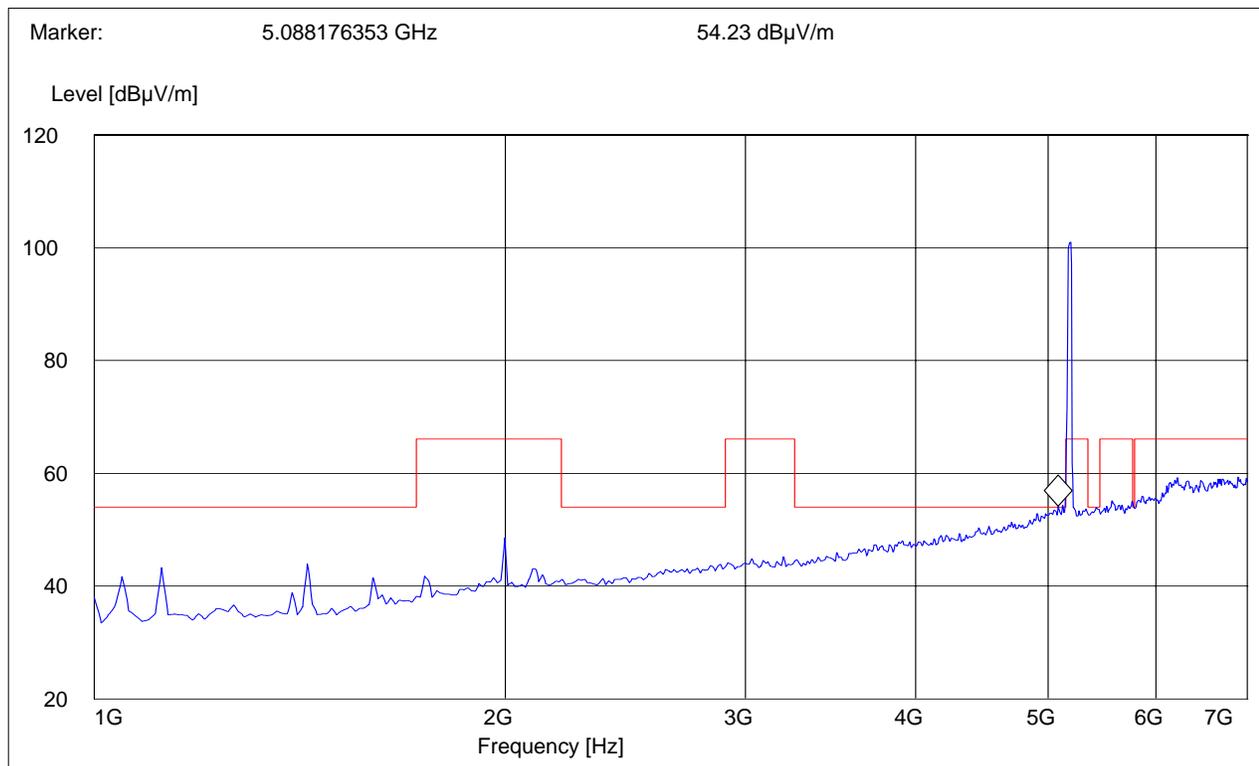


1-7GHz (5180MHz)

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	7GHz	Max Peak	Coupled	1 MHz	1 MHz

Note: The peaks above the limit line is the carrier freq.

Note: Peak Reading vs. Average limit , see next page for Average Reading vs. Average limit



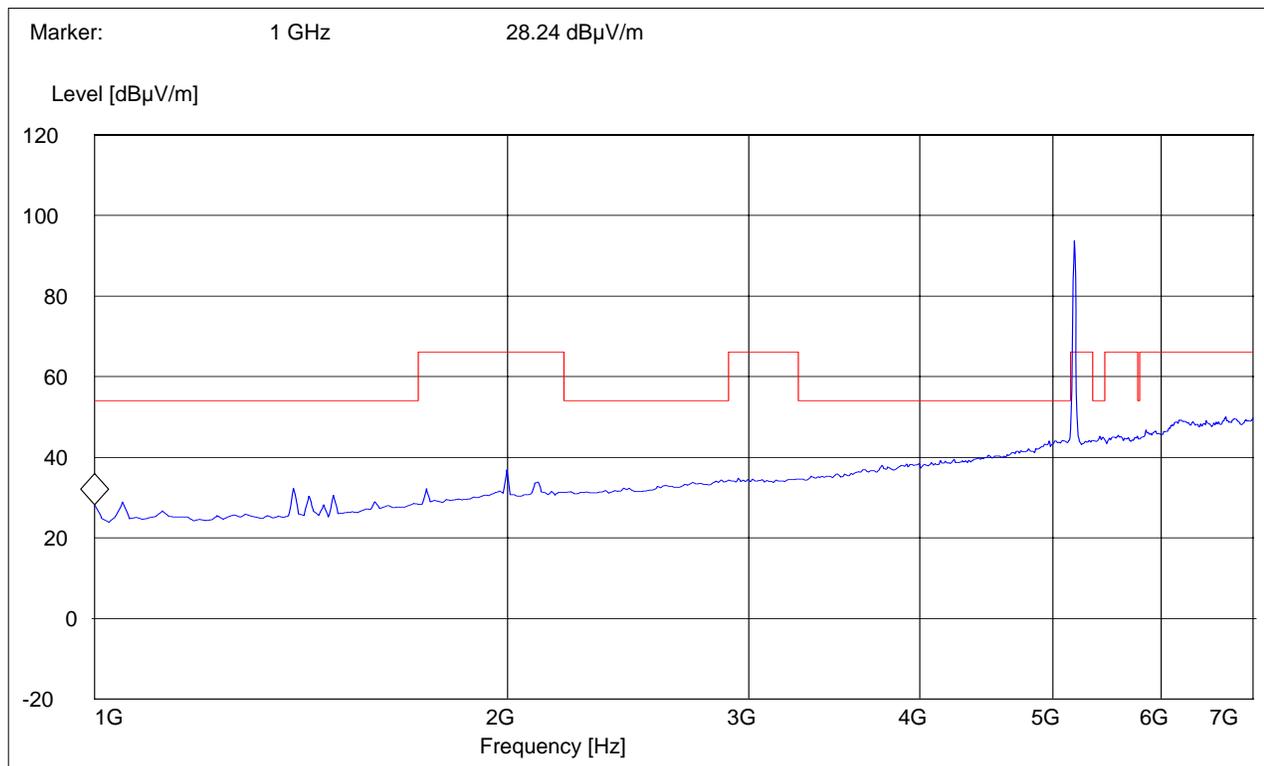


1-7GHz (5180MHz)

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	7GHz	Max Peak	Coupled	1 MHz	10Hz

Note: The peaks above the limit line is the carrier freq.

Note: Average Reading vs. Average limit



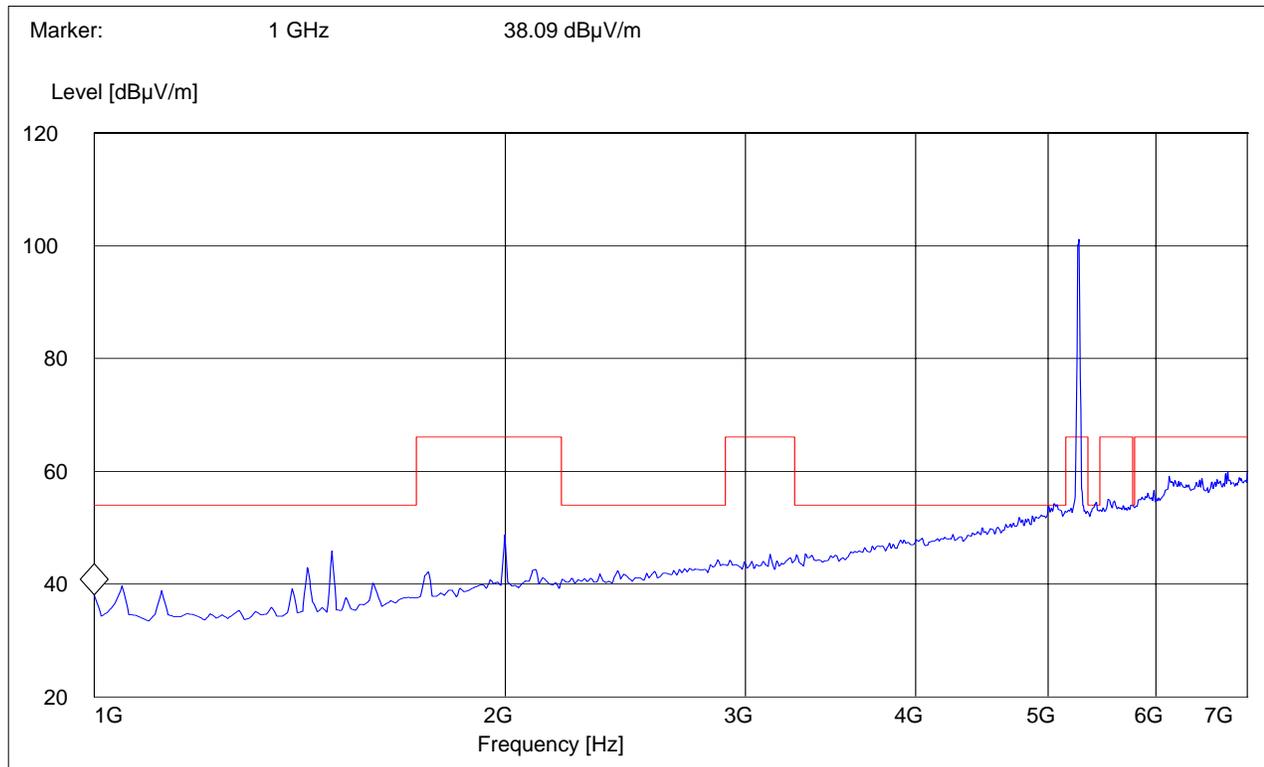


1-7GHz (5260MHz)

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	7GHz	Max Peak	Coupled	1 MHz	1 MHz

Note: The peaks above the limit line is the carrier freq.

Note: Peak Reading vs. Average limit , see next page for Average Reading vs. Average limit



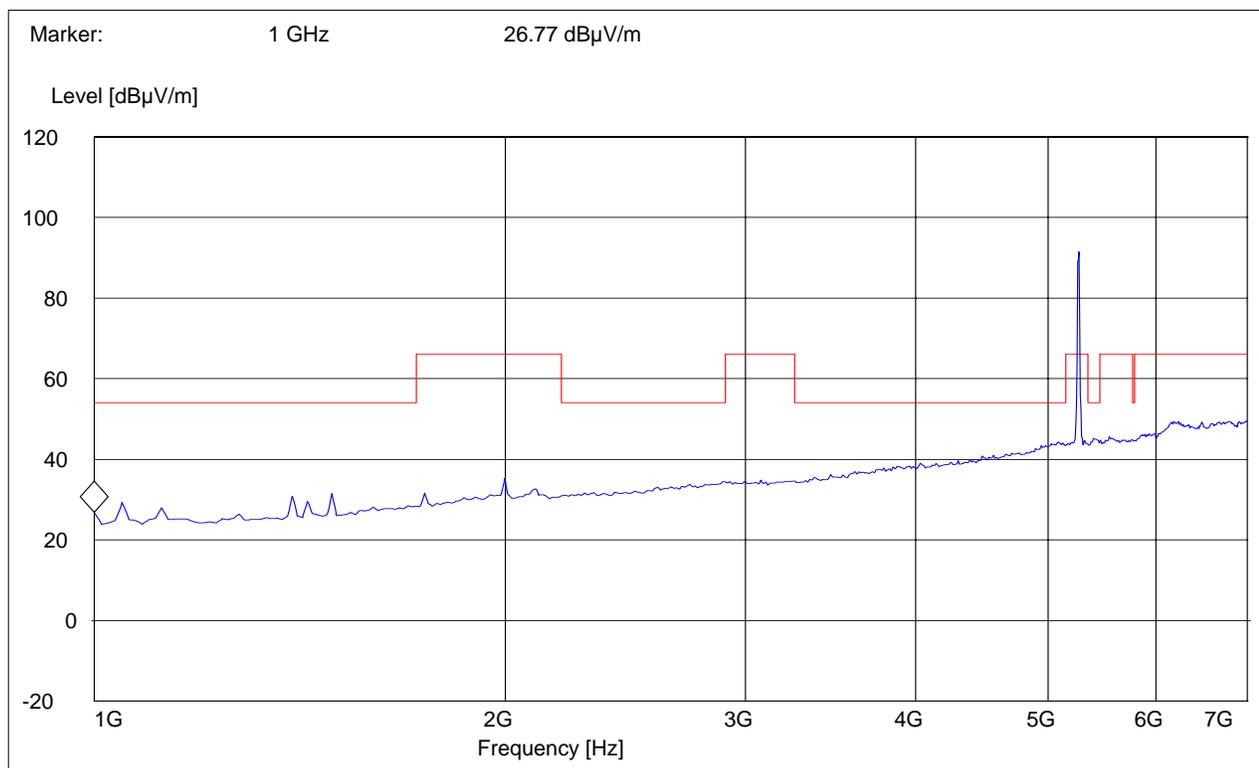


1-7GHz (5260MHz)

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	7GHz	Max Peak	Coupled	1 MHz	10Hz

Note: The peaks above the limit line is the carrier freq.

Note: Average Reading vs. Average limit



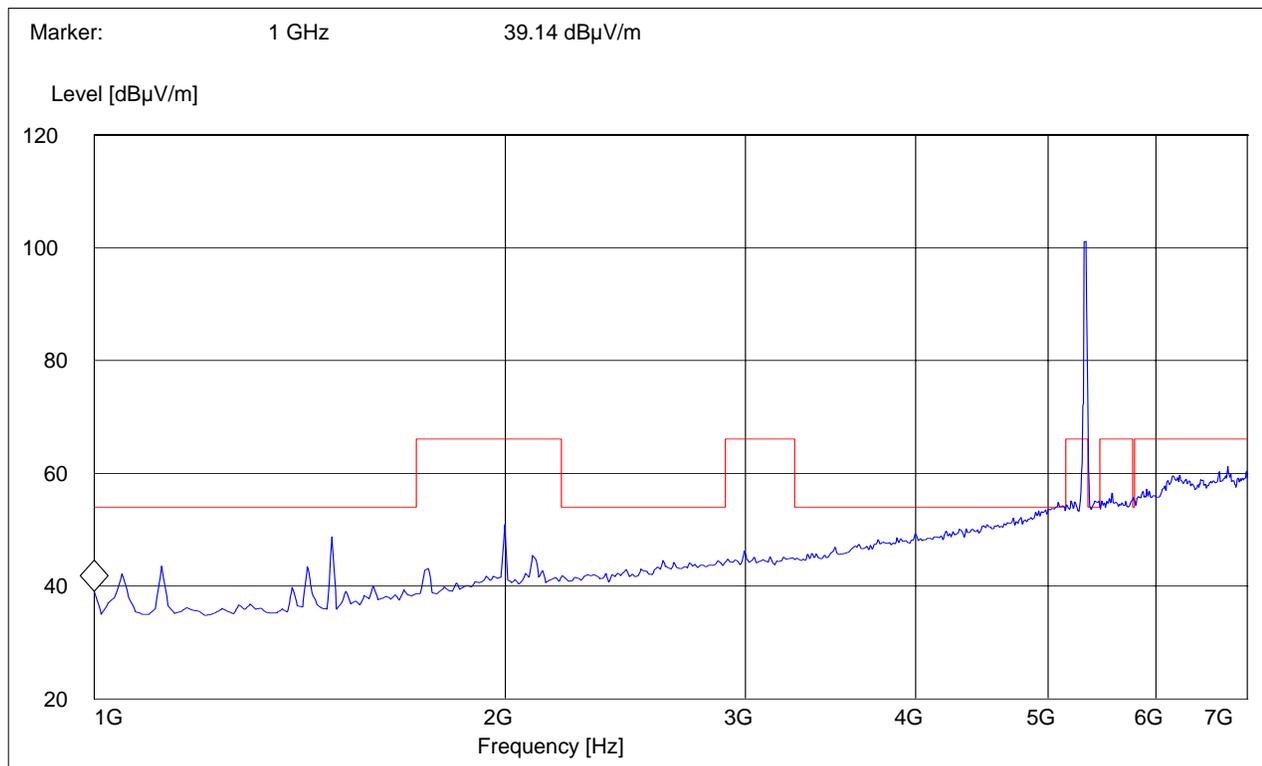


1-7GHz (5320MHz)

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	7GHz	Max Peak	Coupled	1 MHz	1 MHz

Note: The peaks above the limit line is the carrier freq.

Note: Peak Reading vs. Average limit , see next page for Average Reading vs. Average limit



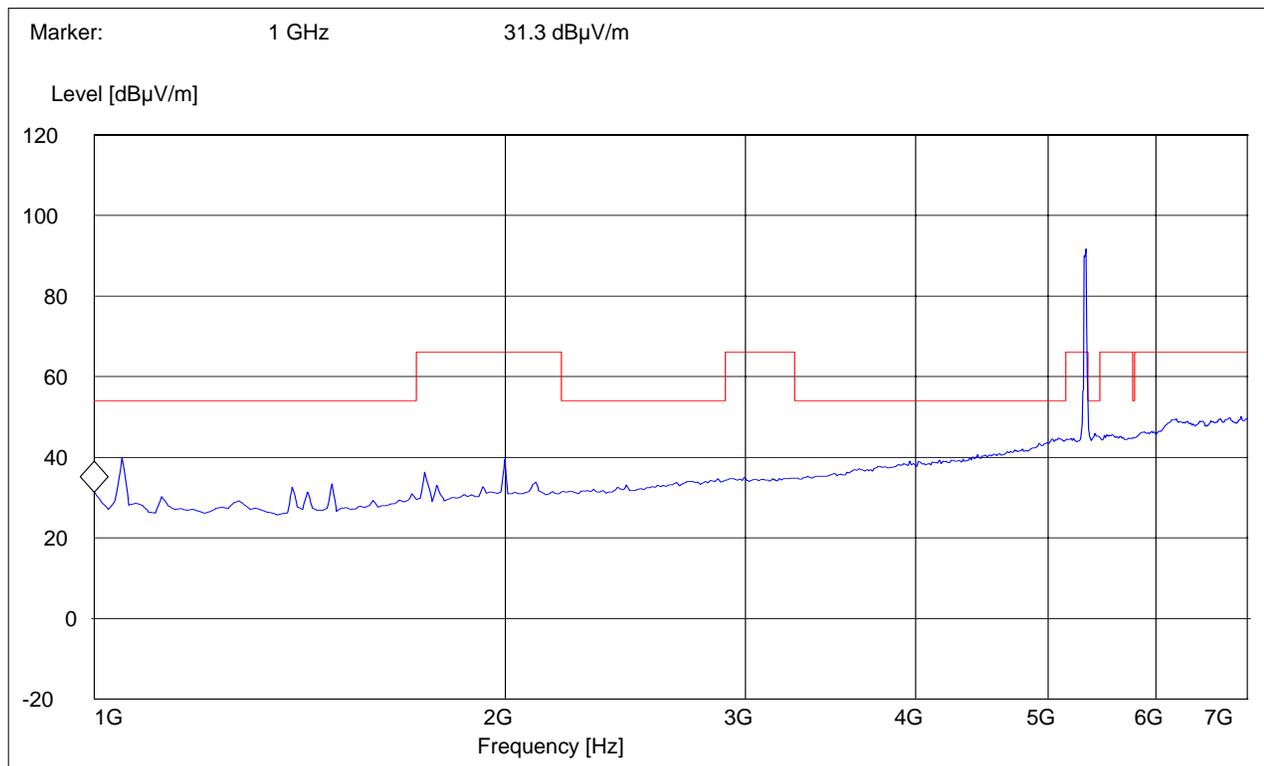


1-7GHz (5320MHz)

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	7GHz	Max Peak	Coupled	1 MHz	10Hz

Note: The peaks above the limit line is the carrier freq.

Note: Average Reading vs. Average limit

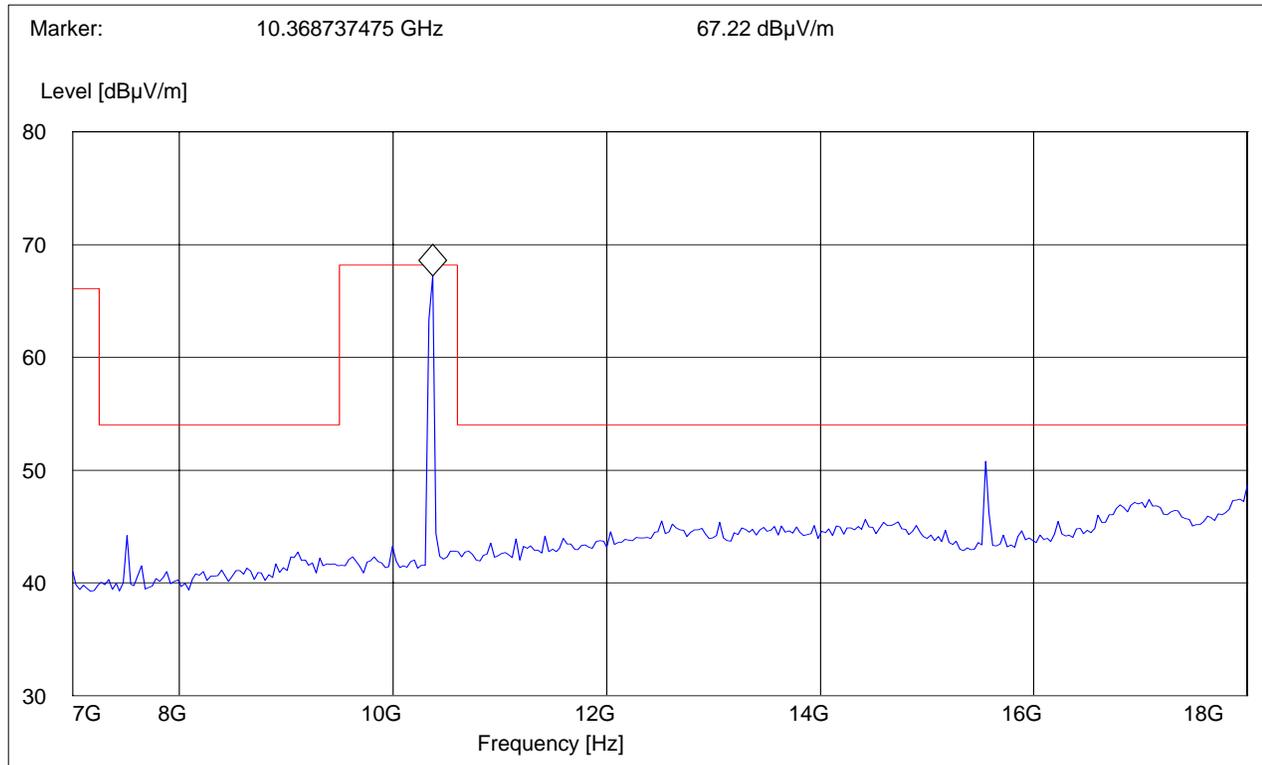




7-18GHz (5180MHz)

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
7GHz	18GHz	Max Peak	Coupled	1 MHz	1 MHz

Note: Peak Reading

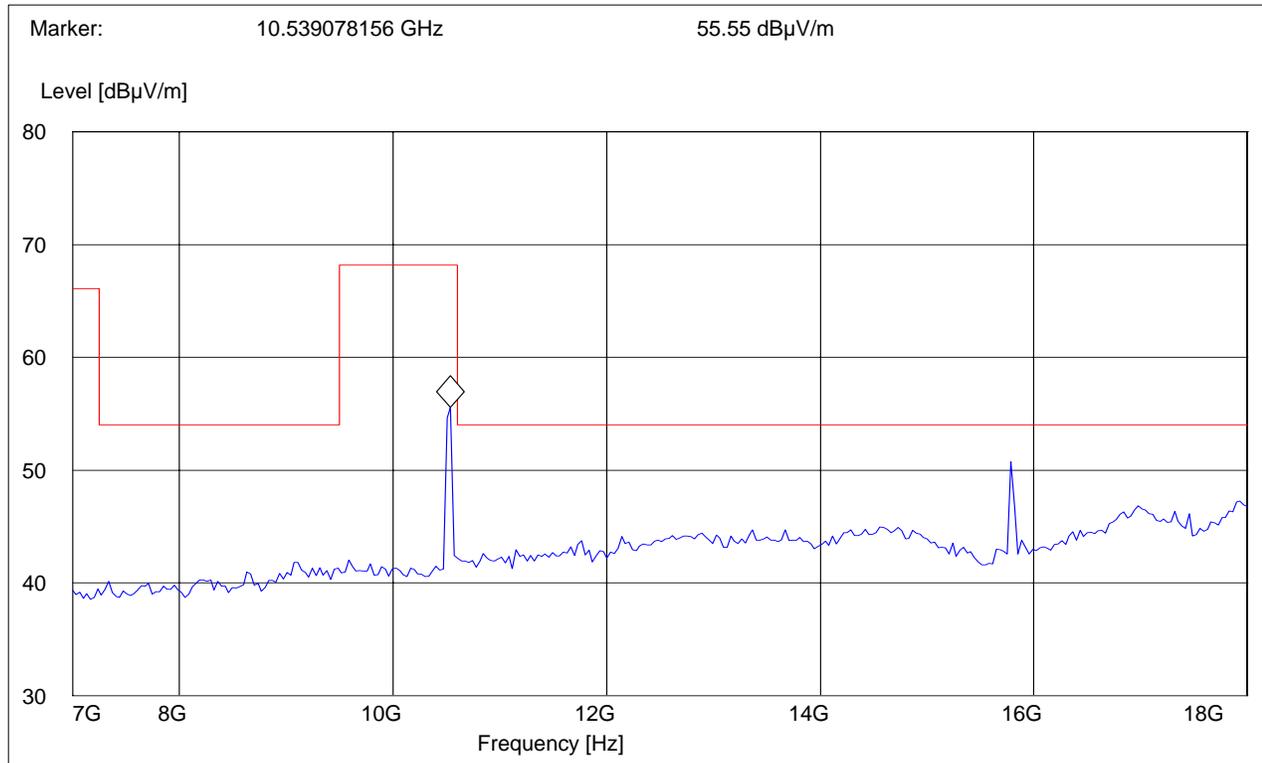




7-18GHz (5260MHz)

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
7GHz	18GHz	Max Peak	Coupled	1 MHz	1 MHz

Note: Peak Reading

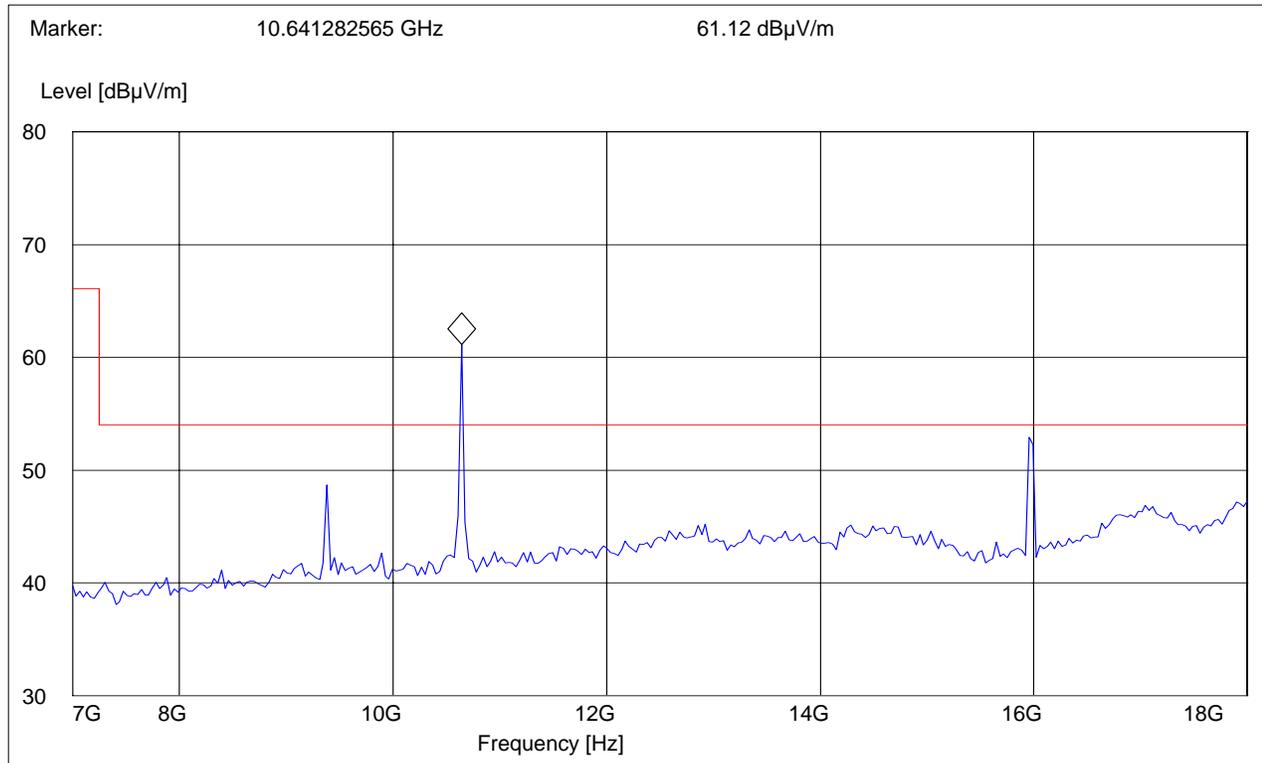




7-18GHz (5320MHz)

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
7GHz	18GHz	Max Peak	Coupled	1 MHz	1 MHz

Note: Peak Reading vs. Average limit, see next page for Average Reading vs. Average Limit

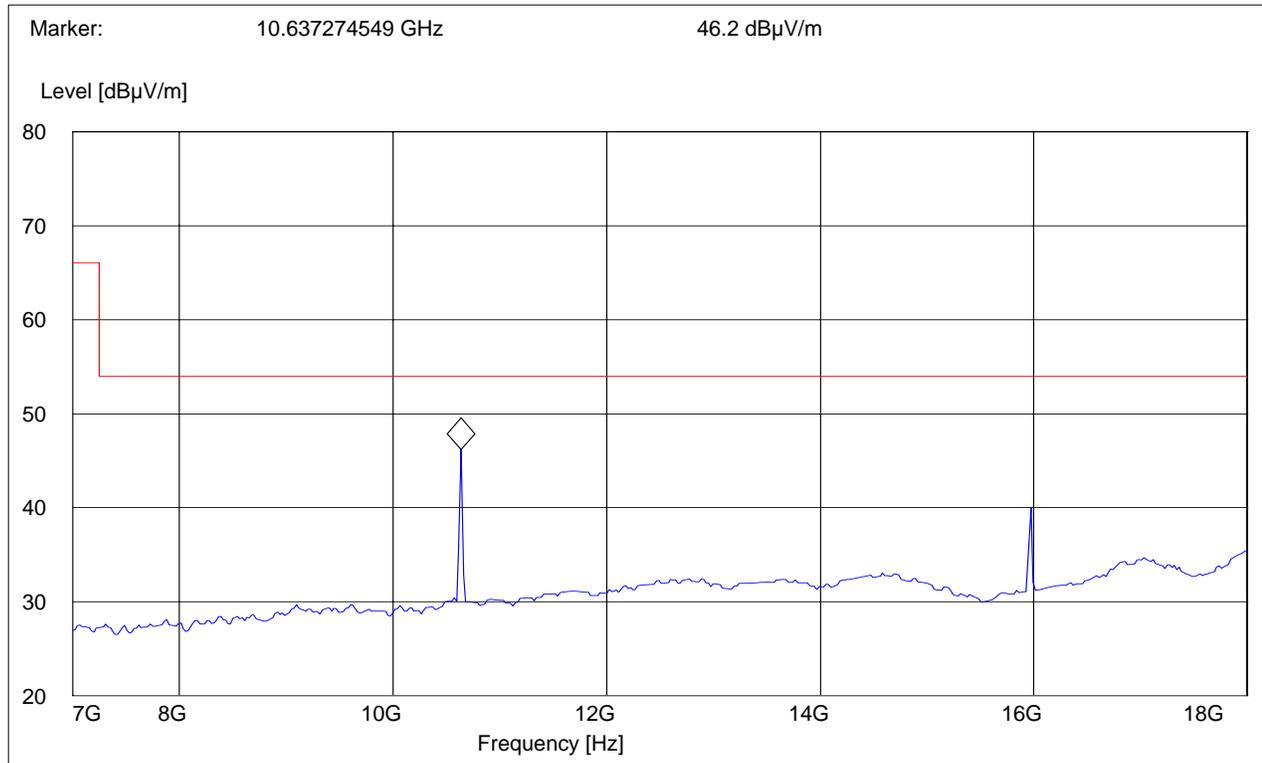




7-18GHz (5320MHz)

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
7GHz	18GHz	Max Peak	Coupled	1 MHz	10Hz

Note: Average Reading vs. Average limit

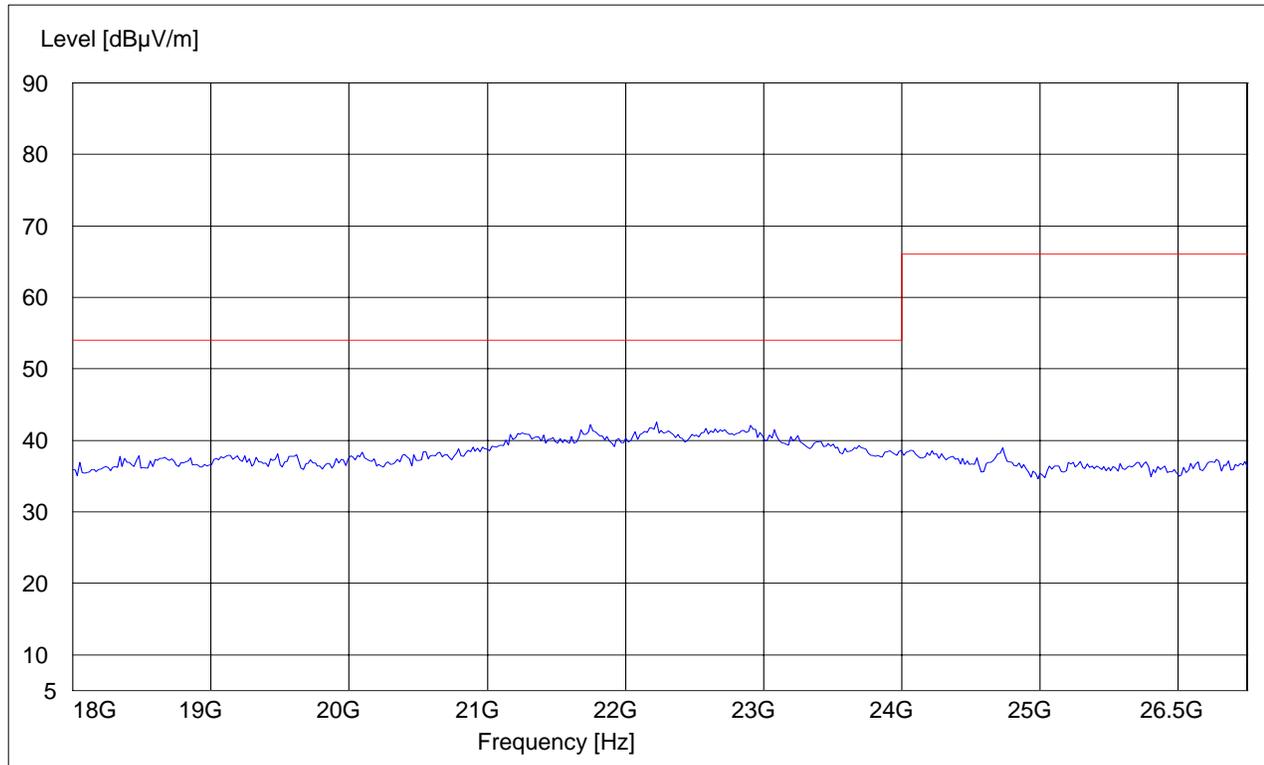




18-26.5GHz (5180MHz)

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
18GHz	26.5GHz	Max Peak	Coupled	1 MHz	1 MHz

Note: Peak Reading vs. Average limit ,

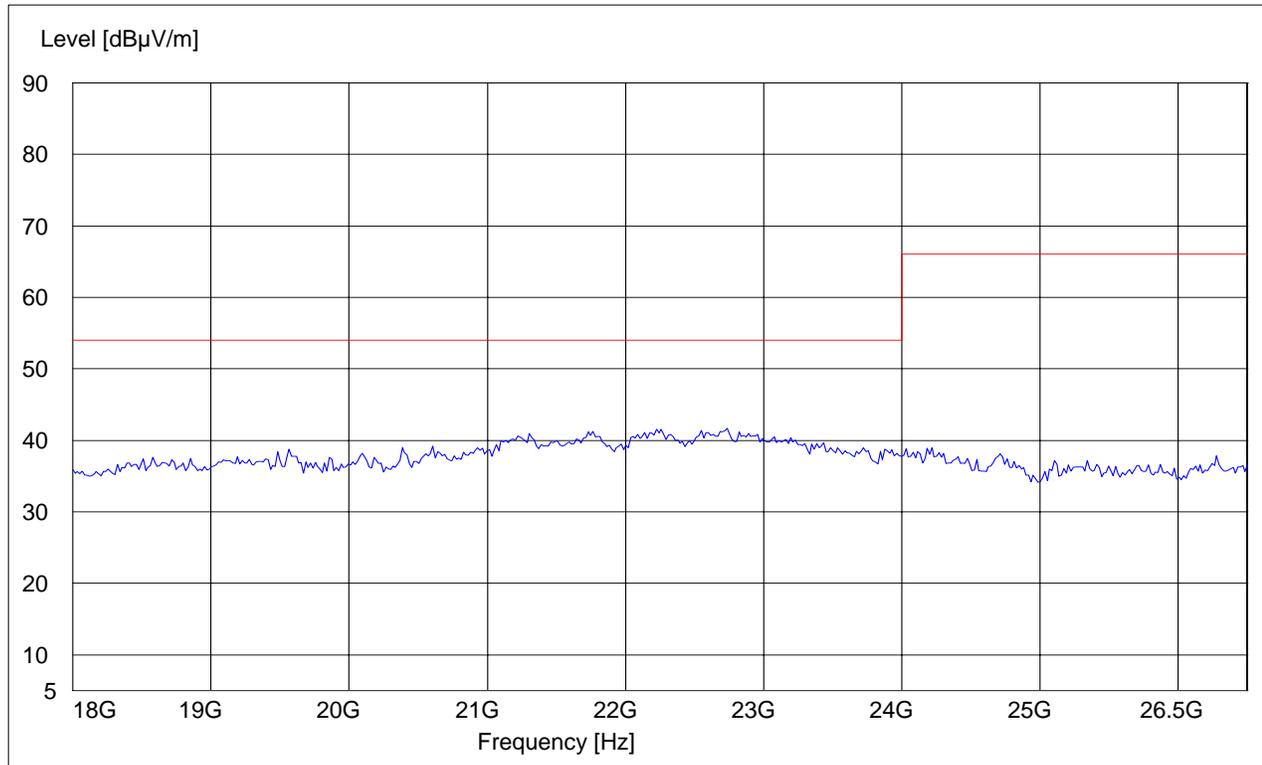




18-26.5GHz (5260MHz)

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
18GHz	26.5GHz	Max Peak	Coupled	1 MHz	1 MHz

Note: Peak Reading vs. Average limit ,

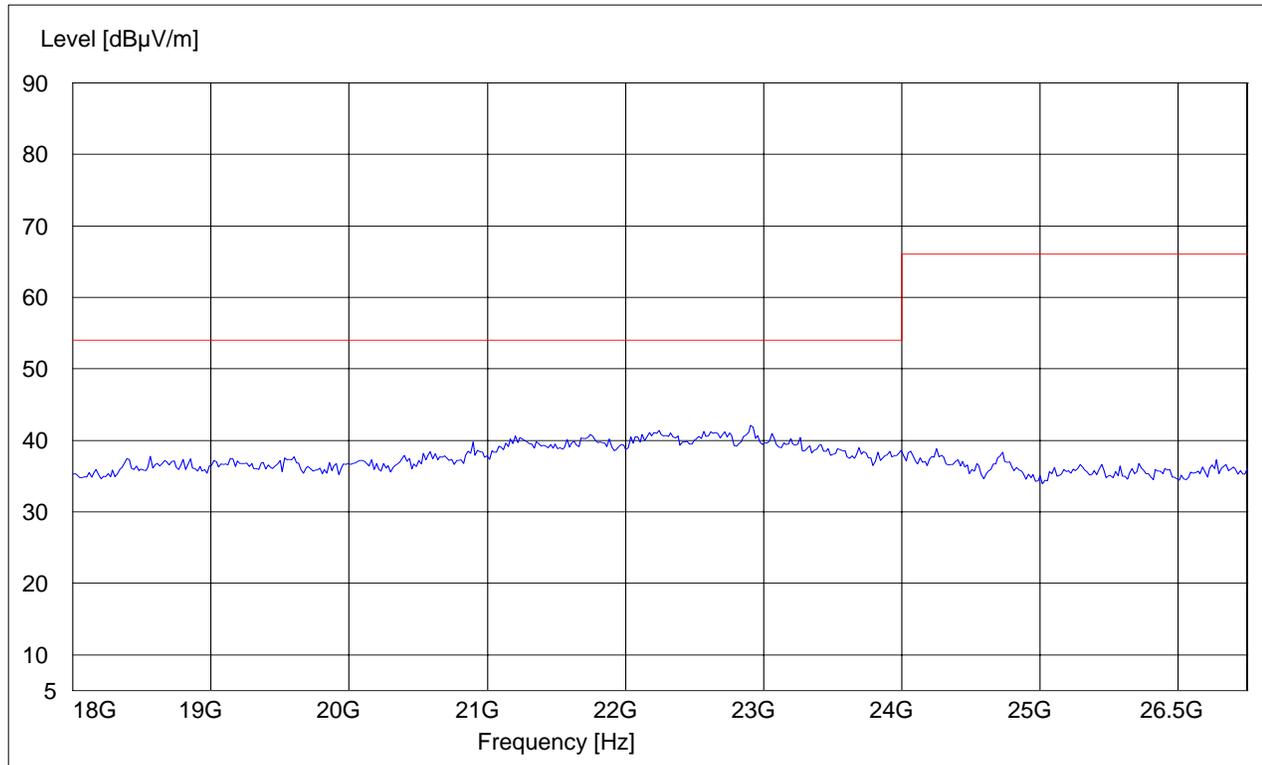




18-26.5GHz (5320MHz)

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
18GHz	26.5GHz	Max Peak	Coupled	1 MHz	1 MHz

Note: Peak Reading vs. Average limit ,



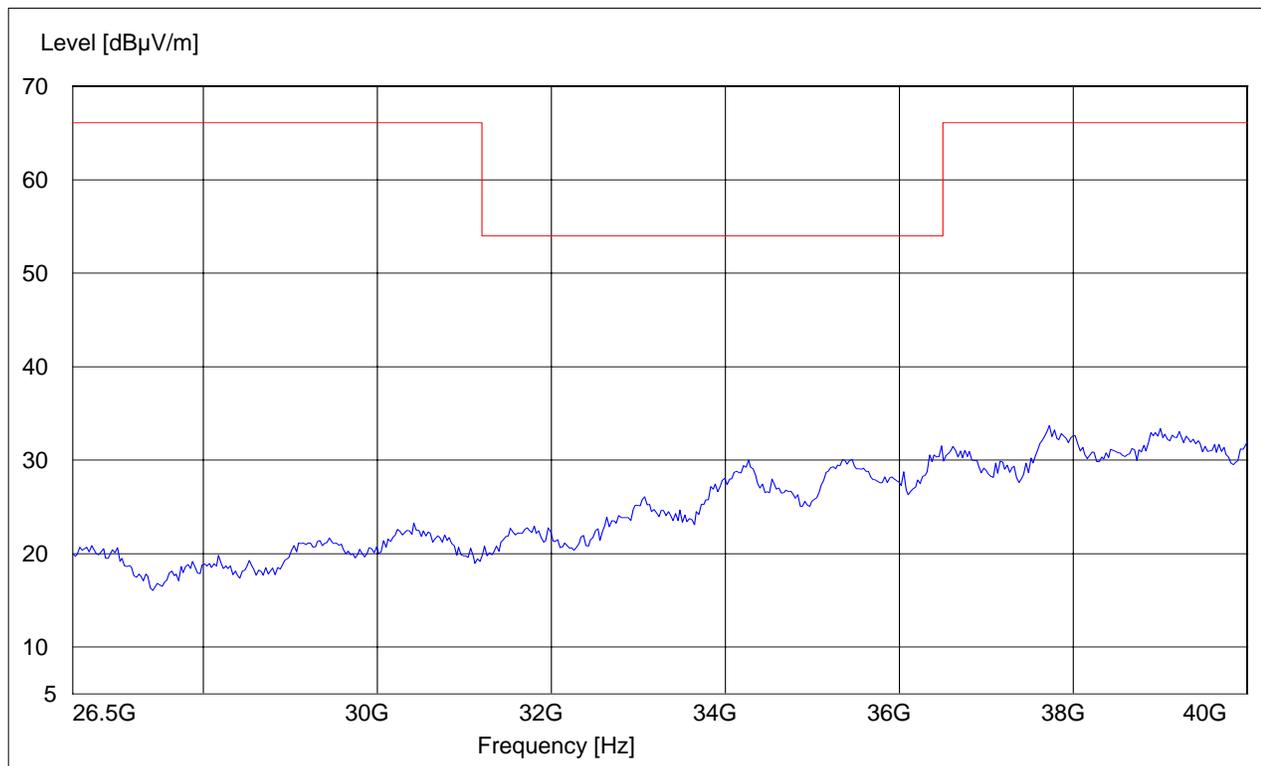


26-40GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
26GHz	40GHz	Max Peak	Coupled	1 MHz	1 MHz

Note: This plot is valid for low, mid, high channels (worst-case plot)

Note: Peak Reading vs. Average limit ,





5.4 RECEIVER SPURIOUS RADIATION § 15.209/RSS210

5.4.1 LIMITS

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	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

NOTE:

1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.

2. All measurements are done in peak mode using an average limit , unless specified with the plots.



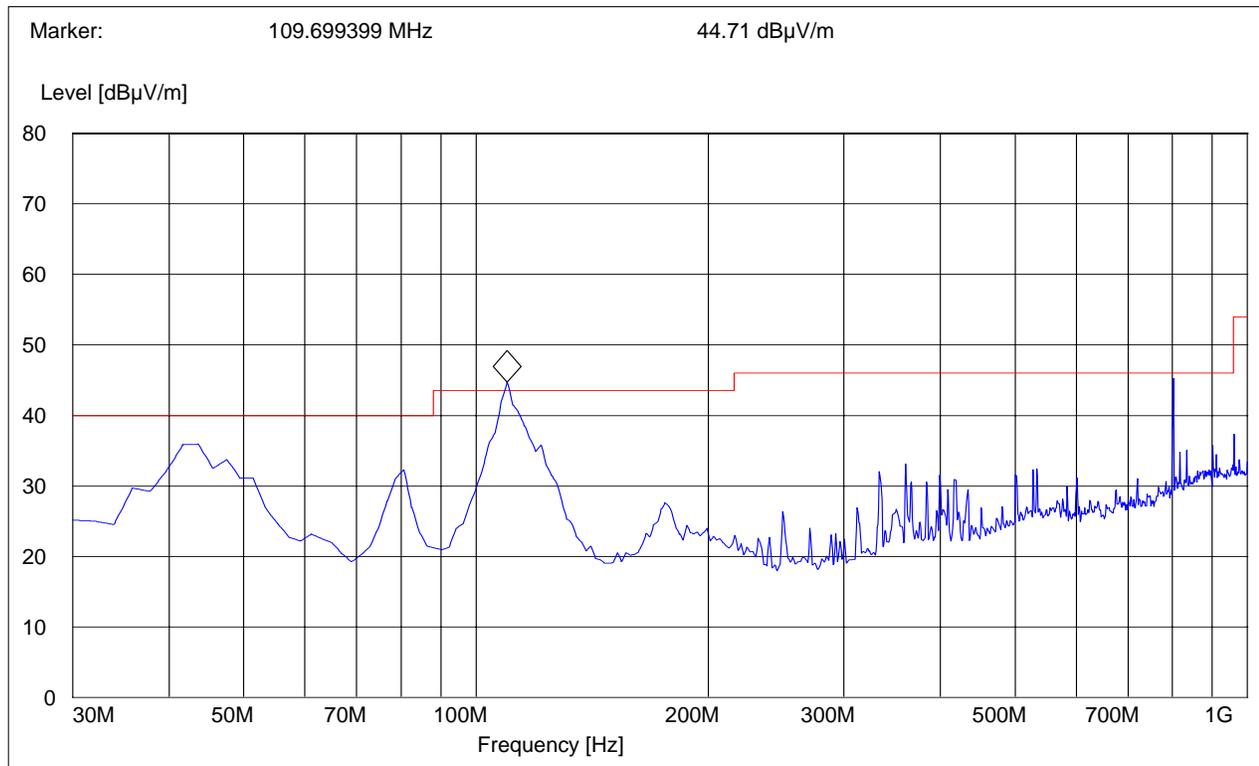
5.4.2 RESULTS

30MHz – 1GHz

Antenna: vertical

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
30MHz	1GHz	Max Peak	Coupled	100 KHz	100 KHz

Note: Peak Reading vs. Quasi-peak limit



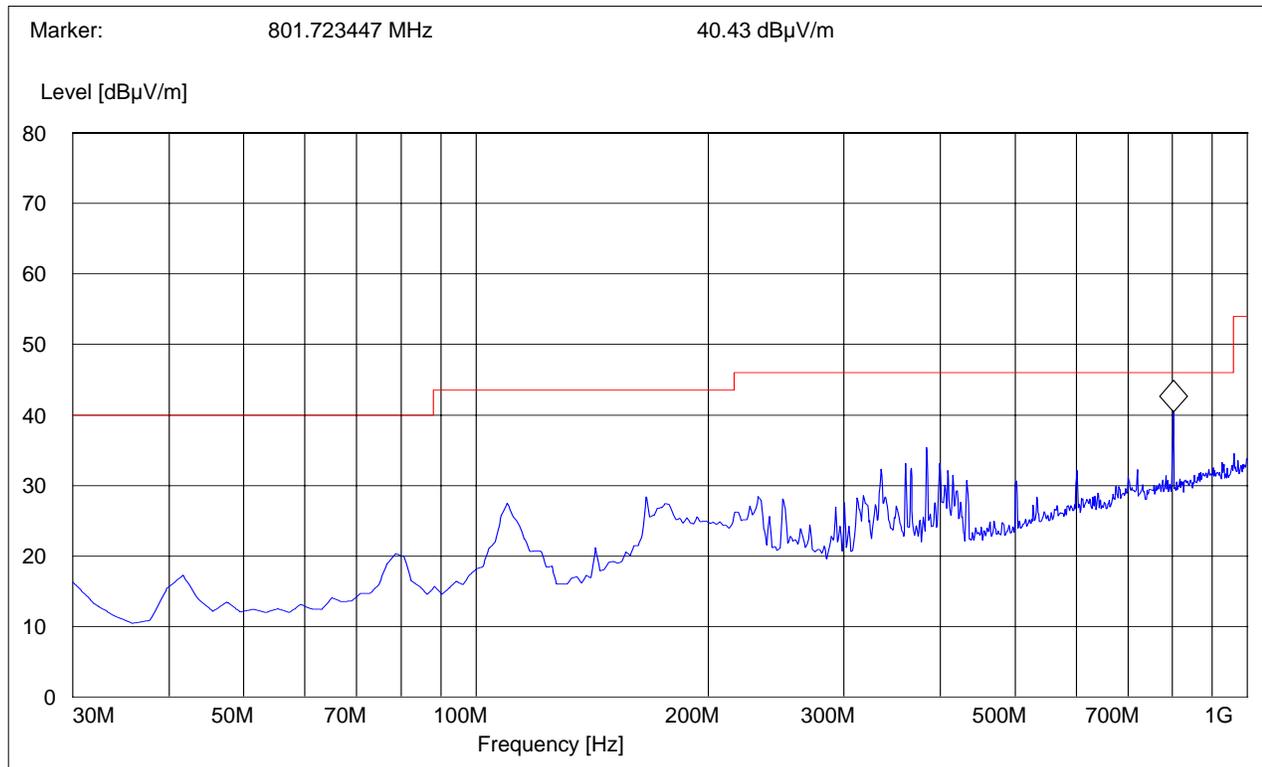
Frequency (MHz)	Max peak (dBuV/m)	Quasi-peak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Comments
109.69	44.71	39.89	43.5	-3.61	Pass



30MHz – 1GHz
Antenna: horizontal

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
30MHz	1GHz	Max Peak	Coupled	100 KHz	100 KHz

Note: Peak Reading vs. Quasi-peak limit

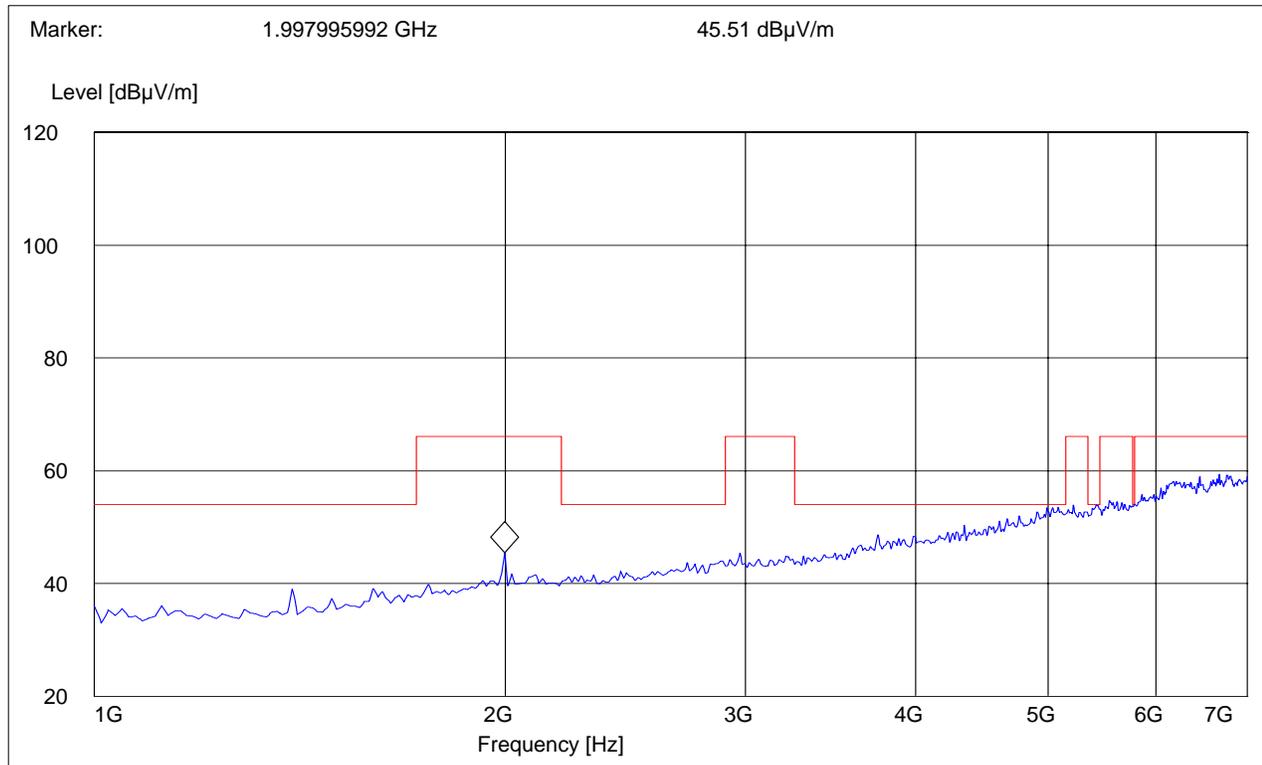




1-7GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	7GHz	Max Peak	Coupled	1 MHz	1 MHz

Note: Peak Reading vs. Average limit, see next page for Average Reading vs. Average limit

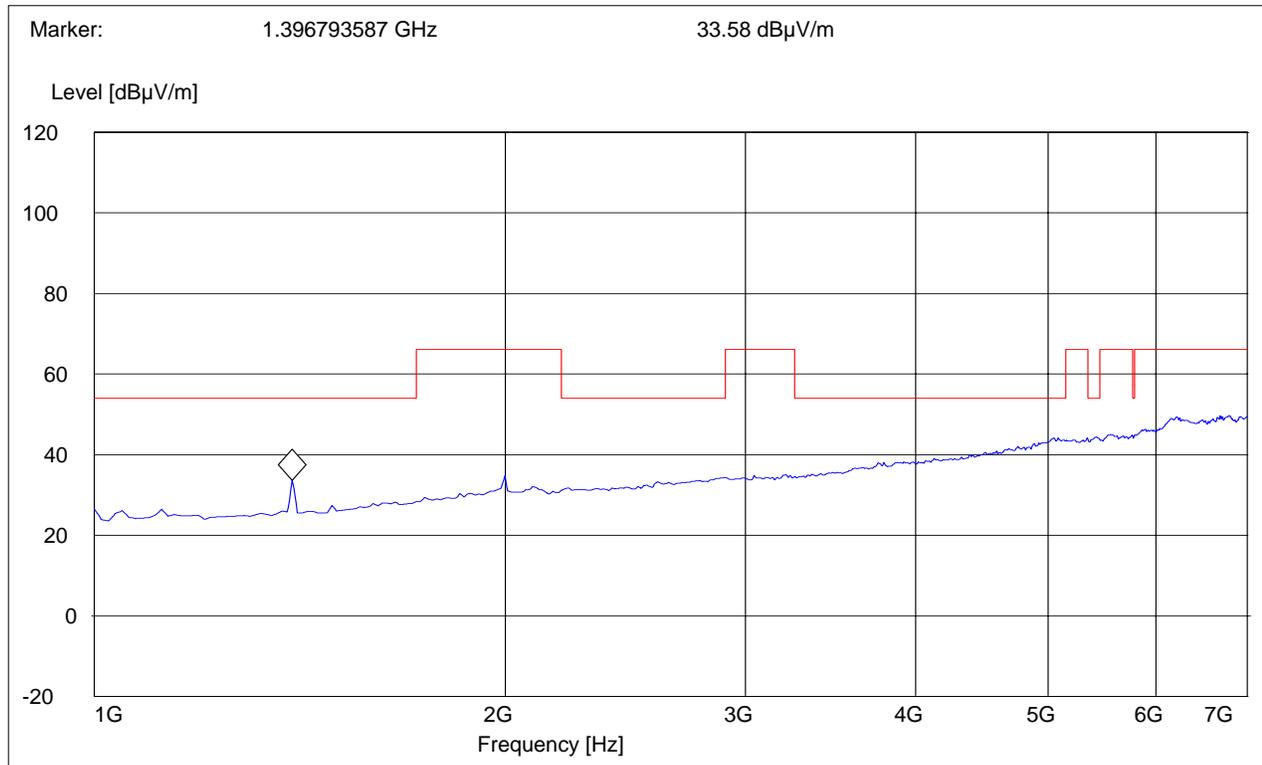




1-7GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	7GHz	Max Peak	Coupled	1 MHz	10Hz

Note: Average Reading vs. Average limit

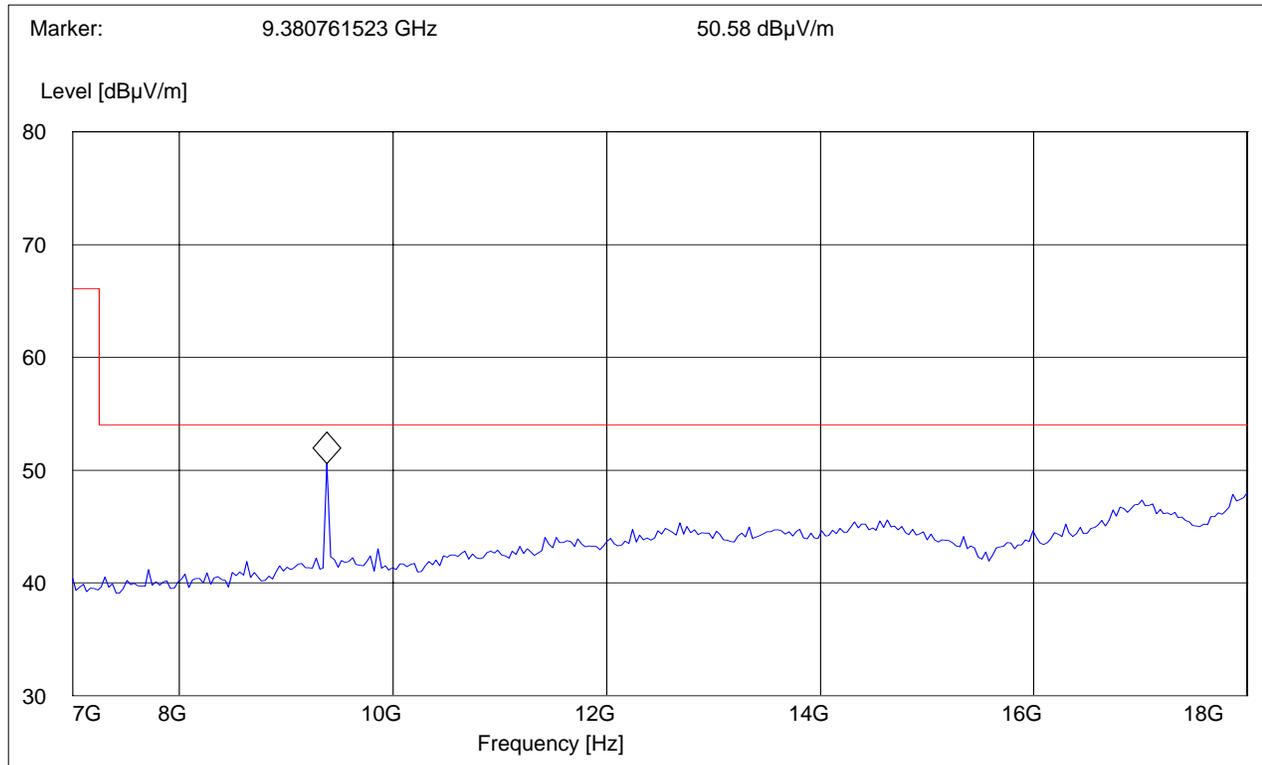




7-18GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
7GHz	18GHz	Max Peak	Coupled	1 MHz	1 MHz

Note: Peak Reading vs. Average limit

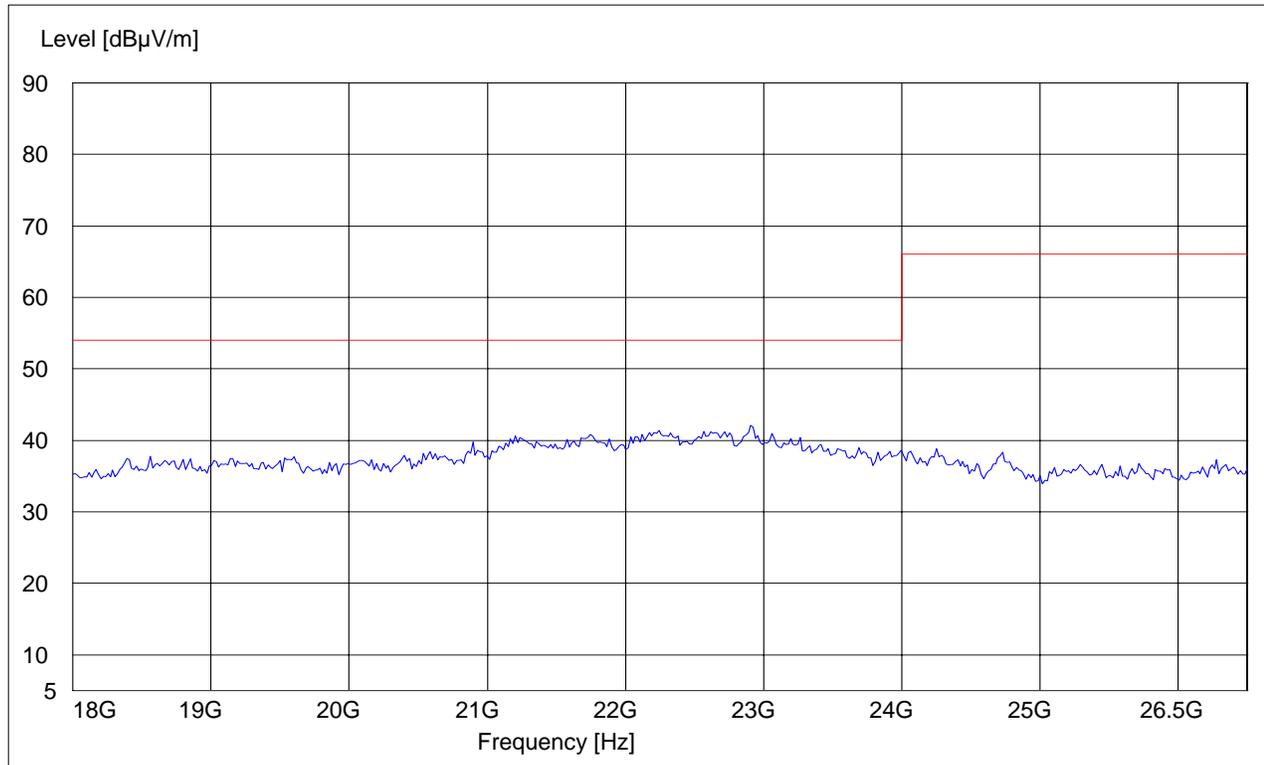




18-26.5GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
18GHz	26.5GHz	Max Peak	Coupled	1 MHz	1 MHz

Note: Peak Reading vs. Average limit

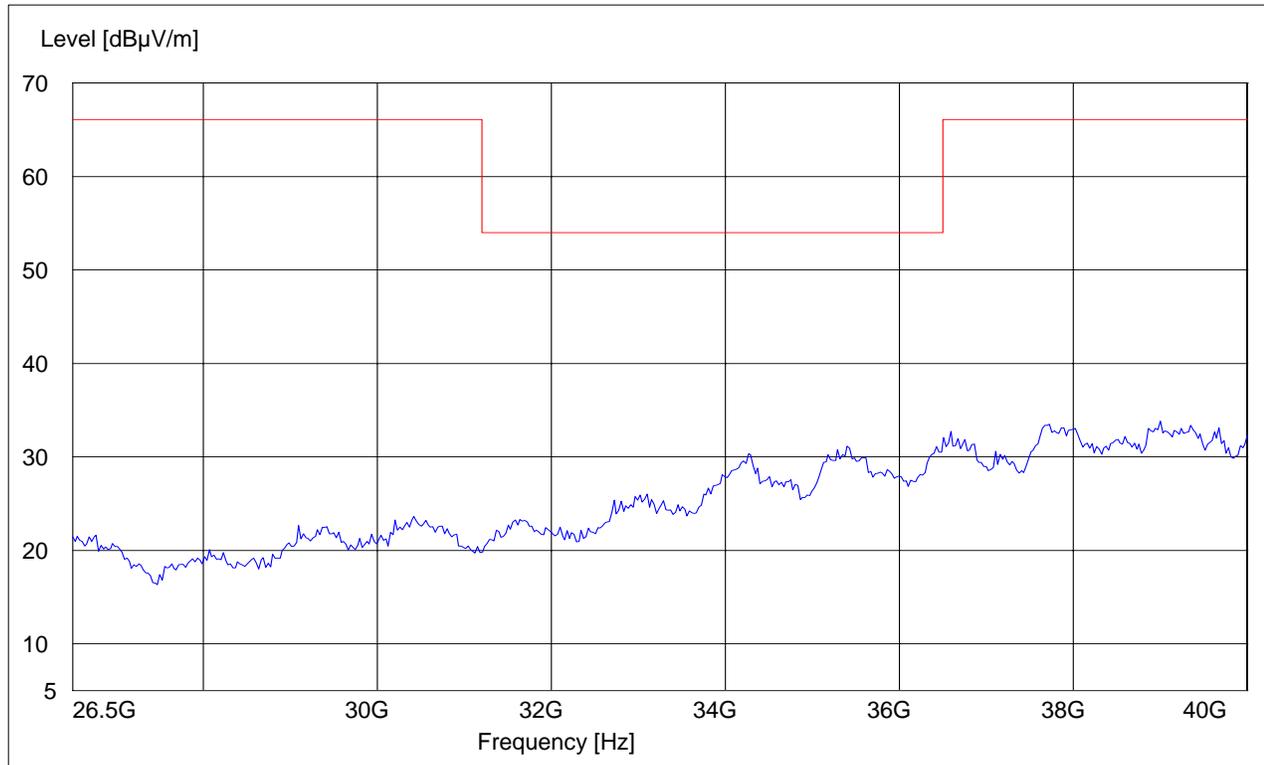




26.5-40GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
26.5GHz	40GHz	Max Peak	Coupled	1 MHz	1 MHz

Note: Peak Reading vs. Average limit





5.5 AC POWER LINE CONDUCTED EMISSIONS § 15.107/207

5.5.1 LIMITS

Technical specification: 15.107 / 15.207 (Revised as of August 20, 2002)

Limit

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

* Decreases with logarithm of the frequency

ANALYZER SETTINGS: RBW = 10KHz

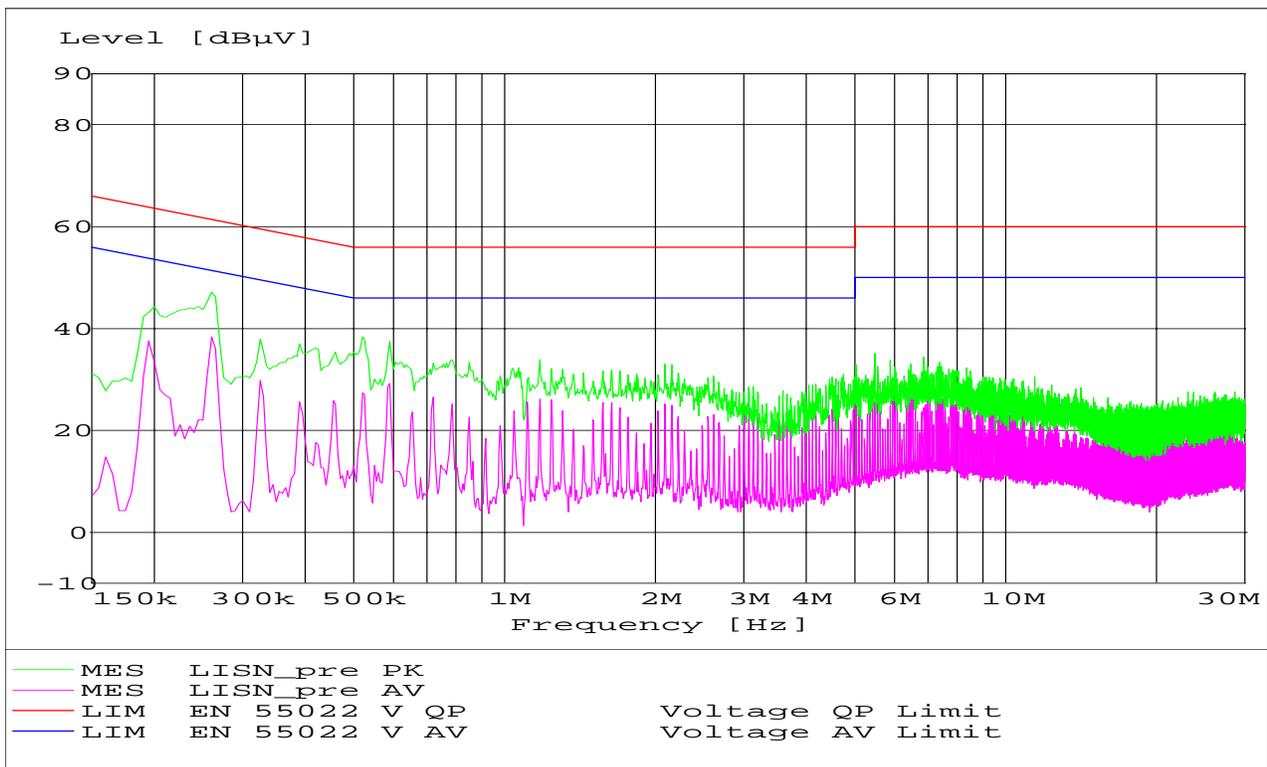
VBW = 10KHz



5.5.2 RESULTS

SCAN TABLE: "EN 55022 Voltage @ 110VAC"

Short Description:			EN 55022 Voltage			
Start	Stop	Step	Detector	Meas.	IF	Transducer
Frequency	Frequency	Width		Time	Bandw.	
150.0 kHz	30.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			



5.6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No	Instrument/Ancillary	Type	Manufacturer	Serial No.	Cal Due	Interval
01	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107	May 2006	1 year
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	100017	August 2006	1 year
03	Signal Generator	SMY02	Rohde & Schwarz	836878/011	May 2006	1 year
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02	May 2006	1 year
05	Biconilog Antenna	3141	EMCO	0005-1186	June 2006	1 year
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325	June 2006	1 year
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240	June 2006	1 year
08	Power Splitter	11667B	Hewlett Packard	645348	n/a	n/a
09	Climatic Chamber	VT4004	Voltsch	G1115	May 2006	1 year
10	High Pass Filter	5HC2700	Trilithic Inc.	9926013	n/a	n/a
11	High Pass Filter	4HC1600	Trilithic Inc.	9922307	n/a	n/a
12	Pre-Amplifier	JS4-00102600	Miteq	00616	May 2006	1 year
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807	May 2006	1 year
14	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008	May 2006	1 year
15	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06	May 2006	1 year
16	Horn Antenna (26.5-40GHz)	3160-10	EMCO	1156	June 2006	1 year

5.7 BLOCK DIAGRAMS

Radiated Testing

ANECHOIC CHAMBER

