FCC CFR47 PART 15 SUBPART C
CLASS II PERMISSIVE CHANGE

TEST REPORT

FOR

WIRELESS LAN MODULE

MODEL: PA3171WL

FCC ID: CJ6PA3171WL

REPORT NUMBER: 02U1606-1

ISSUE DATE: OCTOBER 15, 2002

Prepared for
TOSHIBA CORPORATION DIGITAL MEDIA NETWORK COMPANY
2-9, SUEHIRO-CHO, OME,
TOKYO, 198-8710
JAPAN

Prepared by
COMPLIANCE CERTIFICATION SERVICES
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1. TEST RESULT CERTIFICATION

COMPANY NAME: TOSHIBA CORPORATION DIGITAL MEDIA NETWORK COMPANY
2-9, SUEHIRO-CHO, OME
TOKYO, 198-8710 JAPAN

EUT DESCRIPTION: WIRELESS LAN MODULE

MODEL: PA3171WL

DATE TESTED: SEPTEMBER 24 - 25, 2002

TYPE OF EQUIPMENT	INTENTIONAL RADIATOR
EQUIPMENT TYPE	2.4 - 2.4835 GHz TRANSCEIVER
MEASUREMENT PROCEDURE	ANSI 63.4 / 1992, TIA/EIA 603
PROCEDURE	CLASS II PERMISSIVE CHANGE
FCC RULE	CFR 47 PART 15.C

Compliance Certification Services, Inc. tested the above equipment for compliance with the requirements set forth in CFR 47, PART 15, Subpart C. Test results show that the measured emission levels emanating from the equipment in the configuration described in this report do not exceed the specified limits. This report documents the radiated emissions of the co-located radio modules. See Section 2 below for cross references to additional reports with respect to other applicable requirements.

Note: This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document.

Approved & Released For CCS By:

THU CHAN
SENIOR EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

Tested By:

MIKE HECKROTTE
CHIEF ENGINEER
COMPLIANCE CERTIFICATION SERVICES

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2. CROSS REFERENCES TO OTHER APPLICABLE REPORTS

The Bluetooth Transmitter Module performance, with respect to FCC Part 15 Subpart C requirements, is documented by CCS Report 02U1501-1 dated October 3, 2002, FCC ID: CJ6UPA3232BT, Certification Pending.

The WLAN Transmitter Module has an existing limited module approval under FCC ID CJ6PA3171WL.

The performance of the Touch Screen Platform system, with respect to AC Mains Line Conducted emissions and radiated emissions as a Digital Device, is documented by Toshiba Document Number OFA-H3355 Rev. A dated October 3, 2002, FCC ID: CJ6UPP350SY, Certification Pending.

3. DESCRIPTION OF EUT AND CLASS II PERMISSIVE CHANGE

3.1.1. EUT DESCRIPTION

The PA3171WL is a wireless Direct Sequence Spread Spectrum WLAN transceiver module that operates from 2412 – 2462 MHz. This unit provides a maximum power output of +19.29 dBm (85 mW) and is connected to two identical internal film antennas. One antenna (Main) is used for transmit and both antennas (Main plus Aux) are used for dual diversity receive.

According to the original FCC Grant of Equipment Authorization, this module may only be used in Toshiba laptops.

3.1.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

This module was originally certified with the Dual Film antenna set. Each identical antenna in this set has a 0.9 dBi gain.

The proposed change is to add the Wide Dual Film antenna set and to add co-location with the CSR Bluetooth transceiver module. Each identical antenna in this alternate set has a 1.26 dBi gain

The CSR Bluetooth module is a wireless Frequency Hopping Spread Spectrum transceiver that operates from 2402 – 2480 MHz. This unit provides a maximum power output of +1.4 dBm (1.38 mW) and is connected to an internal film antenna with a 1.22 dBi gain (Single Film).

The Toshiba Portege 3500 is a Touch Screen Platform with two transceivers installed. One is the CSR Bluetooth module and one is the WLAN module.

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4. TEST METHODOLOGY

Conducted and radiated testing were performed according to the procedures documented on chapter 13 of ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, and 15.407.

5. FACILITIES AND ACCREDITATION

5.1. FACILITIES AND EQUIPMENT

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

Receiving equipment (i.e., receiver, analyzer, quasi-peak adapter, pre-selector) and LISNs conform to CISPR specifications for "Radio Interference Measuring Apparatus and Measurement Methods," Publication 16.

5.2. LABORATORY ACCREDITATIONS AND LISTINGS

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200065-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (reference no: 31040/SIT (1300B3) and 31040/SIT (1300F2)).

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5.3. TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	NVLAP*	FCC Part 15, CISPR 22, AS/NZS 3548,IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, CNS 13438	NVLAP 200065-0
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	FC 1300
Japan	VCCI	CISPR 22 Two OATS and one conducted Site	VCCI R-1014, R-619, C-640
Norway	NEMKO	EN50081-1, EN50081-2, EN50082-1, EN50082-2, IEC61000-6-1, IEC61000-6-2, EN50083-2, EN50091-2, EN50130-4, EN55011, EN55013, EN55014-1, EN55104, EN55015, EN61547, EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN60945, EN61326-1	N ELA 117
Norway	NEMKO	EN60601-1-2 and IEC 60601-1-2, the Collateral Standards for Electro-Medical Products. MDD, 93/42/EEC, AIMD 90/385/EEC	N ELA-171
Taiwan	BSMI	CNS 13438	SL2-IN-E-1012
Canada	Industry Canada	RSS210 Low Power Transmitter and Receiver	Canada IC2324 A,B,C, and F

* No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government.

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6. CALIBRATION AND UNCERTAINTY

6.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

6.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Radiated Emission	
30MHz – 200 MHz	+/- 3.3dB
200MHz – 1000MHz	+4.5/-2.9dB
1000MHz – 2000MHz	+4.6/-2.2dB
Power Line Conducted Emission	
150kHz – 30MHz	+/-2.9

Any results falling within the above values are deemed to be marginal.

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6.3. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST AND MEASUREMENT EQUIPMENT LIST				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due Date
Spectrum Analyzer	HP	8566B	3014A06685	6/1/03
Spectrum Display	HP	85662A	2152A03066	6/1/03
Quasi-Peak Detector	HP	85650A	3145A01654	6/1/03
Preamplifier	HP	8447D	2944A06833	8/10/02
Log Periodic Antenna	EMCO	3146	9107-3163	3/30/03
Biconical Antenna	Eaton	94455-1	1197	3/30/03
Spectrum Analyzer	HP	8593EM	3710A00205	6/11/03
Preamplifier (1 - 26.5GHz)	HP	11	646456	4/26/03
Horn Antenna (1 - 18GHz)	EMCO	3115	6717	1/31/03
Horn Antenna (18 – 26.5GHz)	ARA	MWH 1826/B	6717	1/31/03
High Pass Filter (4.57GHz)	FSY Microwave	FM-4570-9SS	003	N.C.R.

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7. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Device Type	Manufacturer	Model	Serial Number	FCC ID
Touch Screen Platform	Toshiba	Portege 3500	92027903	Prototype / EUT
Laptop	Toshiba	TECRA 9100	12040512	DoC
Touch Screen Platform	Toshiba	Portege 3500	82010051	Prototype / EUT
Laptop	Toshiba	TECRA 9100	72043652	DoC
AC Adapter	Toshiba	PA3083U-1ACA	1336963G	DoC
AC Adapter	Toshiba	PA3083U-1ACA	1230257G	DoC

Note 1: EUT Serial Number 92027903 is equipped with the Dual Film WLAN antenna set.

Note 2: The Tecra 9100 Serial Number 12040512 is set up to establish an ad hoc WLAN link with EUT Serial Number 92027903.

Note 3: EUT Serial Number 82010051 is equipped with the Wide Dual Film WLAN antenna set.

Note 4: The Tecra 9100 Serial Number 72043652 is set up to establish an ad hoc WLAN link with EUT Serial Number 82010051.

Note 5: Both EUT samples are equipped with the Single Film Bluetooth antenna.

I/O CABLES

Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US115	Unshielded	2 m	Integrated with AC Adapter
2	AC	1	US115	Unshielded	2 m	Integrated with AC Adapter

TEST SETUP

The EUT (equipped with a Bluetooth transceiver and a WLAN transceiver) is placed next to a laptop computer (equipped with a similar WLAN transceiver) during the test.

The Bluetooth transceiver in the EUT is operated in a standalone mode by a utility program. The WLAN transceiver in the EUT is operated in a linked ad hoc mode, using the similar WLAN to complete the link.

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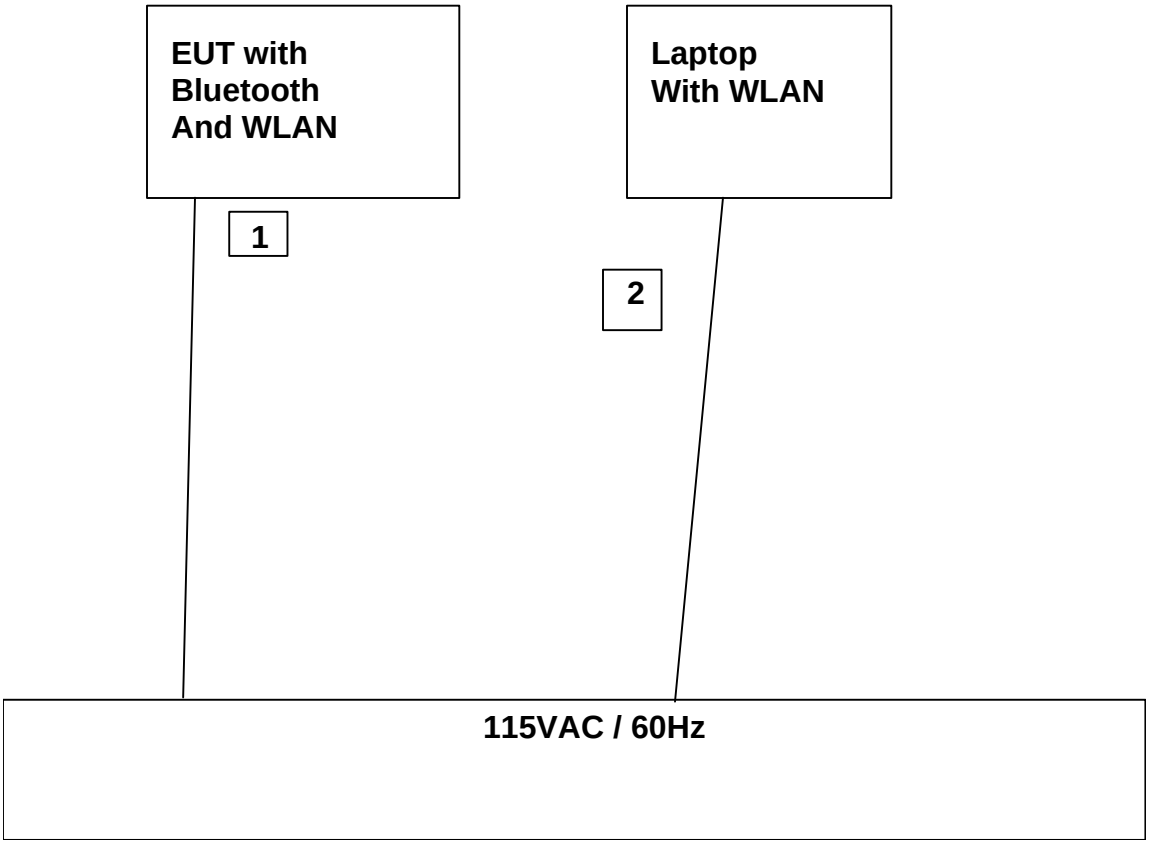
SETUP DIAGRAM FOR TRANSMITTER TESTS



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7.1. APPLICABLE RULES

§15.247 (c)- SPURIOUS EMISSIONS

In addition, radiated emissions which fall in the restricted bands, as defined in§15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

§15.205- RESTRICTED BANDS OF OPERATIONS

(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	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 - 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

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

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§15.209- RADIATED EMISSION LIMITS

(a) 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 (microvolts/meter)	Measurement Distance (meters)
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.

(b) In the emission table above, the tighter limit applies at the band edges.

Frequency Range (MHz)	Field Strength (uV/m at 3 m)	Field Strength (dBuV/m at 3 m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

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8. TEST SETUP, PROCEDURE AND RESULT

8.1. UNDESIRABLE EMISSIONS – RADIATED MEASUREMENTS

TEST SETUP

The EUT is placed on the wooden table. The antenna to EUT distance is 3 meters for measurements below 1 GHz and 1 meter for measurements above 1 GHz. The EUT is configured in accordance with Section 8 of ANSI C63.4/1992.

The EUT is set to transmit in a continuous mode.

TEST PROCEDURE

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz within restricted bands, the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 26 GHz is investigated.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The frequency span is set small enough to easily differentiate between broadcast stations, intermittent ambient signals and EUT emissions. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the suspected signal. Measurements were made with the antenna polarized in both the vertical and the horizontal positions.

TEST PROCEDURE FOR CO-LOCATED TRANSMITTERS

Each transmitter is operated individually, in a continuously transmitting mode, on their respective Low, Middle, and High channels, and the spurious emissions are measured.

Pretesting of all channel combinations with both transmitters operating simultaneously is performed to determine the worst case simultaneous configuration.

The results of final testing of the worst case simultaneous configuration is presented in this report.

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SYSTEM NOISE FLOOR FOR HARMONIC AND SPURIOUS MEASUREMENTS

Compliance Certification Services

Worst Case Radiated Emissions System Noise Floor

Each band below corresponds to each horn antenna band
Uses the lowest gain preamplifier; actual preamp used may have higher gain
Uses the longest typical cable configuration; actual cables used may have less loss
Noise floor field strength results are compared to the FCC 15.205 Restricted Band limit

Specification Distance: 3 meters

Freq GHz	SA dBuV	AF dB/m	Distance m	Distance dB	Preamp dB	Cable dB	Field dBuV/m	Limit dBuV/m	Margin dB
1 to 18 GHz band									
RBW = 1 MHz, peak detection									
18	41.9	47.8	1	-9.5	32.6	13.5	61.06	74	-12.94
RBW = 1 MHz, average detection									
18	28.7	47.8	1	-9.5	32.6	13.5	47.86	54	-6.14
18 to 26.5 GHz band									
RBW = 1 MHz, peak detection									
26.5	44.6	33.4	1	-9.5	35.0	19.5	52.96	74	-21.04
RBW = 1 MHz, average detection									
26.5	32.4	33.4	1	-9.5	35.0	19.5	40.76	54	-13.24

TEST RESULTS

No non-compliance noted:

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SPURIOUS RADIATED EMISSIONS WITH BLUETOOTH ONLY OPERATING

	Description of Test:			Spurious Radiated Emissions							
	Project Number:			02U1501							
			Date:	09/24/02							
	Test Engineer:			Mike Heckrotte							
			Site:	B							
		Company:		Toshiba							
	EUT Description:			Touch Screen / Bluetooth / Single Film Antenna / WLAN							
	Test Configuration:			EUT / AC Adapter / Laptop with WLAN / AC Adapter							
	Mode of Operation:			Bluetooth transmitting at maximum power, Low channel							
				WLAN is off							
	Specification Distance:			3.0	meters						
	Actual Distance:			1.0	meters	Cable Length:		15.0	feet		
Freq	**Pol**	**Det**	**SA**	**Dist**	**AF**	**Preamp**	**Filter**	**Cable**	**Field**	**Limit**	**Margin**
GHz	**V/H**		**dBuV**	**dB**	**dB/m**	**dB**	**dB**	**dB**	**dBuV/m**	**dBuV/m**	**dB**
4.804	V	Peak	50.0	-9.5	33.8	34.5	1.0	5.7	46.4	74.0	-27.6
4.804	V	Peak*	50.0	-9.5	33.8	34.5	1.0	5.7	46.4	54.0	-7.6
4.804	H	Peak	52.1	-9.5	33.8	34.5	1.0	5.7	48.5	74.0	-25.5
4.804	H	Peak*	52.1	-9.5	33.8	34.5	1.0	5.7	48.5	54.0	-5.5
7.206	V	Peak	44.6	-9.5	37.0	34.5	1.0	7.2	45.7	74.0	-28.3
7.206	V	Peak*	44.6	-9.5	37.0	34.5	1.0	7.2	45.7	54.0	-8.3
7.206	H	Peak	49.9	-9.5	37.0	34.5	1.0	7.2	51.0	74.0	-23.0
7.206	H	Peak*	49.9	-9.5	37.0	34.5	1.0	7.2	51.0	54.0	-3.0
Note 1: No other spurious emissions were detected above the system noise floor.											
Note 2: * The Peak level was less than the Average limit.											

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	Description of Test:			Spurious Radiated Emissions							
	Project Number:			02U1501							
			Date:	09/24/02							
	Test Engineer:			Mike Heckrotte							
			Site:	B							
			Company:	Toshiba							
	EUT Description:			Touch Screen / Bluetooth / Single Film Antenna / WLAN							
	Test Configuration:			EUT / AC Adapter / Laptop with WLAN / AC Adapter							
	Mode of Operation:			Bluetooth transmitting at maximum power, Mid channel							
				WLAN is off							
	Specification Distance:			3.0	meters						
	Actual Distance:			1.0	meters	Cable Length:		15.0	feet		
Freq	**Pol**	**Det**	**SA**	**Dist**	**AF**	**Preamp**	**Filter**	**Cable**	**Field**	**Limit**	**Margin**
GHz	**V/H**		**dBuV**	**dB**	**dB/m**	**dB**	**dB**	**dB**	**dBuV/m**	**dBuV/m**	**dB**
4.882	V	Peak	51.1	-9.5	34.0	34.5	1.0	5.8	47.8	74.0	-26.2
4.882	V	Peak*	51.1	-9.5	34.0	34.5	1.0	5.8	47.8	54.0	-6.2
4.882	H	Peak	51.5	-9.5	34.0	34.5	1.0	5.8	48.2	74.0	-25.8
4.882	H	Peak*	51.5	-9.5	34.0	34.5	1.0	5.8	48.2	54.0	-5.8
7.323	V	Peak	43.9	-9.5	37.2	34.6	1.0	7.3	45.3	74.0	-28.7
7.323	V	Peak*	43.9	-9.5	37.2	34.6	1.0	7.3	45.3	54.0	-8.7
7.323	H	Peak	49.4	-9.5	37.2	34.6	1.0	7.3	50.8	74.0	-23.2
7.323	H	Peak*	49.4	-9.5	37.2	34.6	1.0	7.3	50.8	54.0	-3.2
Note 1: No other spurious emissions were detected above the system noise floor.											
Note 2: * The Peak level was less than the Average limit.											

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	Description of Test:			Spurious Radiated Emissions							
	Project Number:			02U1501							
			Date:	09/24/02							
	Test Engineer:			Mike Heckrotte							
			Site:	B							
			Company:	Toshiba							
	EUT Description:			Touch Screen / Bluetooth / Single Film Antenna / WLAN							
	Test Configuration:			EUT / AC Adapter / Laptop with WLAN / AC Adapter							
	Mode of Operation:			Bluetooth transmitting at maximum power, High channel							
				WLAN is off							
	Specification Distance:			3.0	meters						
	Actual Distance:			1.0	meters	Cable Length:		15.0	feet		

Freq	Pol	Det	SA	Dist	AF	Preamp	Filter	Cable	Field	Limit	Margin
GHz	V/H		dBuV	dB	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB
4.960	V	Peak	50.2	-9.5	34.2	34.5	1.0	5.8	47.2	74.0	-26.8
4.960	V	Peak*	50.2	-9.5	34.2	34.5	1.0	5.8	47.2	54.0	-6.8
4.960	H	Peak	52.9	-9.5	34.2	34.5	1.0	5.8	49.9	74.0	-24.1
4.960	H	Peak*	52.9	-9.5	34.2	34.5	1.0	5.8	49.9	54.0	-4.1
7.440	V	Peak	44.7	-9.5	37.5	34.6	1.0	7.4	46.4	74.0	-27.6
7.440	V	Peak*	44.7	-9.5	37.5	34.6	1.0	7.4	46.4	54.0	-7.6
7.440	H	Peak	48.6	-9.5	37.5	34.6	1.0	7.4	50.3	74.0	-23.7
7.440	H	Peak*	48.6	-9.5	37.5	34.6	1.0	7.4	50.3	54.0	-3.7

Note 1: No other spurious emissions were detected above the system noise floor.

Note 2: * The Peak level was less than the Average limit.

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SPURIOUS RADIATED EMISSIONS WITH WLAN ONLY OPERATING, DUAL FILM ANTENNAS

	Description of Test:			Spurious Radiated Emissions							
	Project Number:			02U1501							
			Date:	09/24/02							
	Test Engineer:			Mike Heckrotte							
			Site:	B							
		Company:		Toshiba							
	EUT Description:			Touch Screen / Bluetooth / WLAN / Dual Film Antenna							
	Test Configuration:			EUT / AC Adapter / Laptop with WLAN / AC Adapter							
	Mode of Operation:			WLAN transmitting at maximum power in linked mode, Low channel							
				Bluetooth is off							
	Specification Distance:			3.0	meters						
	Actual Distance:			1.0	meters	Cable Length:		15.0	feet		
Freq	**Pol**	**Det**	**SA**	**Dist**	**AF**	**Preamp**	**Filter**	**Cable**	**Field**	**Limit**	**Margin**
GHz	**V/H**		**dBuV**	**dB**	**dB/m**	**dB**	**dB**	**dB**	**dBuV/m**	**dBuV/m**	**dB**
4.824	V	Peak	63.3	-9.5	33.8	34.5	1.0	5.7	59.8	74.0	-14.2
4.824	V	Avg	46.0	-9.5	33.8	34.5	1.0	5.7	42.5	54.0	-11.5
4.824	H	Peak	61.8	-9.5	33.8	34.5	1.0	5.7	58.3	74.0	-15.7
4.824	H	Avg	45.7	-9.5	33.8	34.5	1.0	5.7	42.2	54.0	-11.8
7.236	V	Peak	58.5	-9.5	37.0	34.5	1.0	7.2	59.7	74.0	-14.3
7.236	V	Avg	42.5	-9.5	37.0	34.5	1.0	7.2	43.7	54.0	-10.3
7.236	H	Peak	60.8	-9.5	37.0	34.5	1.0	7.2	62.0	74.0	-12.0
7.236	H	Avg	44.8	-9.5	37.0	34.5	1.0	7.2	46.0	54.0	-8.0
9.648	V	Peak	56.7	-9.5	39.7	34.9	1.0	8.5	61.4	74.0	-12.6
9.648	V	Avg	41.8	-9.5	39.7	34.9	1.0	8.5	46.6	54.0	-7.4
9.648	H	Peak	56.5	-9.5	39.7	34.9	1.0	8.5	61.2	74.0	-12.8
9.648	H	Avg	41.5	-9.5	39.7	34.9	1.0	8.5	46.2	54.0	-7.8
Note 1: No other spurious emissions were detected above the system noise floor.											

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			Site:	B							
			Company:	Toshiba							
		EUT Description:		Touch Screen / Bluetooth / WLAN / Dual Film Antenna							
		Test Configuration:		EUT / AC Adapter / Laptop with WLAN / AC Adapter							
		Mode of Operation:		WLAN transmitting at maximum power in linked mode, Mid channel							
				Bluetooth is off							
		Specification Distance:		3.0	meters						
		Actual Distance:		1.0	meters		Cable Length:		15.0	feet	
Freq	**Pol**	**Det**	**SA**	**Dist**	**AF**	**Preamp**	**Filter**	**Cable**	**Field**	**Limit**	**Margin**
GHz	**V/H**		**dBuV**	**dB**	**dB/m**	**dB**	**dB**	**dB**	**dBuV/m**	**dBuV/m**	**dB**
4.874	V	Peak	63.6	-9.5	33.9	34.5	1.0	5.8	60.3	74.0	-13.7
4.874	V	Avg	46.1	-9.5	33.9	34.5	1.0	5.8	42.8	54.0	-11.2
4.874	H	Peak	61.5	-9.5	33.9	34.5	1.0	5.8	58.2	74.0	-15.8
4.874	H	Avg	45.6	-9.5	33.9	34.5	1.0	5.8	42.3	54.0	-11.7
7.311	V	Peak	58.1	-9.5	37.2	34.6	1.0	7.3	59.5	74.0	-14.5
7.311	V	Avg	42.0	-9.5	37.2	34.6	1.0	7.3	43.4	54.0	-10.6
7.311	H	Peak	61.6	-9.5	37.2	34.6	1.0	7.3	63.0	74.0	-11.0
7.311	H	Avg	45.1	-9.5	37.2	34.6	1.0	7.3	46.5	54.0	-7.5
9.748	V	Peak	56.0	-9.5	39.8	34.9	1.0	8.6	60.9	74.0	-13.1
9.748	V	Avg	41.5	-9.5	39.8	34.9	1.0	8.6	46.4	54.0	-7.6
9.748	H	Peak	56.9	-9.5	39.8	34.9	1.0	8.6	61.8	74.0	-12.2
9.748	H	Avg	41.9	-9.5	39.8	34.9	1.0	8.6	46.8	54.0	-7.2
Note 1: No other spurious emissions were detected above the system noise floor.											

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	Description of Test:			Spurious Radiated Emissions							
	Project Number:			02U1501							
			Date:	09/24/02							
	Test Engineer:			Mike Heckrotte							
			Site:	B							
		Company:		Toshiba							
	EUT Description:			Touch Screen / Bluetooth / WLAN / Dual Film Antenna							
	Test Configuration:			EUT / AC Adapter / Laptop with WLAN / AC Adapter							
	Mode of Operation:			WLAN transmitting at maximum power in linked mode, High channel							
				Bluetooth is off							
	Specification Distance:			3.0	meters						
	Actual Distance:			1.0	meters	Cable Length:		15.0	feet		
Freq	**Pol**	**Det**	**SA**	**Dist**	**AF**	**Preamp**	**Filter**	**Cable**	**Field**	**Limit**	**Margin**
GHz	**V/H**		**dBuV**	**dB**	**dB/m**	**dB**	**dB**	**dB**	**dBuV/m**	**dBuV/m**	**dB**
4.924	V	Peak	62.7	-9.5	34.1	34.5	1.0	5.8	59.6	74.0	-14.4
4.924	V	Avg	45.8	-9.5	34.1	34.5	1.0	5.8	42.7	54.0	-11.3
4.924	H	Peak	62.3	-9.5	34.1	34.5	1.0	5.8	59.2	74.0	-14.8
4.924	H	Avg	46.1	-9.5	34.1	34.5	1.0	5.8	43.0	54.0	-11.0
7.386	V	Peak	58.9	-9.5	37.3	34.6	1.0	7.3	60.5	74.0	-13.5
7.386	V	Avg	42.7	-9.5	37.3	34.6	1.0	7.3	44.3	54.0	-9.7
7.386	H	Peak	60.5	-9.5	37.3	34.6	1.0	7.3	62.1	74.0	-11.9
7.386	H	Avg	44.2	-9.5	37.3	34.6	1.0	7.3	45.8	54.0	-8.2
9.848	V	Peak	56.9	-9.5	40.0	35.0	1.0	8.6	62.0	74.0	-12.0
9.848	V	Avg	41.9	-9.5	40.0	35.0	1.0	8.6	47.0	54.0	-7.0
9.848	H	Peak	56.4	-9.5	40.0	35.0	1.0	8.6	61.5	74.0	-12.5
9.848	H	Avg	41.3	-9.5	40.0	35.0	1.0	8.6	46.4	54.0	-7.6
Note 1: No other spurious emissions were detected above the system noise floor.											

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SPURIOUS RADIATED EMISSIONS WITH WLAN ONLY OPERATING, WIDE DUAL FILM ANTENNAS

	Description of Test:			Spurious Radiated Emissions							
	Project Number:			02U1501							
			Date:	09/24/02							
	Test Engineer:			Mike Heckrotte							
			Site:	B							
		Company:		Toshiba							
	EUT Description:			Touch Screen / Bluetooth / WLAN / Wide Dual Film Antenna							
	Test Configuration:			EUT / AC Adapter / Laptop with WLAN / AC Adapter							
	Mode of Operation:			WLAN transmitting at maximum power in linked mode, Low channel							
				Bluetooth is off							
	Specification Distance:			3.0	meters						
	Actual Distance:			1.0	meters	Cable Length:		15.0	feet		
Freq	**Pol**	**Det**	**SA**	**Dist**	**AF**	**Preamp**	**Filter**	**Cable**	**Field**	**Limit**	**Margin**
GHz	**V/H**		**dBuV**	**dB**	**dB/m**	**dB**	**dB**	**dB**	**dBuV/m**	**dBuV/m**	**dB**
4.824	V	Peak	64.5	-9.5	33.8	34.5	1.0	5.7	61.0	74.0	-13.0
4.824	V	Avg	47.3	-9.5	33.8	34.5	1.0	5.7	43.8	54.0	-10.2
4.824	H	Peak	63.5	-9.5	33.8	34.5	1.0	5.7	60.0	74.0	-14.0
4.824	H	Avg	46.5	-9.5	33.8	34.5	1.0	5.7	43.0	54.0	-11.0
7.236	V	Peak	60.5	-9.5	37.0	34.5	1.0	7.2	61.7	74.0	-12.3
7.236	V	Avg	45.7	-9.5	37.0	34.5	1.0	7.2	46.8	54.0	-7.2
7.236	H	Peak	64.0	-9.5	37.0	34.5	1.0	7.2	65.2	74.0	-8.8
7.236	H	Avg	47.0	-9.5	37.0	34.5	1.0	7.2	48.2	54.0	-5.8
9.648	V	Peak	57.2	-9.5	39.7	34.9	1.0	8.5	61.9	74.0	-12.1
9.648	V	Avg	42.0	-9.5	39.7	34.9	1.0	8.5	46.7	54.0	-7.3
9.648	H	Peak	57.8	-9.5	39.7	34.9	1.0	8.5	62.6	74.0	-11.4
9.648	H	Avg	42.0	-9.5	39.7	34.9	1.0	8.5	46.7	54.0	-7.3
Note 1: No other spurious emissions were detected above the system noise floor.											

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	Description of Test:			Spurious Radiated Emissions							
	Project Number:			02U1501							
			Date:	09/24/02							
	Test Engineer:			Mike Heckrotte							
			Site:	B							
		Company:		Toshiba							
	EUT Description:			Touch Screen / Bluetooth / WLAN / Wide Dual Film Antenna							
	Test Configuration:			EUT / AC Adapter / Laptop with WLAN / AC Adapter							
	Mode of Operation:			WLAN transmitting at maximum power in linked mode, Mid channel							
				Bluetooth is off							
	Specification Distance:			3.0	meters						
	Actual Distance:			1.0	meters	Cable Length:		15.0	feet		
Freq	**Pol**	**Det**	**SA**	**Dist**	**AF**	**Preamp**	**Filter**	**Cable**	**Field**	**Limit**	**Margin**
GHz	**V/H**		**dBuV**	**dB**	**dB/m**	**dB**	**dB**	**dB**	**dBuV/m**	**dBuV/m**	**dB**
4.874	V	Peak	64.2	-9.5	33.9	34.5	1.0	5.8	60.9	74.0	-13.1
4.874	V	Avg	47.0	-9.5	33.9	34.5	1.0	5.8	43.7	54.0	-10.3
4.874	H	Peak	64.0	-9.5	33.9	34.5	1.0	5.8	60.7	74.0	-13.3
4.874	H	Avg	47.1	-9.5	33.9	34.5	1.0	5.8	43.8	54.0	-10.2
7.311	V	Peak	60.8	-9.5	37.2	34.6	1.0	7.3	62.2	74.0	-11.8
7.311	V	Avg	45.9	-9.5	37.2	34.6	1.0	7.3	47.3	54.0	-6.7
7.311	H	Peak	63.6	-9.5	37.2	34.6	1.0	7.3	65.0	74.0	-9.0
7.311	H	Avg	46.3	-9.5	37.2	34.6	1.0	7.3	47.7	54.0	-6.3
9.748	V	Peak	56.9	-9.5	39.8	34.9	1.0	8.6	61.8	74.0	-12.2
9.748	V	Avg	41.9	-9.5	39.8	34.9	1.0	8.6	46.8	54.0	-7.2
9.748	H	Peak	58.2	-9.5	39.8	34.9	1.0	8.6	63.1	74.0	-10.9
9.748	H	Avg	42.3	-9.5	39.8	34.9	1.0	8.6	47.2	54.0	-6.8
Note 1: No other spurious emissions were detected above the system noise floor.											

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	Description of Test:			Spurious Radiated Emissions							
	Project Number:			02U1501							
			Date:	09/24/02							
	Test Engineer:			Mike Heckrotte							
			Site:	B							
		Company:		Toshiba							
	EUT Description:			Touch Screen / Bluetooth / WLAN / Wide Dual Film Antenna							
	Test Configuration:			EUT / AC Adapter / Laptop with WLAN / AC Adapter							
	Mode of Operation:			WLAN transmitting at maximum power in linked mode, High channel							
				Bluetooth is off							
	Specification Distance:			3.0	meters						
	Actual Distance:			1.0	meters	Cable Length:		15.0	feet		
Freq	**Pol**	**Det**	**SA**	**Dist**	**AF**	**Preamp**	**Filter**	**Cable**	**Field**	**Limit**	**Margin**
GHz	**V/H**		**dBuV**	**dB**	**dB/m**	**dB**	**dB**	**dB**	**dBuV/m**	**dBuV/m**	**dB**
4.924	V	Peak	64.4	-9.5	34.1	34.5	1.0	5.8	61.3	74.0	-12.7
4.924	V	Avg	47.3	-9.5	34.1	34.5	1.0	5.8	44.2	54.0	-9.8
4.924	H	Peak	63.7	-9.5	34.1	34.5	1.0	5.8	60.6	74.0	-13.4
4.924	H	Avg	46.8	-9.5	34.1	34.5	1.0	5.8	43.7	54.0	-10.3
7.386	V	Peak	60.2	-9.5	37.3	34.6	1.0	7.3	61.8	74.0	-12.2
7.386	V	Avg	45.3	-9.5	37.3	34.6	1.0	7.3	46.9	54.0	-7.1
7.386	H	Peak	64.6	-9.5	37.3	34.6	1.0	7.3	66.2	74.0	-7.8
7.386	H	Avg	47.7	-9.5	37.3	34.6	1.0	7.3	49.3	54.0	-4.7
9.848	V	Peak	57.0	-9.5	40.0	35.0	1.0	8.6	62.1	74.0	-11.9
9.848	V	Avg	42.0	-9.5	40.0	35.0	1.0	8.6	47.1	54.0	-6.9
9.848	H	Peak	58.1	-9.5	40.0	35.0	1.0	8.6	63.2	74.0	-10.8
9.848	H	Avg	42.4	-9.5	40.0	35.0	1.0	8.6	47.5	54.0	-6.5
Note 1: No other spurious emissions were detected above the system noise floor.											

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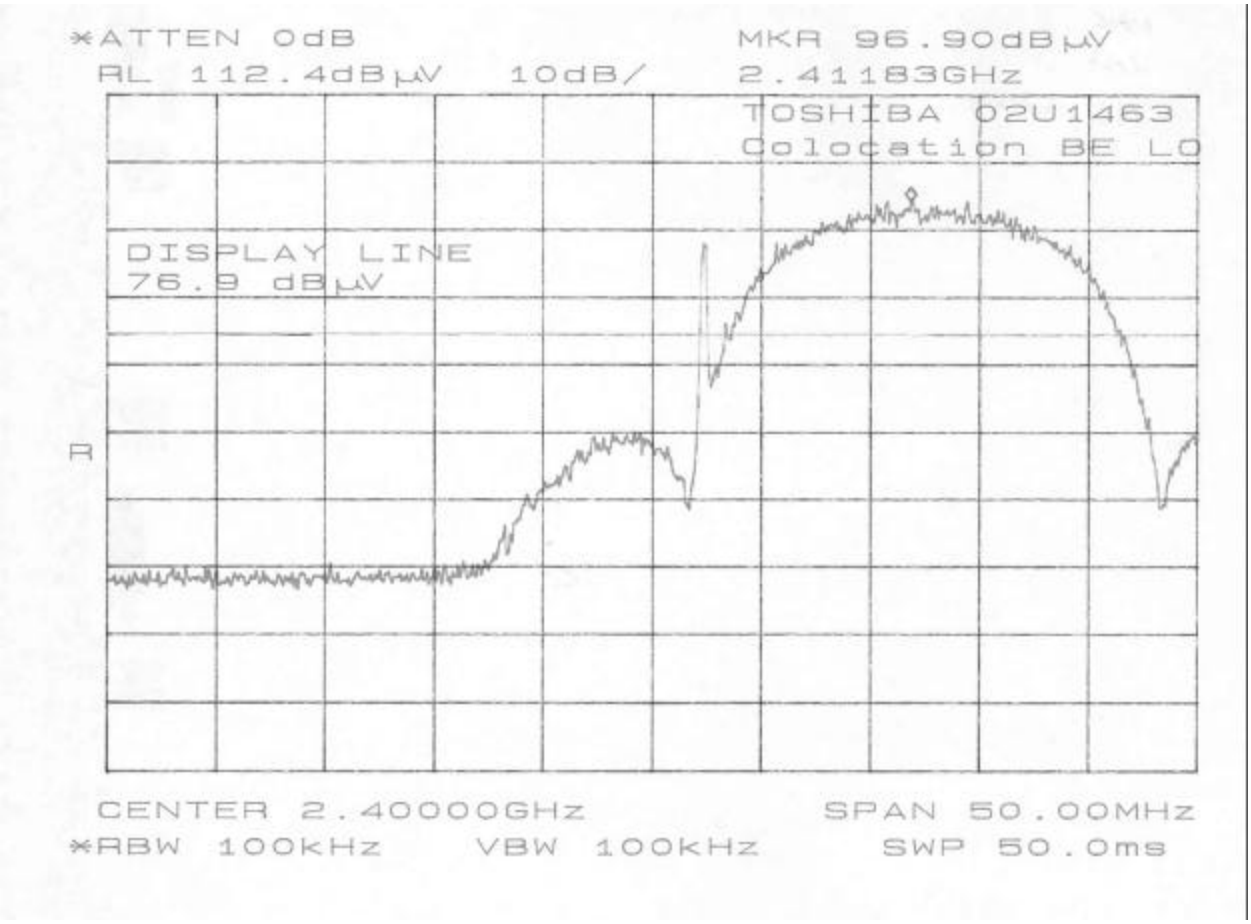
RADIATED EMISSIONS - LOWER BAND EDGE WITH CO-LOCATED BLUETOOTH AND WLAN OPERATING SIMULTANEOUSLY AT THEIR LOW FREQUENCY CHANNELS; DUAL FILM ANTENNAS INSTALLED FOR WLAN



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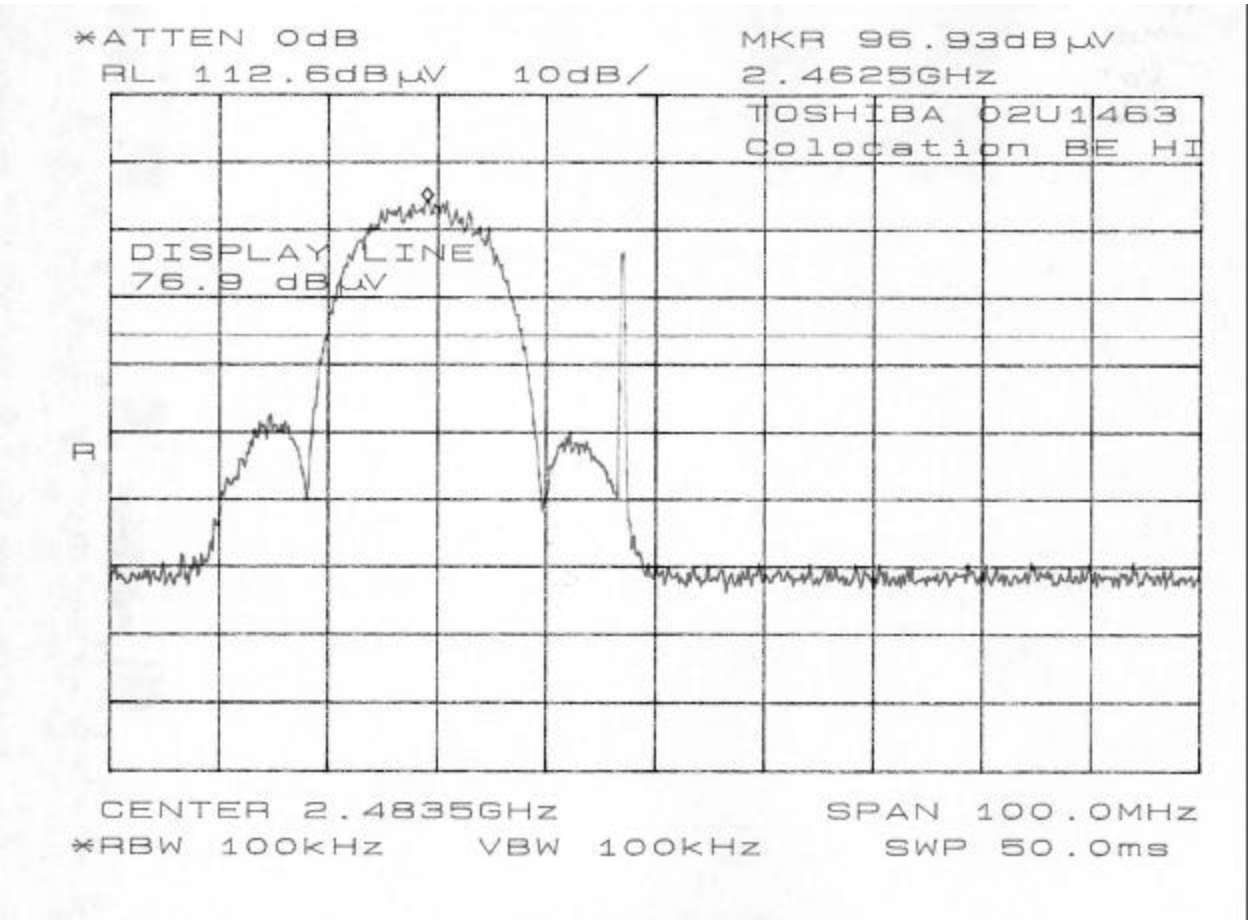
RADIATED EMISSIONS - UPPER BAND EDGE WITH CO-LOCATED BLUETOOTH AND WLAN OPERATING SIMULTANEOUSLY AT THEIR HIGH FREQUENCY CHANNELS; DUAL FILM ANTENNAS INSTALLED FOR WLAN



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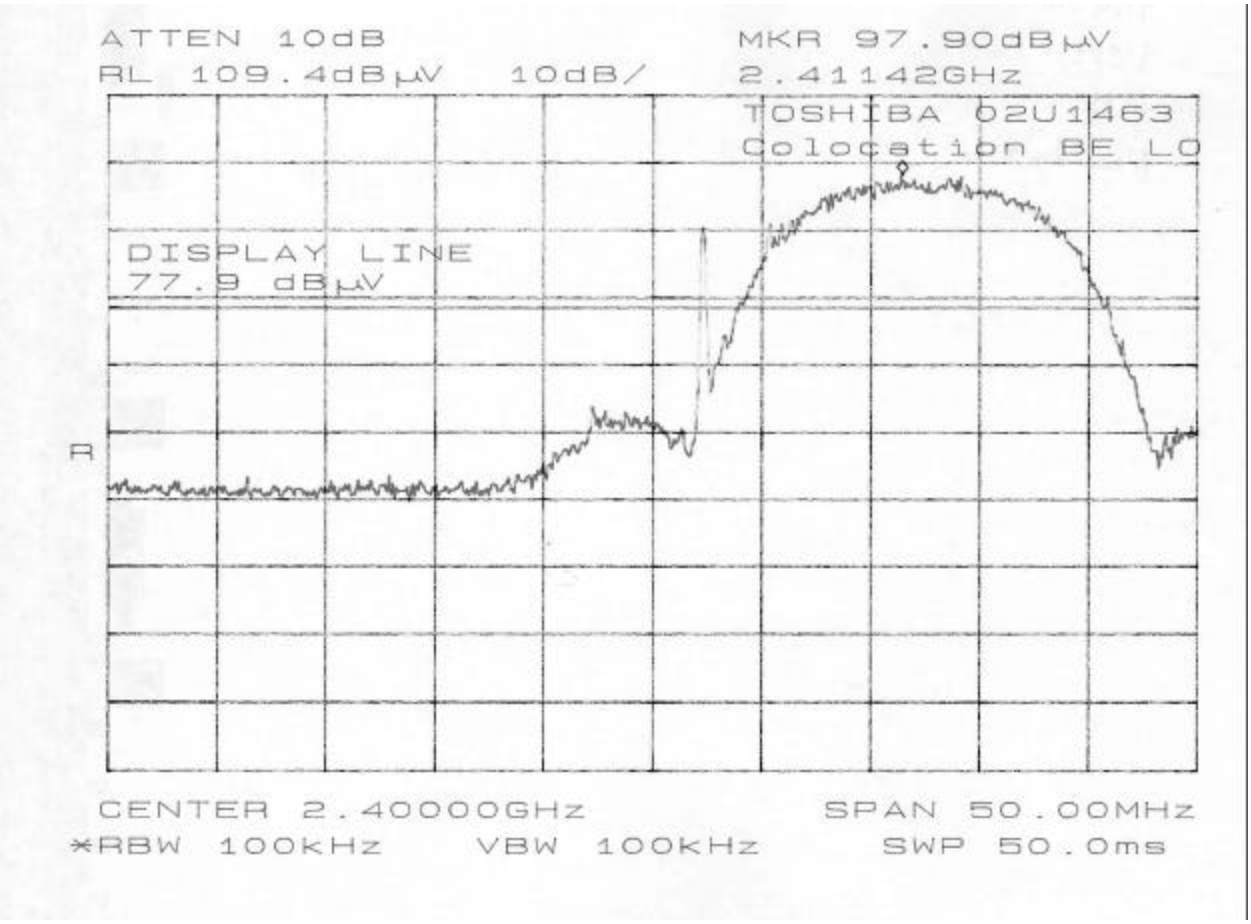
RADIATED EMISSIONS - LOWER BAND EDGE WITH CO-LOCATED BLUETOOTH AND WLAN OPERATING SIMULTANEOUSLY AT THEIR LOW FREQUENCY CHANNELS; WIDE DUAL FILM ANTENNAS INSTALLED FOR WLAN



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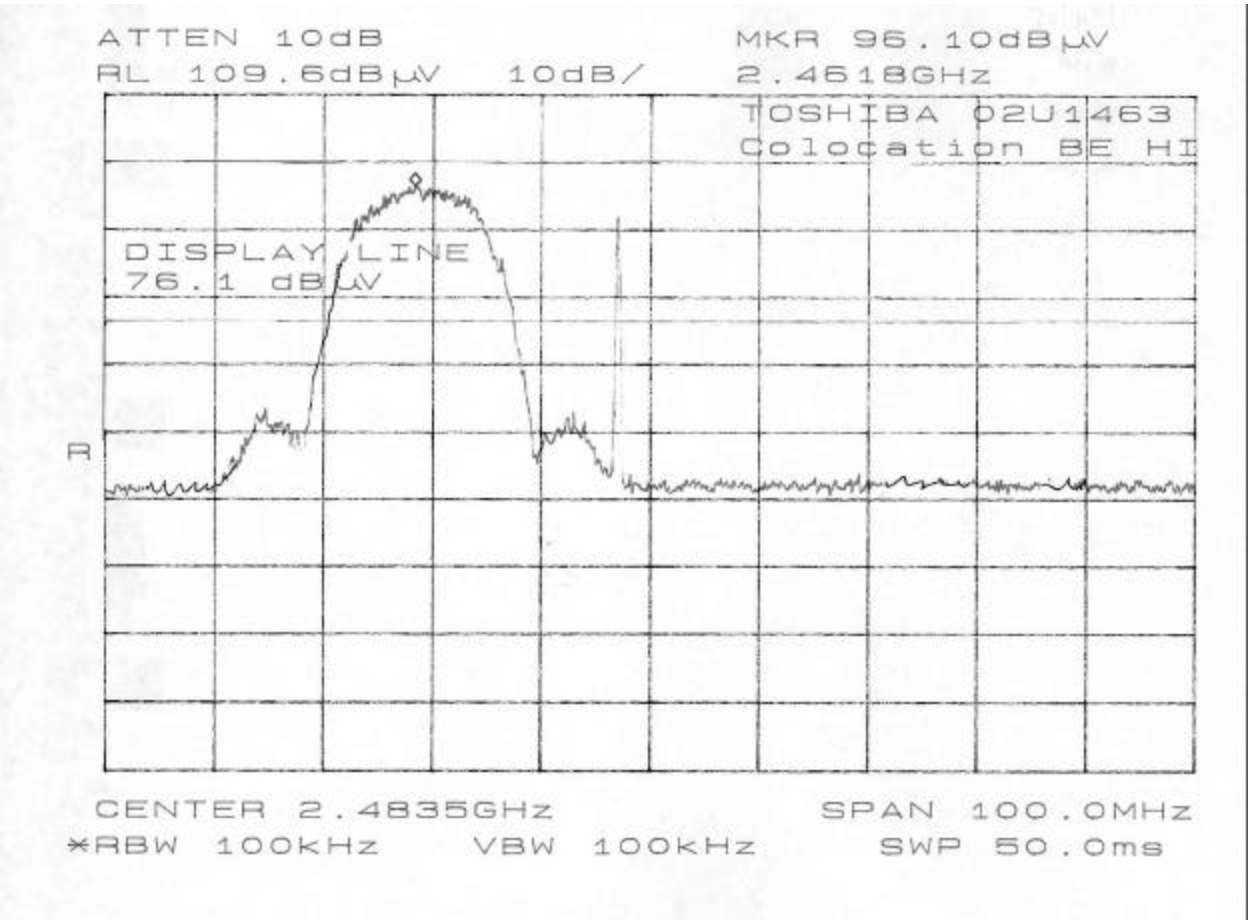
RADIATED EMISSIONS - UPPER BAND EDGE WITH CO-LOCATED BLUETOOTH AND WLAN OPERATING SIMULTANEOUSLY AT THEIR HIGH FREQUENCY CHANNELS; WIDE DUAL FILM ANTENNAS INSTALLED FOR WLAN



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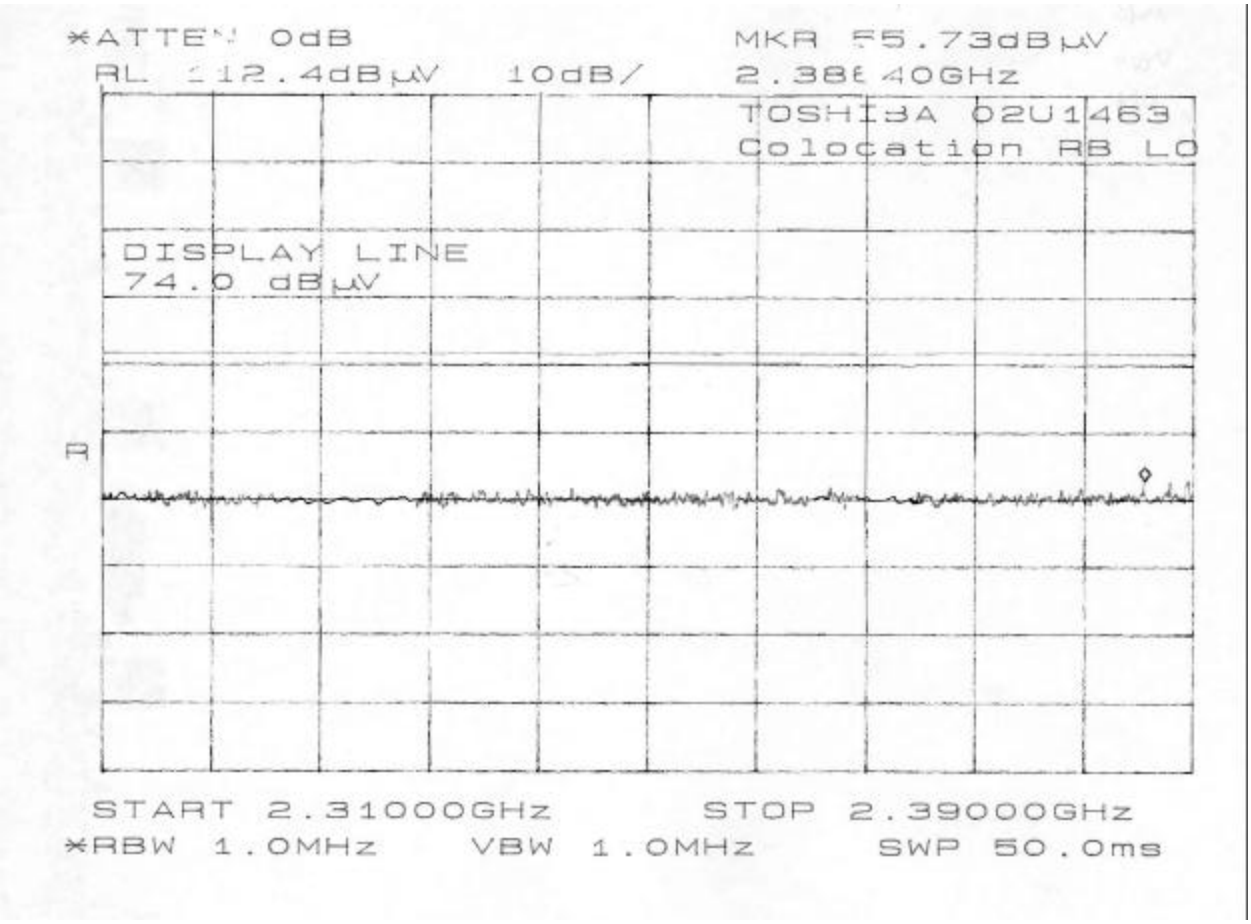
RADIATED EMISSIONS - LOWER RESTRICTED BAND EDGE WITH CO-LOCATED BLUETOOTH AND WLAN OPERATING SIMULTANEOUSLY AT THEIR LOW FREQUENCY CHANNELS; DUAL FILM ANTENNAS INSTALLED FOR WLAN – VERTICAL PEAK



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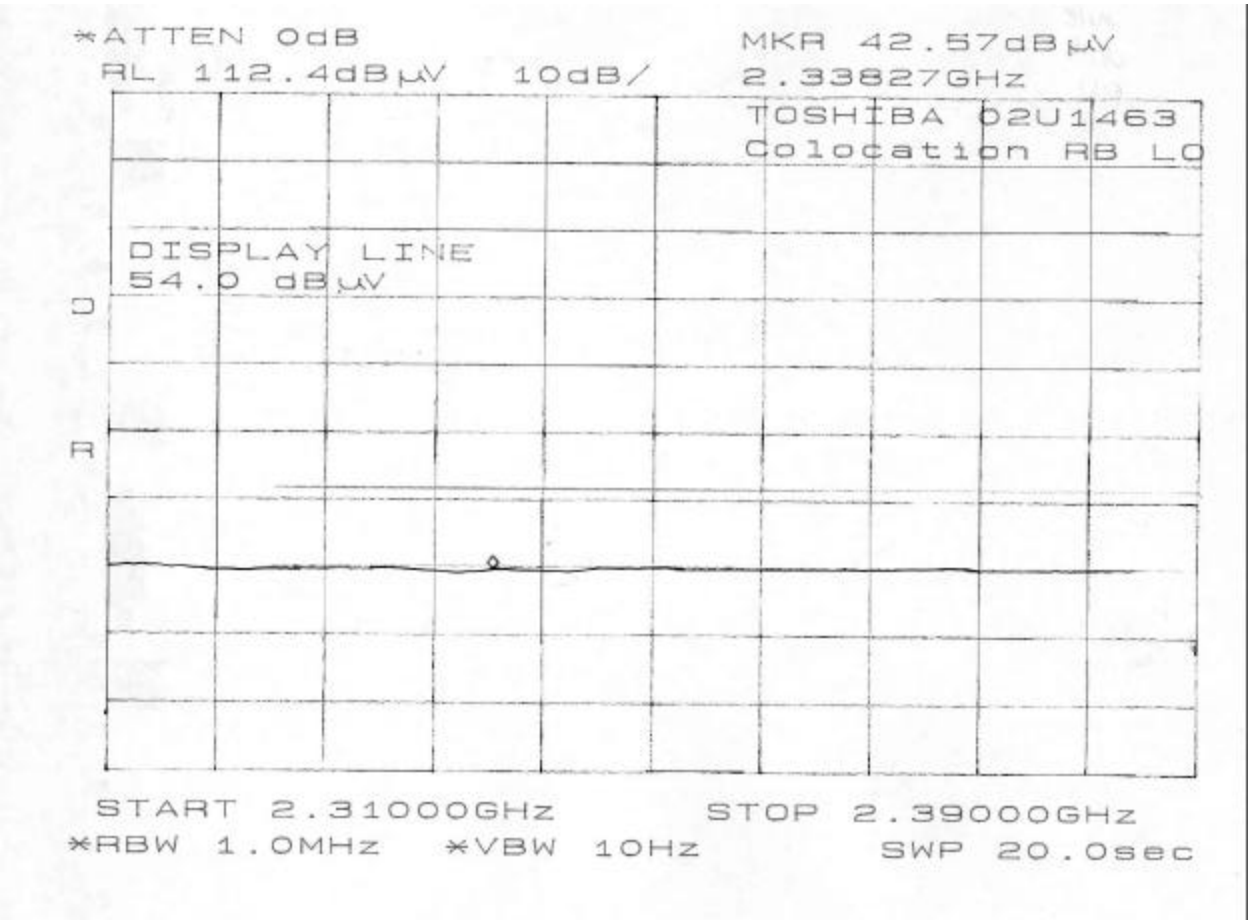
RADIATED EMISSIONS - LOWER RESTRICTED BAND EDGE WITH CO-LOCATED BLUETOOTH AND WLAN OPERATING SIMULTANEOUSLY AT THEIR LOW FREQUENCY CHANNELS; DUAL FILM ANTENNAS INSTALLED FOR WLAN – VERTICAL AVERAGE



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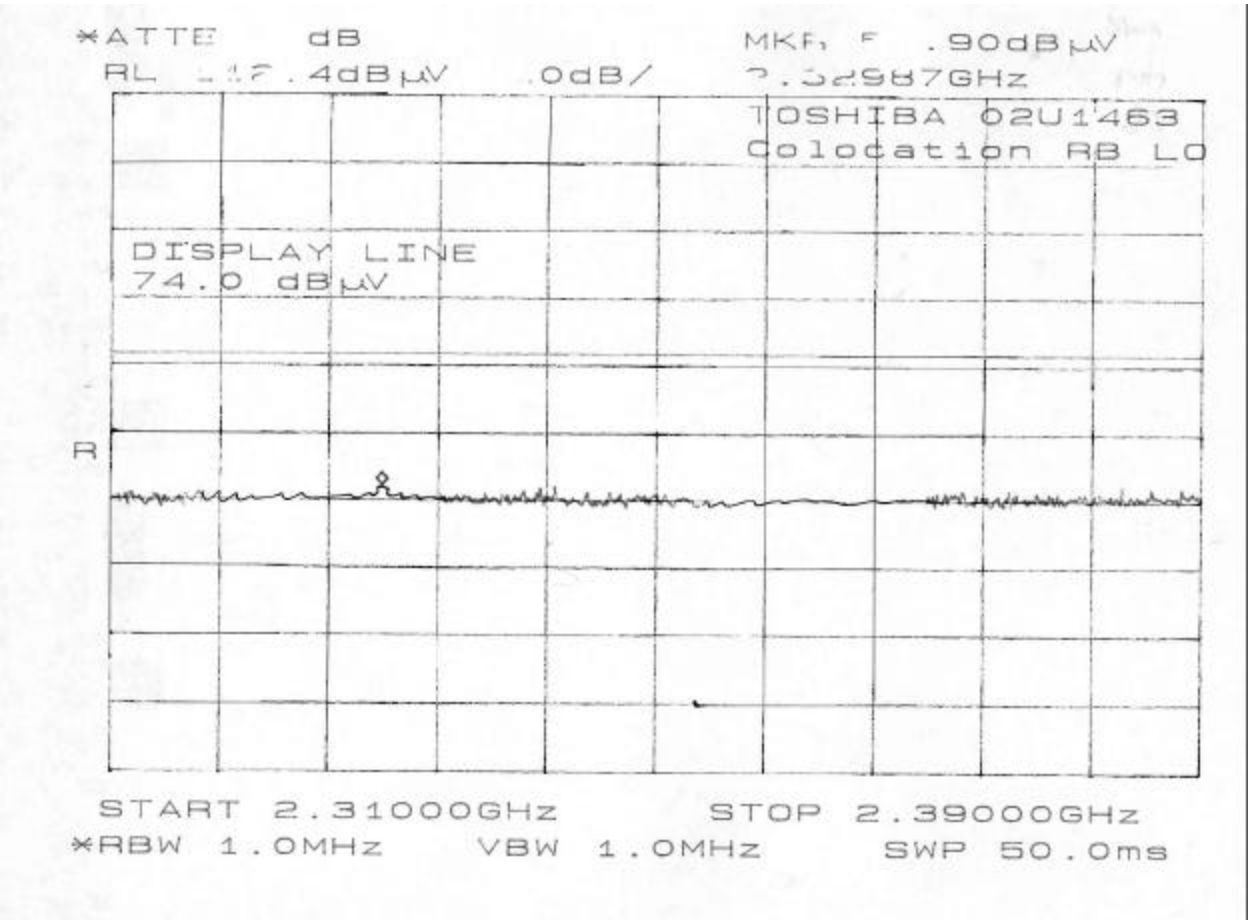
RADIATED EMISSIONS - LOWER RESTRICTED BAND EDGE WITH CO-LOCATED BLUETOOTH AND WLAN OPERATING SIMULTANEOUSLY AT THEIR LOW FREQUENCY CHANNELS; DUAL FILM ANTENNAS INSTALLED FOR WLAN – HORIZONTAL PEAK



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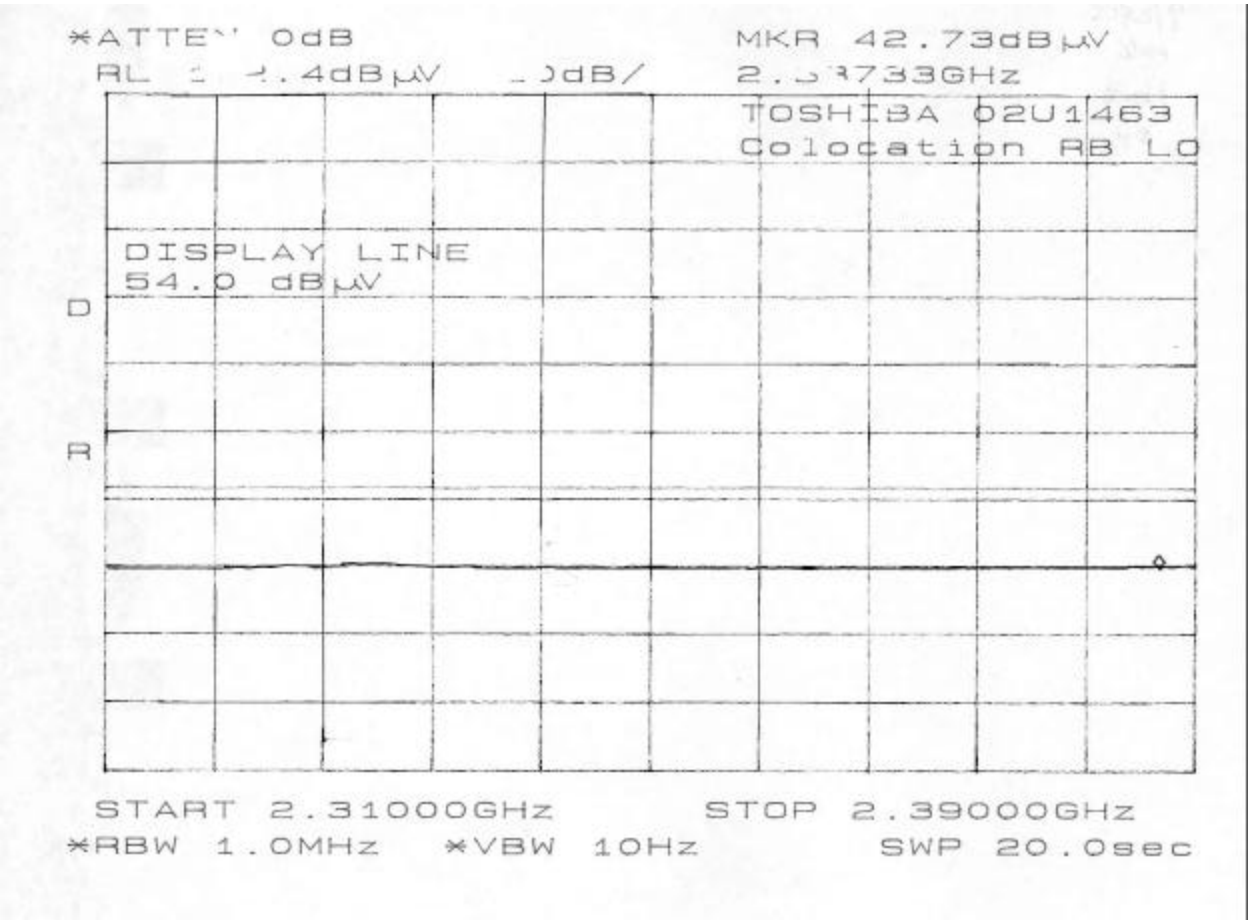
RADIATED EMISSIONS - LOWER RESTRICTED BAND EDGE WITH CO-LOCATED BLUETOOTH AND WLAN OPERATING SIMULTANEOUSLY AT THEIR LOW FREQUENCY CHANNELS; DUAL FILM ANTENNAS INSTALLED FOR WLAN – HORIZONTAL AVERAGE



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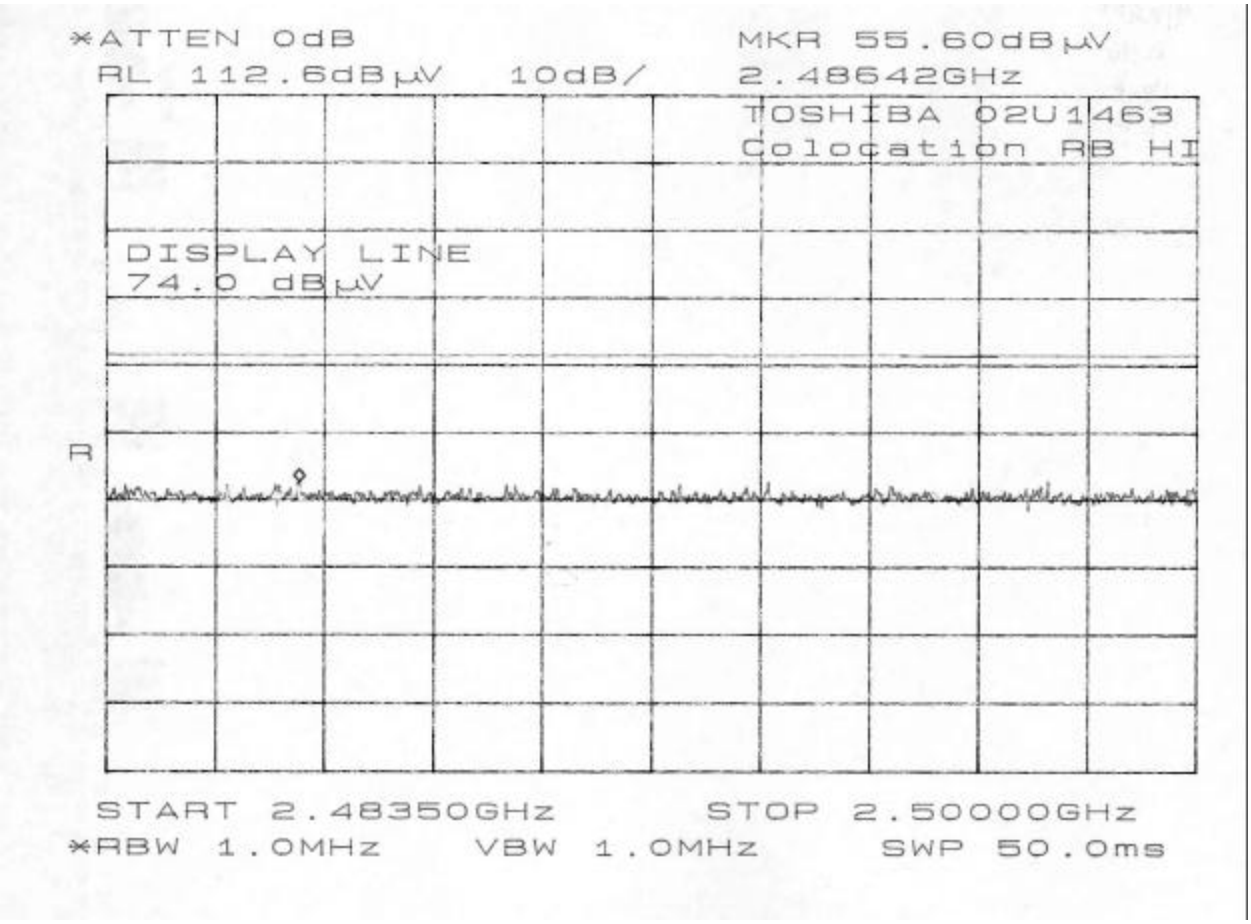

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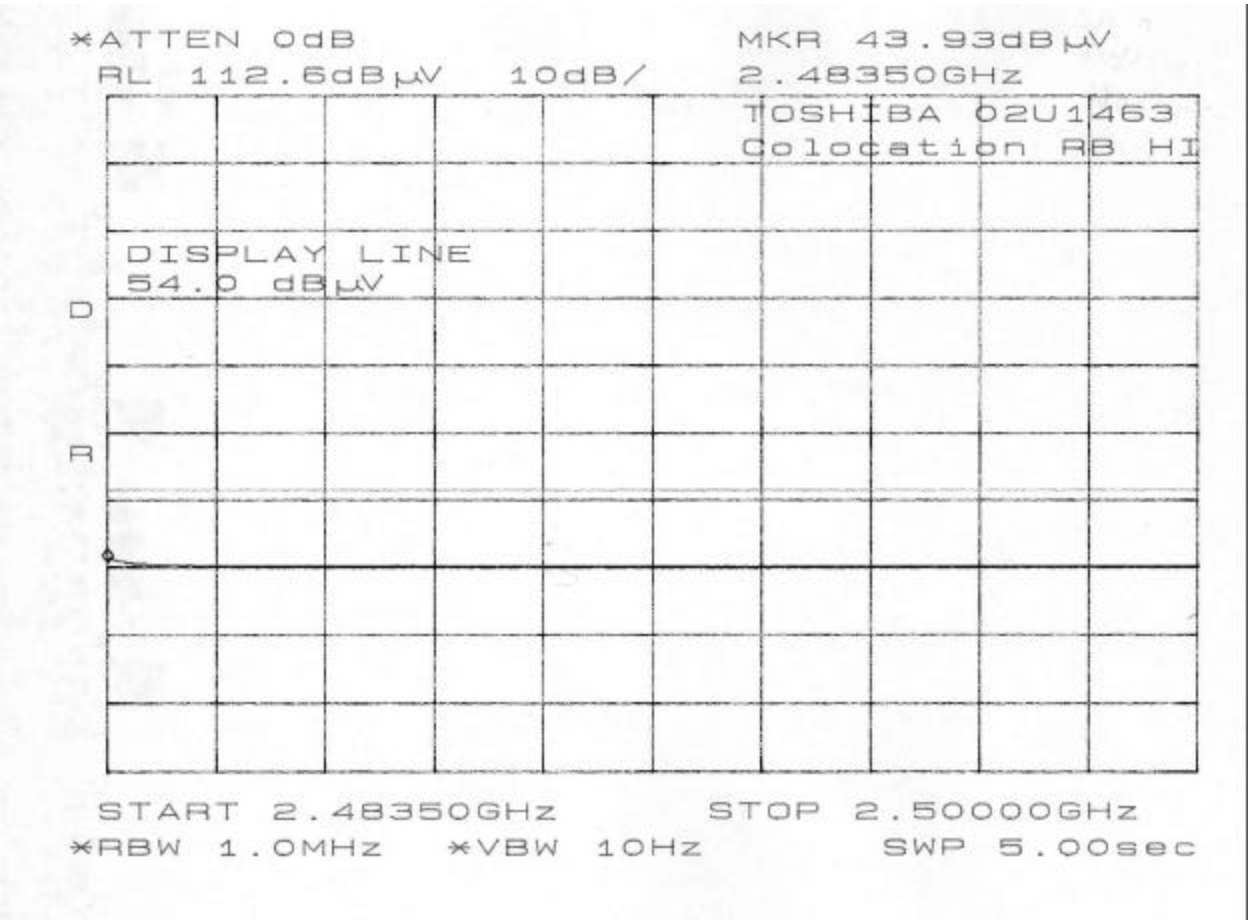

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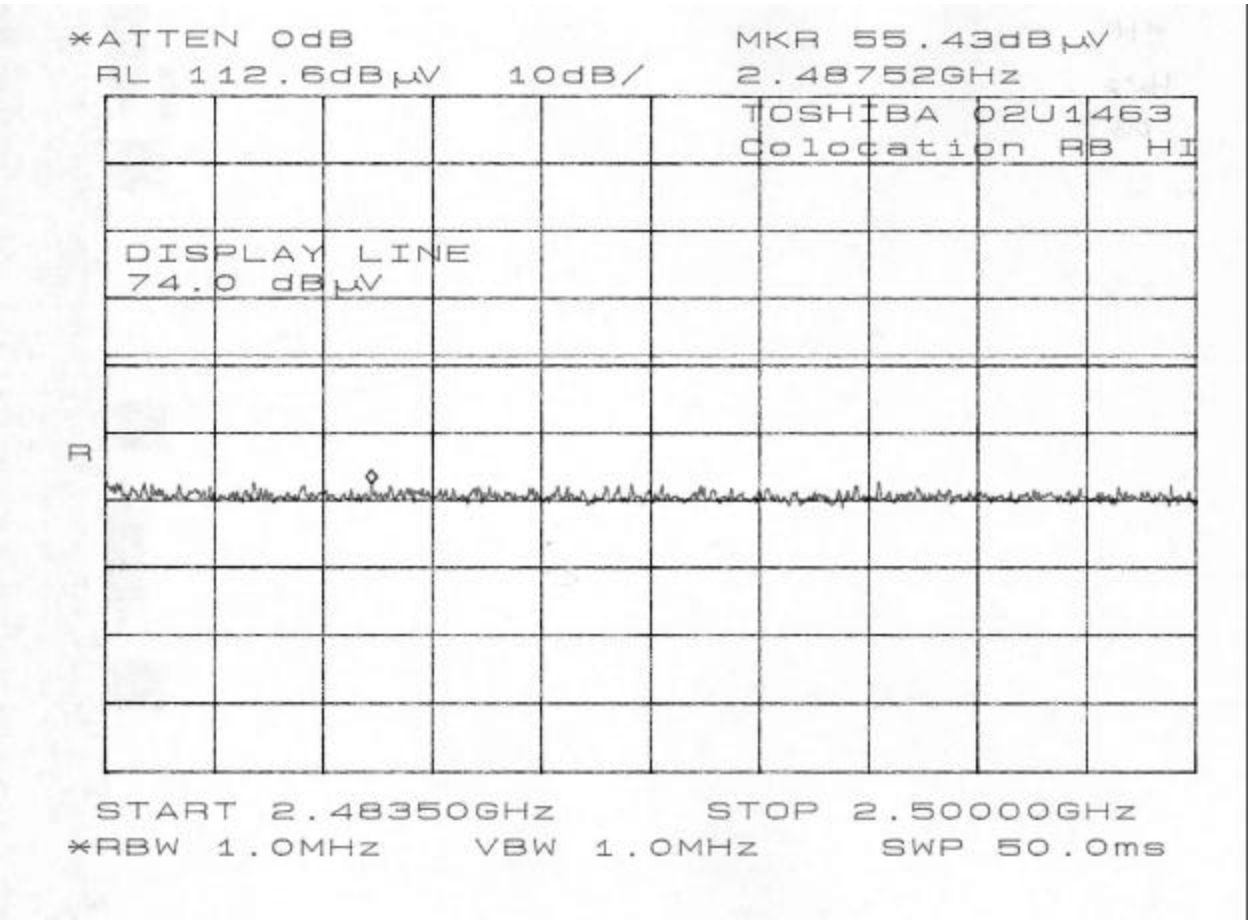

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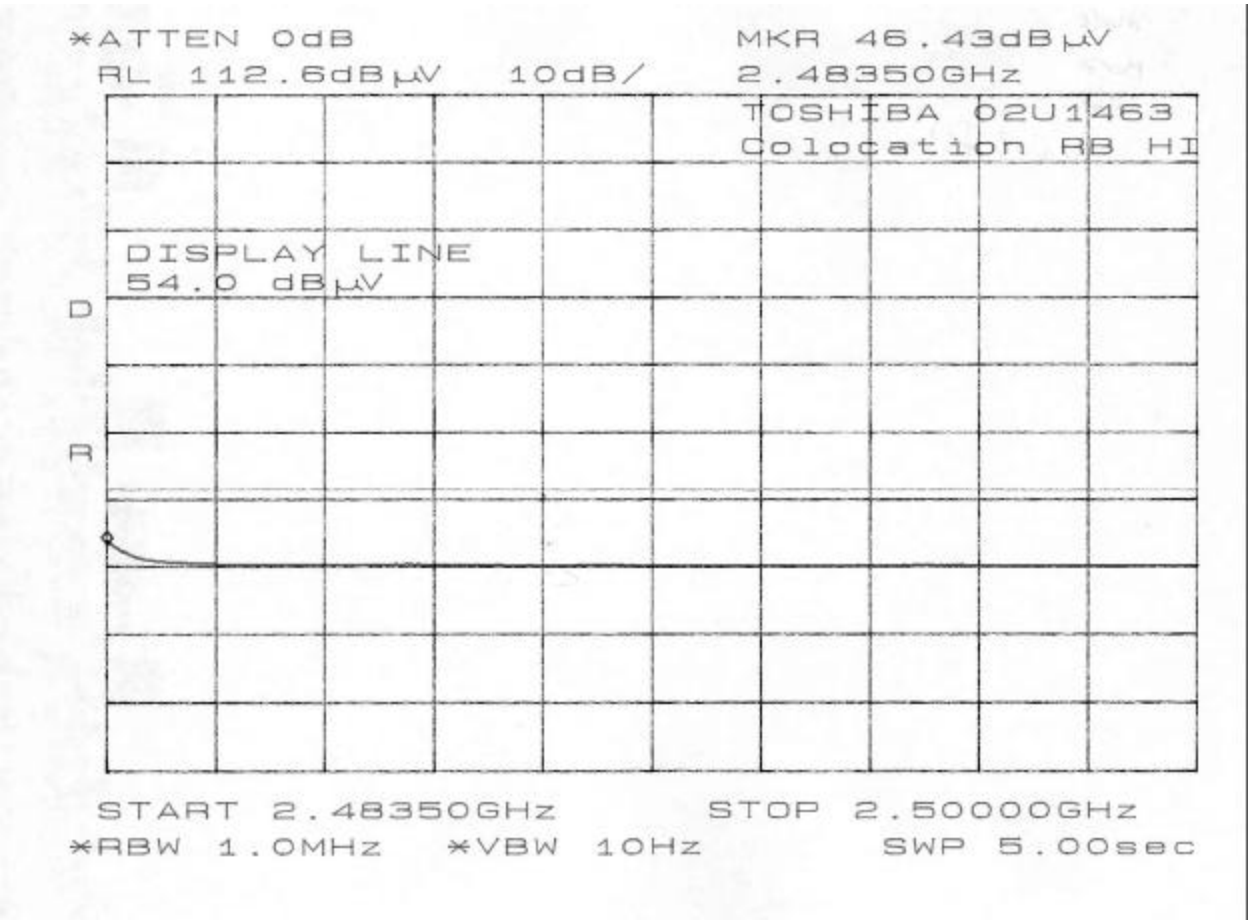

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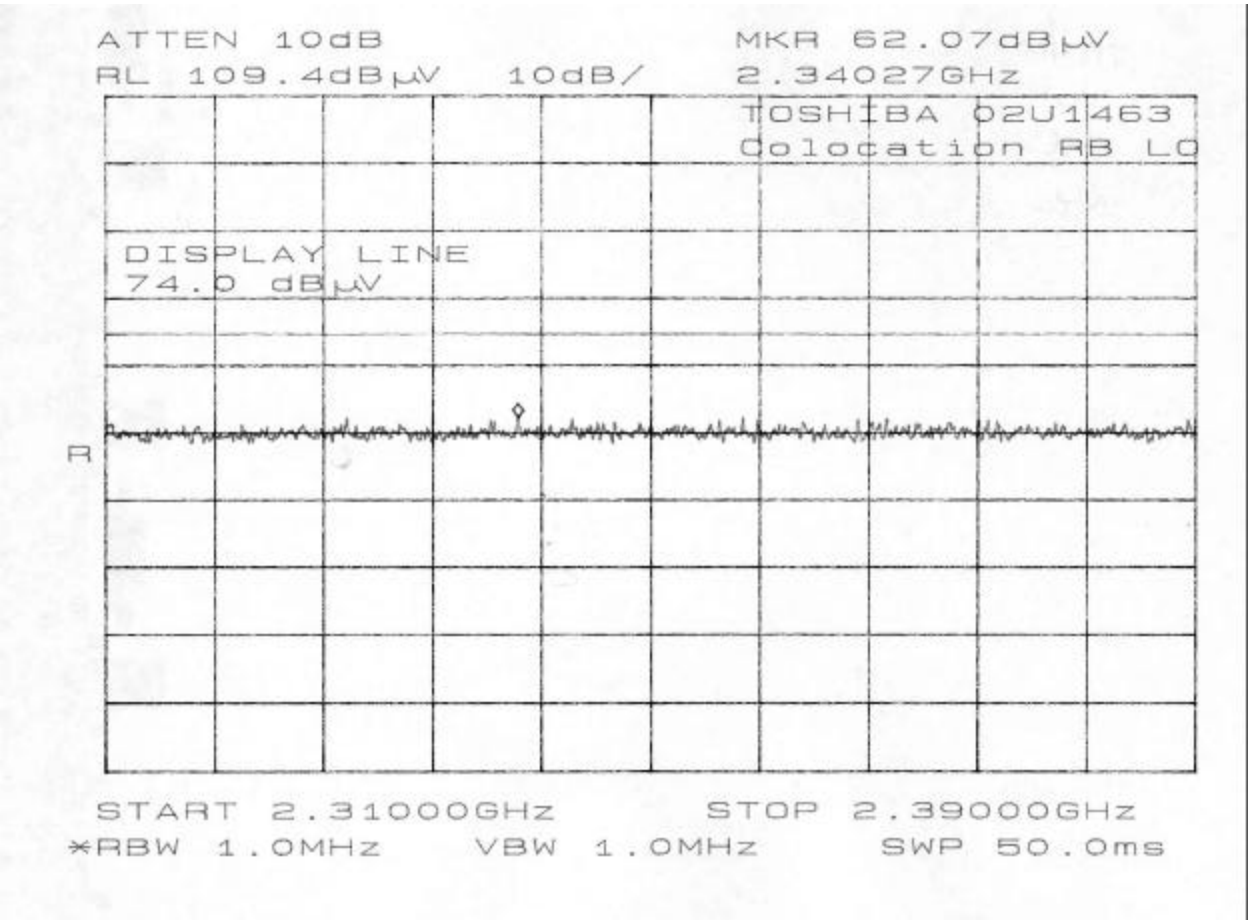

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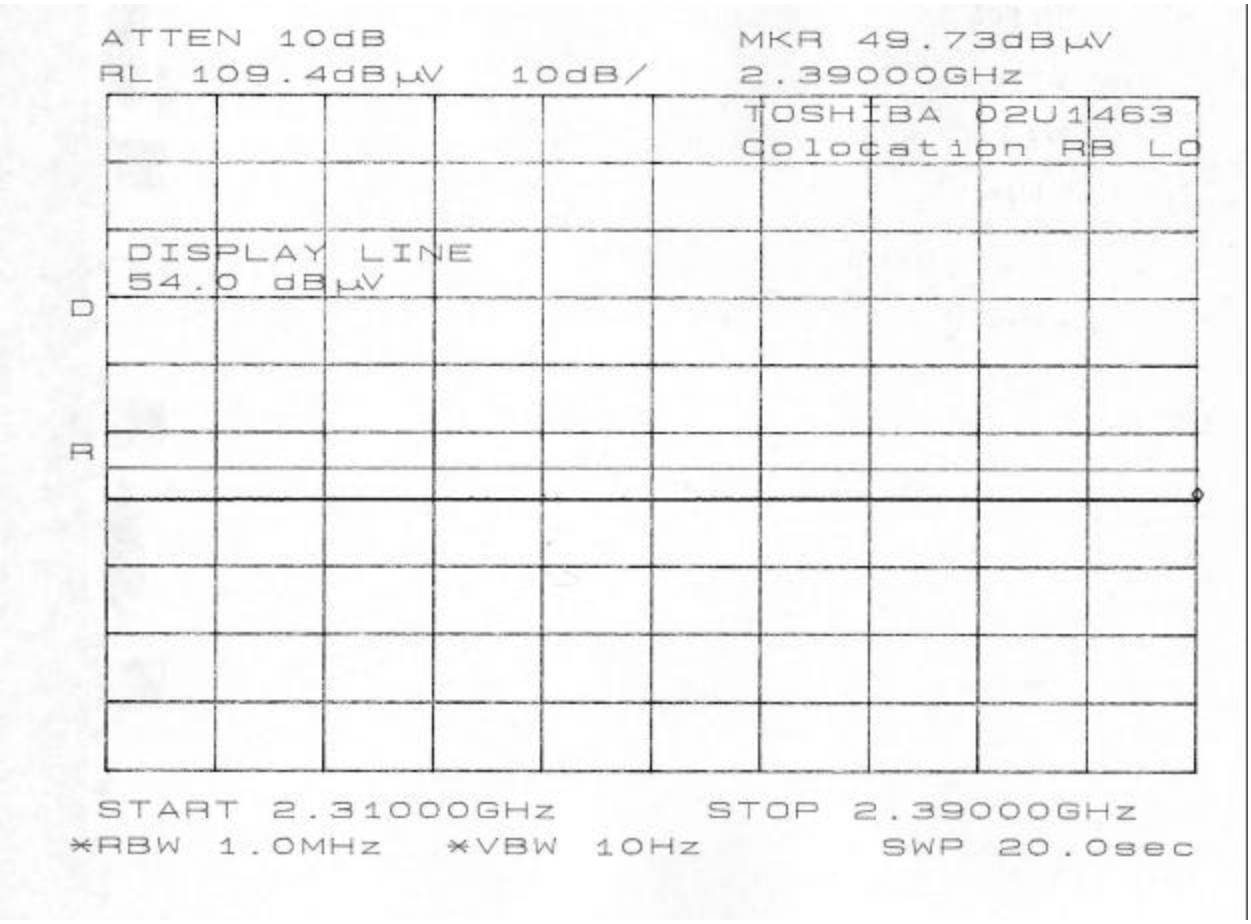

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561F MONTEREY ROAD, MORGAN HILL, CA 95037 USA TEL: (408) 463-0885 FAX: (408) 463-0888
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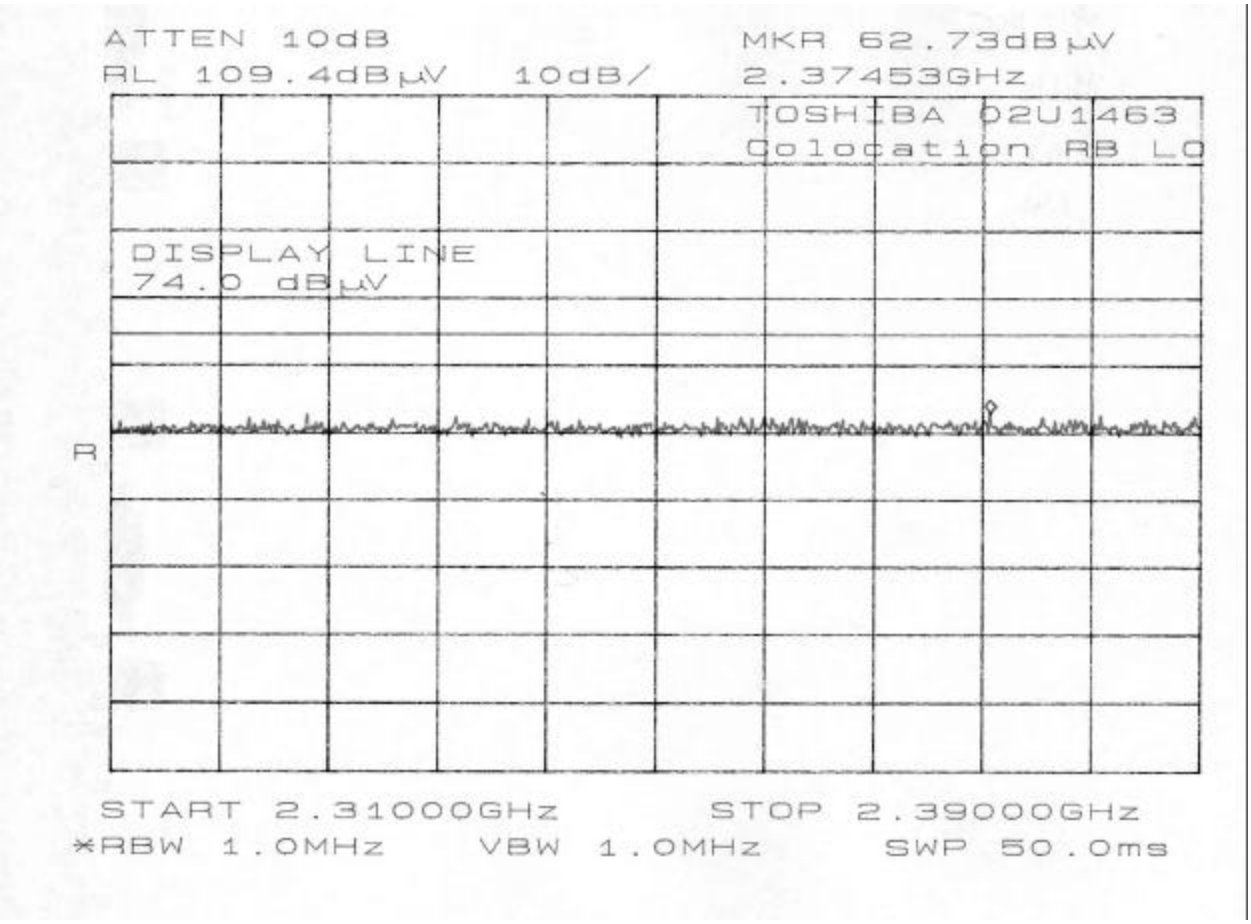

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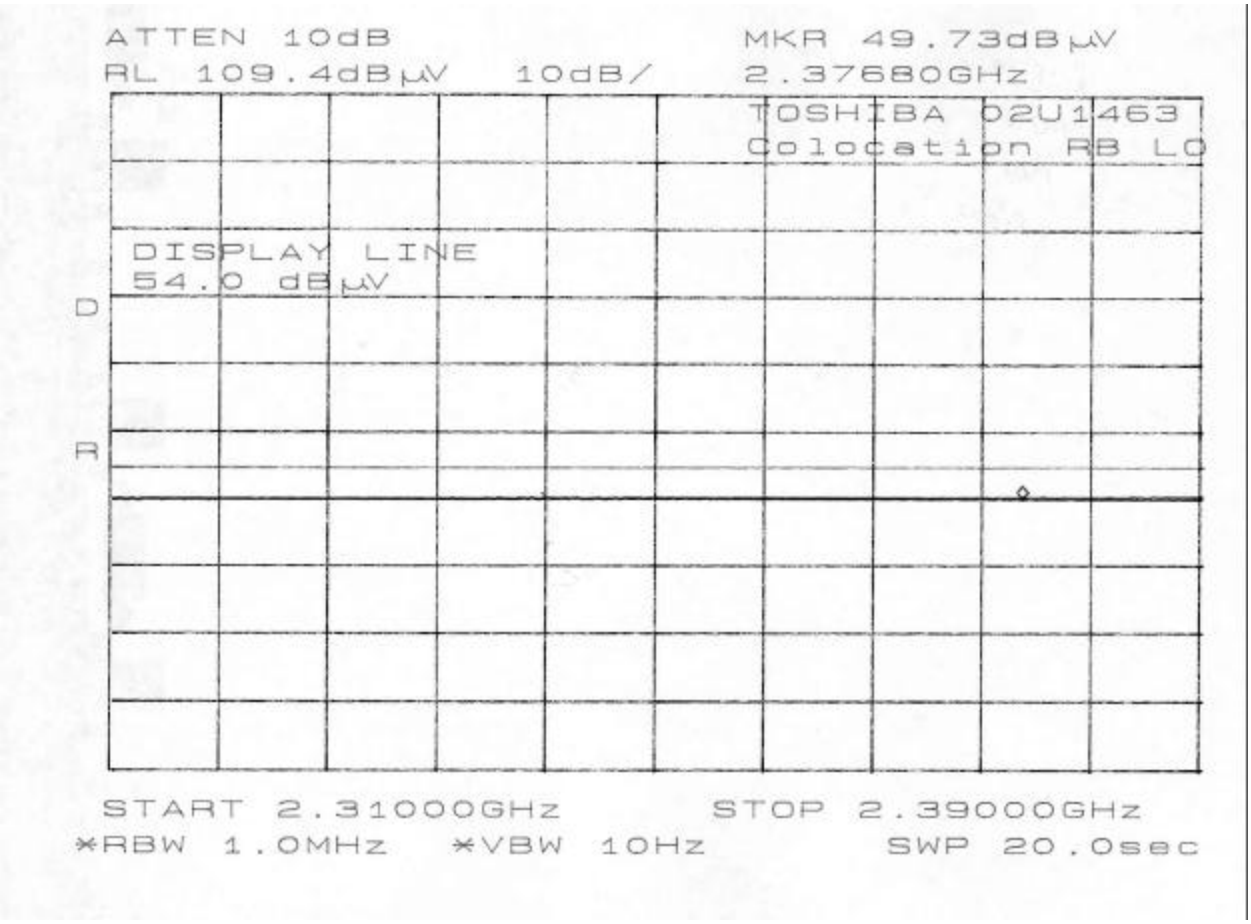

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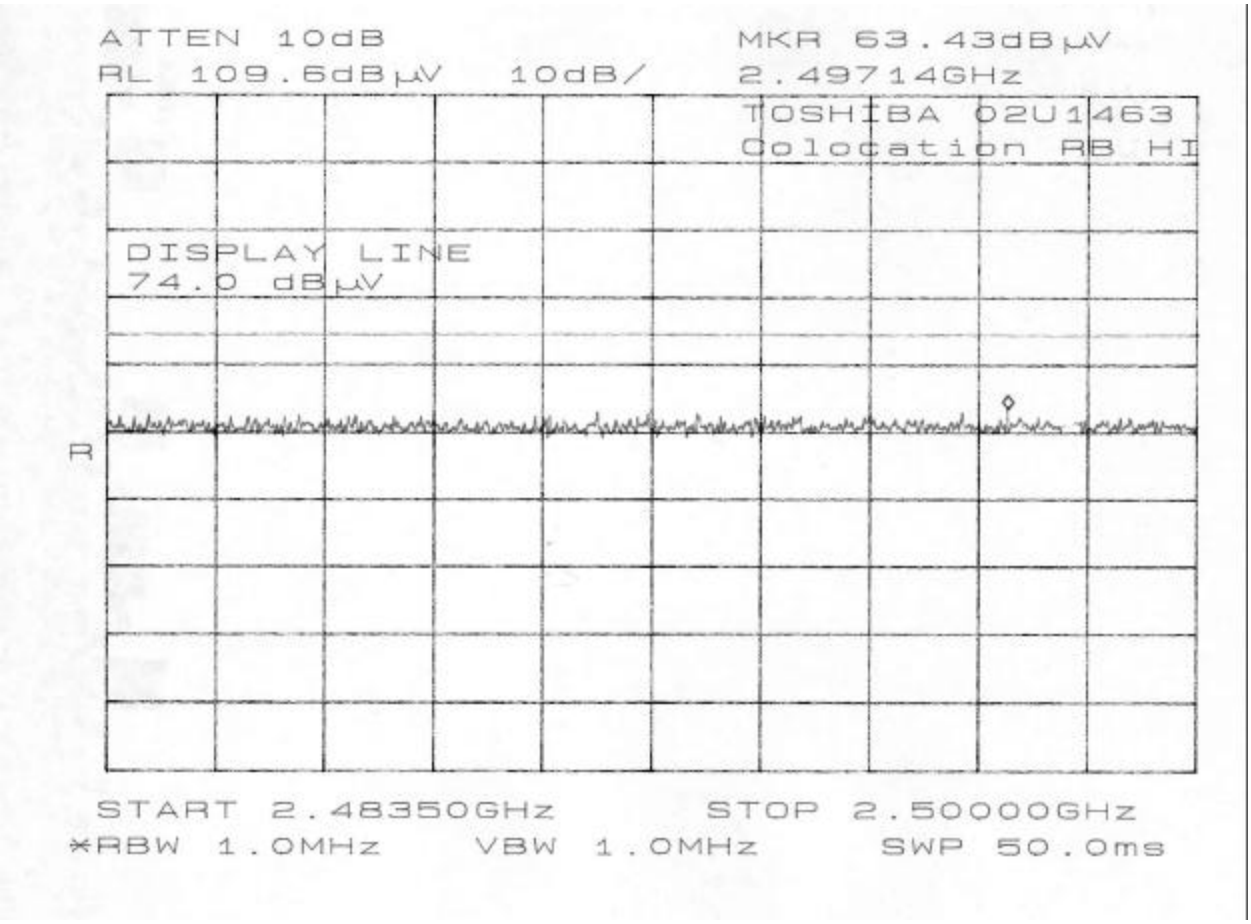

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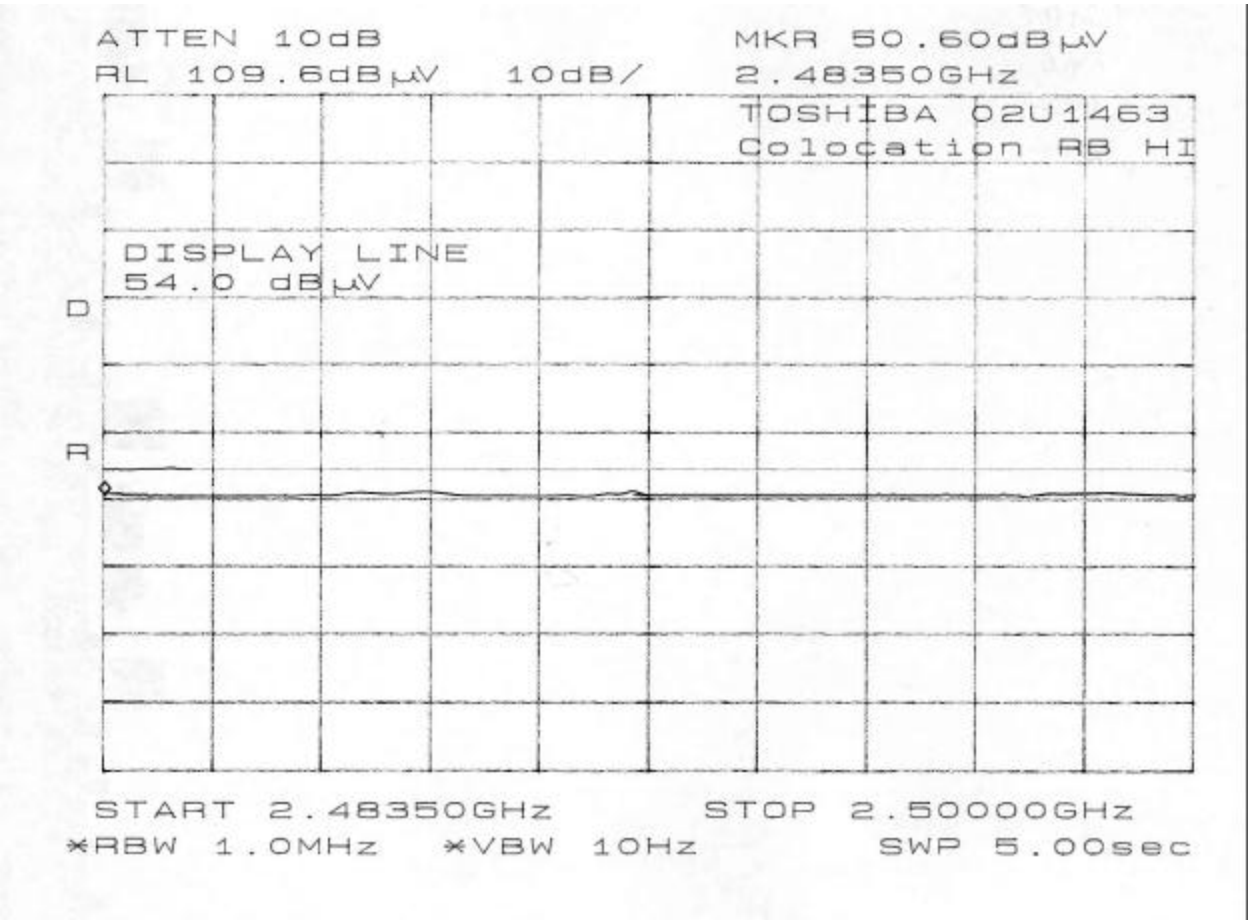

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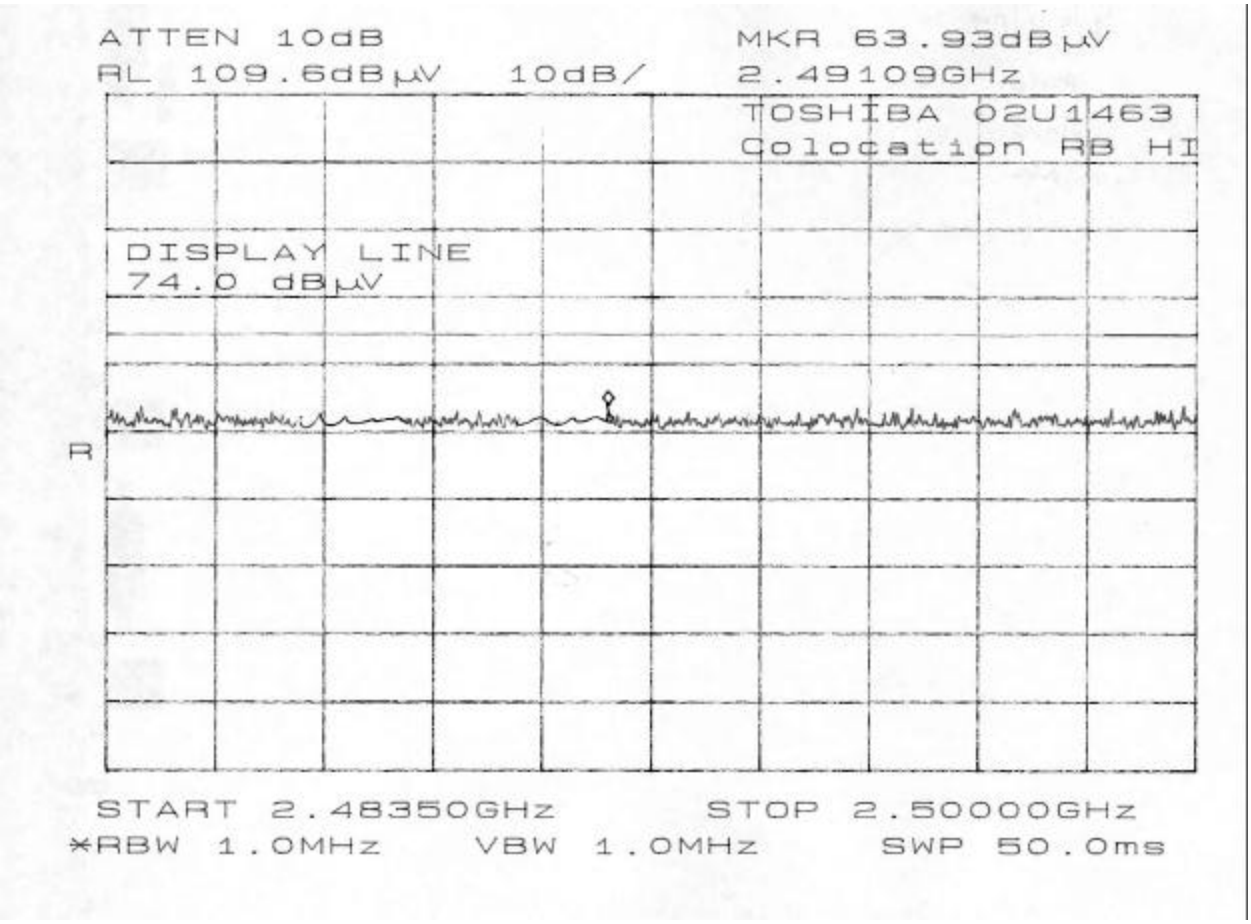

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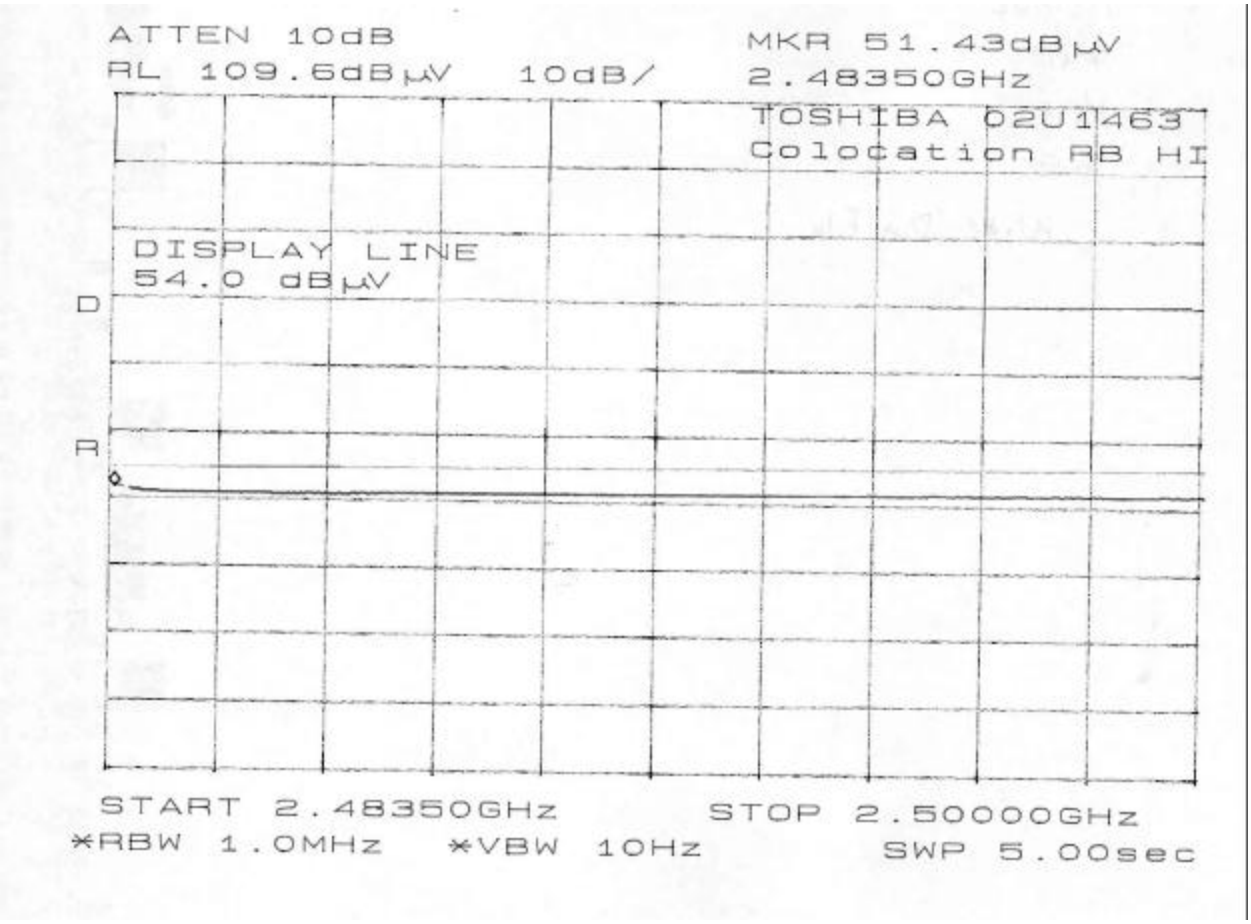

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SPURIOUS RADIATED EMISSIONS WITH WORST CASE CONFIGURATION OF CO-LOCATED BLUETOOTH AND WLAN OPERATING SIMULTANEOUSLY

	Description of Test:			Spurious Radiated Emissions							
	Project Number:			02U1501							
			Date:	09/24/02							
	Test Engineer:			Mike Heckrotte							
			Site:	B							
		Company:		Toshiba							
	EUT Description:			Touch Screen / Bluetooth / Single Film Antenna /							
				/ WLAN / Wide Dual Film Antenna							
	Test Configuration:			EUT / AC Adapter / Laptop with WLAN / AC Adapter							
	Mode of Operation:			Bluetooth transmitting at maximum power, Low channel							
				WLAN transmitting at maximum power in linked mode, Low channel							
	Specification Distance:			3.0	meters						
	Actual Distance:			1.0	meters	Cable Length:		15.0	feet		
Freq	**Pol**	**Det**	**SA**	**Dist**	**AF**	**Preamp**	**Filter**	**Cable**	**Field**	**Limit**	**Margin**
GHz	**V/H**		**dBuV**	**dB**	**dB/m**	**dB**	**dB**	**dB**	**dBuV/m**	**dBuV/m**	**dB**
4.804	V	Peak	49.8	-9.5	33.8	34.5	1.0	5.7	46.2	74.0	-27.8
4.804	V	Peak*	49.8	-9.5	33.8	34.5	1.0	5.7	46.2	54.0	-7.8
4.804	H	Peak	51.6	-9.5	33.8	34.5	1.0	5.7	48.0	74.0	-26.0
4.804	H	Peak*	51.6	-9.5	33.8	34.5	1.0	5.7	48.0	54.0	-6.0
4.824	V	Peak	63.2	-9.5	33.8	34.5	1.0	5.7	59.7	74.0	-14.3
4.824	V	Avg	46.9	-9.5	33.8	34.5	1.0	5.7	43.4	54.0	-10.6
4.824	H	Peak	64.8	-9.5	33.8	34.5	1.0	5.7	61.3	74.0	-12.7
4.824	H	Avg	47.1	-9.5	33.8	34.5	1.0	5.7	43.6	54.0	-10.4
7.206	V	Peak	44.9	-9.5	37.0	34.5	1.0	7.2	46.0	74.0	-28.0
7.206	V	Peak*	44.9	-9.5	37.0	34.5	1.0	7.2	46.0	54.0	-8.0
7.206	H	Peak	47.9	-9.5	37.0	34.5	1.0	7.2	49.0	74.0	-25.0
7.206	H	Peak*	47.9	-9.5	37.0	34.5	1.0	7.2	49.0	54.0	-5.0
7.236	V	Peak	61.2	-9.5	37.0	34.5	1.0	7.2	62.4	74.0	-11.6
7.236	V	Avg	46.2	-9.5	37.0	34.5	1.0	7.2	47.4	54.0	-6.6
7.236	H	Peak	63.7	-9.5	37.0	34.5	1.0	7.2	64.9	74.0	-9.1
7.236	H	Avg	46.6	-9.5	37.0	34.5	1.0	7.2	47.8	54.0	-6.2
9.648	V	Peak	56.8	-9.5	39.7	34.9	1.0	8.5	61.5	74.0	-12.5
9.648	V	Avg	41.8	-9.5	39.7	34.9	1.0	8.5	46.5	54.0	-7.5
9.648	H	Peak	59.0	-9.5	39.7	34.9	1.0	8.5	63.7	74.0	-10.3
9.648	H	Avg	43.5	-9.5	39.7	34.9	1.0	8.5	48.2	54.0	-5.8
Note 1: No other spurious emissions were detected above the system noise floor.											
Note 2: * The Peak level was less than the Average limit.											

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SETUP PHOTOS

COLOCATION RADIATED RF MEASUREMENT SETUP

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