

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Product Name:	Response Receiver
Brand Name:	Interwrite Learning
Model Name:	H2
FCC ID:	CTW-H2
Report No.:	ER/2007/50007
Issue Date:	Jun. 11, 2007
FCC Rule Part:	§15.249
Prepared for	GTCO Corporation 7125 Riverwood Drive Columbia Maryland 21046 United States
Prepared by	SGS Taiwan Ltd. No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei County, Taiwan.



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VERIFICATION OF COMPLIANCE

Applicant: GTCO Corporation
7125 Riverwood Drive Columbia Maryland 21046 United States

Product Description: Response Receiver

Brand Name: Interwrite Learning

FCC ID Number: CTW-H2

Model No.: H2

Model Difference: N/A

File Number: ER/2007/50007

Date of test: May. 12, 2007 ~ Jun. 07, 2007

Date of EUT Received: May. 12, 2007

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.249.

The test results of this report relate only to the tested sample identified in this report.

Test By:

Danny Yeh

Date

Jun. 11, 2007

Danny Yeh / Engineer

Prepared By:

Gigi yeh

Date

Jun. 11, 2007

Gigi Yeh / Clerk

Approved By:

Vincent Su

Date

Jun. 11, 2007

Vincent Su / Manager

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Version

Version No.	Date
00	Jun. 11, 2007

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1. GENERAL INFORMATION

1.1 Product Description

The GTCO Corporation, Model: H2 (referred to as the EUT in this report) is Response Receiver, the major technical descriptions of EUT is described as following:

- A). Operation Frequency: 2400~2483MHz, 78 channels, 1MHz step
- B). Modulation Type: DSSS (GFSK)
- C). Power Supply: 5 Vdc from PC USB Port.
- D). Antenna Designation: Chip Antenna, 2dBi, Non-User Replaceable (Fixed)

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **CTW-H2** filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules. The composite system (digital device) is compliance with Subpart B is authorized under a DoC procedure.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the address of SGS Taiwan Ltd. No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003 and CISPR 22/EN 55022 requirements. Site No. 1(3 &10 meters) Registration Number: 94644, Both OATS and Anechoic chamber (3 meters) was accredited by TAF (0513).

1.5 Special Accessories

Not available for this EUT intended for grant.

1.6 Equipment Modifications

Not available for this EUT intended for grant.

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the engineering operating mode. the Tx frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7 and 13 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and Average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4-2003.

2.4 Limitation

(1) Conducted Emission

According to section 15.207(a) Conducted Emission Limits is as following.

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 – 0.5	66 - 56	56 - 46
0.5 – 5	56	46
5 - 30	60	50

(2) Radiated Emission 15.249(a)

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following.

Frequency (MHz)	Field strength of Fundamental	Field strength of Harmonics	Distance (m)
902 - 928	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3
2400 – 2483.5	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3
5725 – 5875	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3
24.0 – 24.25 GHz	250 mV/m (107.95dBuV/m)	2500 uV/m (67.95dBuV/m)	3

(3) Radiated Emission 15.249 (d)

Emission Radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in Section 15.209 as below, whichever is the lesser attenuation.

Frequency (MHz)	Field strength $\mu\text{V/m}$	Distance (m)	Field strength at 3m $\text{dB}\mu\text{V/m}$
1.705-30	30	30	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

(4) Radiated Emission 15.249(e)

For frequencies above 1000MHz, the above field strength limits are based on average limits. The peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20dB under any condition of modulation.

Remark: 1. Emission level in $\text{dB}\mu\text{V/m} = 20 \log (\mu\text{V/m})$

2. Measurement was performed at an antenna to the closed point of EUT distance of meters.

3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205

4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of § 15.205, then the general radiated emission limits in § 15.209 apply.

2.5 Configuration of Tested System

Fig. 2-1 Configuration of TX

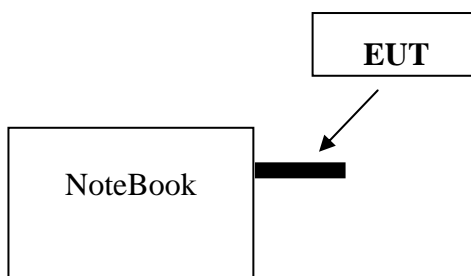


Table 2-2 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	FCC ID	Series No.	Data Cable	Power Cord
1.	NoteBook	IBM	T40	N/A	99HCYF4	120cm , shielded	Un-shield

Note: All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

Grounding: Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

3. Summary Of Test Results

FCC Rules	Description Of Test	Result
§15.207	Conducted Emission	Compliant
§15.249(a)(e)	Radiated Emission	Compliant
§15.249(d)	26dB band width Measurement	Compliant

Description of test modes

The EUT has been tested under engineering testing condition.

EUT is staying in continuous transmitting mode is programmed.

Channel low (2402MHz), mid (2441MHz) and high (2479MHz) with highest data rate are chosen for full testing.

4.3 Measurement Equipment Used:

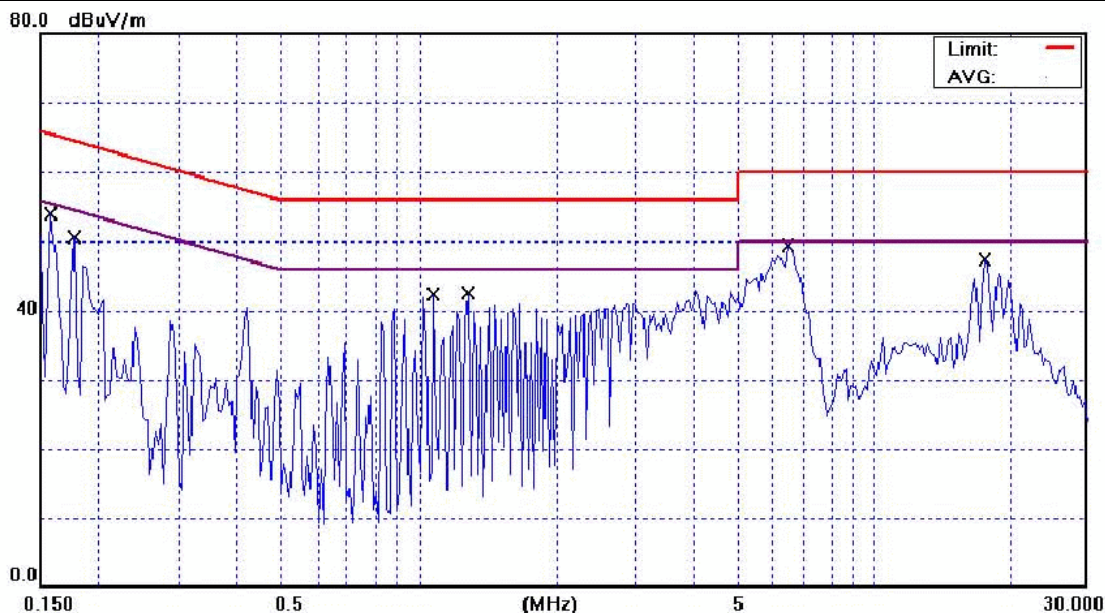
Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMC Analyzer	HP	8594EM	3624A00203	09/02/2006	09/03/2007
EMI Test Receiver	R&S	ESCS30	828985/004	06/09/2007	06/10/2008
Transient Limiter	HP	11947A	3107A02062	09/02/2006	09/03/2007
LISN	Rolf-Heine	NNB-2/16Z	99012	12/31/2006	12/30/2007
LISN	Rolf-Heine	NNB-2/16Z	99013	12/24/2006	12/23/2007
Coaxial Cables	N/A	No. 3, 4	N/A	12/01/2006	12/01/2207

4.4 Measurement Result:

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	OPERATION			Test Date:	Jun. 04, 2007
Temperature:	24	Humidity:	56%	Test By:	Danny



Site SGS CONDUCTED #1

Limit: EN55022 Class B Conduction(QP)

EUT: Response Receiver

M/N: H2

Note: Operation mode

Phase: L1

Power: AC110V/60HZ

Distance:

Temperature: 24 °C

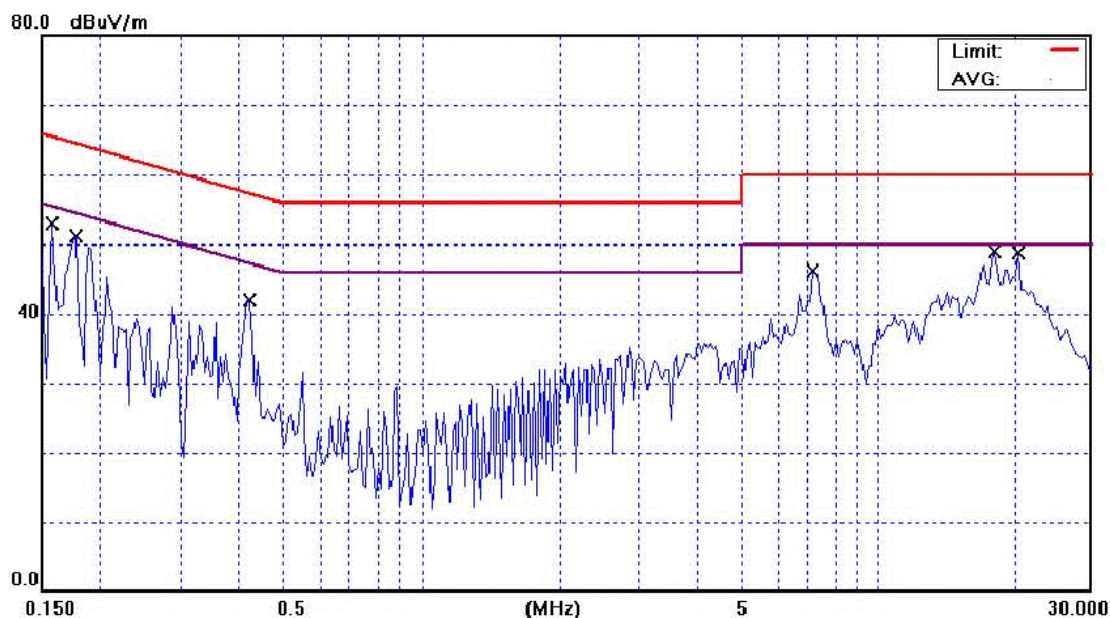
Humidity: 56 %

Air Pressure: hpa

No.	Mk.	Freq. MHz	Reading Level dBuV/m	Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		0.1578	57.39	0.20	57.59	65.58	-7.99	QP	
2		0.1578	35.65	0.20	35.85	55.58	-19.73	AVG	
3		0.1773	51.22	0.20	51.42	64.61	-13.19	QP	
4		0.1773	34.39	0.20	34.59	54.61	-20.02	AVG	
5		1.0836	43.38	0.20	43.58	56.00	-12.42	QP	
6	*	1.0836	42.85	0.20	43.05	46.00	-2.95	AVG	
7		1.2828	43.84	0.20	44.04	56.00	-11.96	QP	
8		1.2828	42.03	0.20	42.23	46.00	-3.77	AVG	
9		6.5094	43.82	0.53	44.35	60.00	-15.65	QP	
10		6.5094	43.35	0.53	43.88	50.00	-6.12	AVG	
11		17.5055	46.16	0.70	46.86	60.00	-13.14	QP	
12		17.5055	40.79	0.70	41.49	50.00	-8.51	AVG	

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Operation Mode:	OPERATION			Test Date:	Jun. 04, 2007
Temperature:	24 °C	Humidity:	56%	Test By:	Danny



Site SGS CONDUCTED #1

Phase: **N**

Temperature: 24 °C

Limit: EN55022 Class B Conduction(QP)

Power: AC110V/60HZ

Humidity: 56 %

EUT: Response Receiver

Distance:

Air Pressure: hpa

M/N: H2

Note: Operation mode

No.	Mk.	Freq.	Reading Level	Factor	Measurement	Limit	Over		
		MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.1578	57.22	0.20	57.42	65.58	-8.16	QP	
2		0.1578	40.47	0.20	40.67	55.58	-14.91	AVG	
3		0.1773	51.02	0.20	51.22	64.61	-13.39	QP	
4		0.1773	36.47	0.20	36.67	54.61	-17.94	AVG	
5		0.4234	40.25	0.20	40.45	57.38	-16.93	QP	
6	*	0.4234	39.89	0.20	40.09	47.38	-7.29	AVG	
7		7.2008	43.78	0.56	44.34	60.00	-15.66	QP	
8		7.2008	36.53	0.56	37.09	50.00	-12.91	AVG	
9		17.9625	44.98	0.76	45.74	60.00	-14.26	QP	
10		17.9625	36.90	0.76	37.66	50.00	-12.34	AVG	
11		20.2594	40.82	0.81	41.63	60.00	-18.37	QP	
12		20.2594	32.82	0.81	33.63	50.00	-16.37	AVG	

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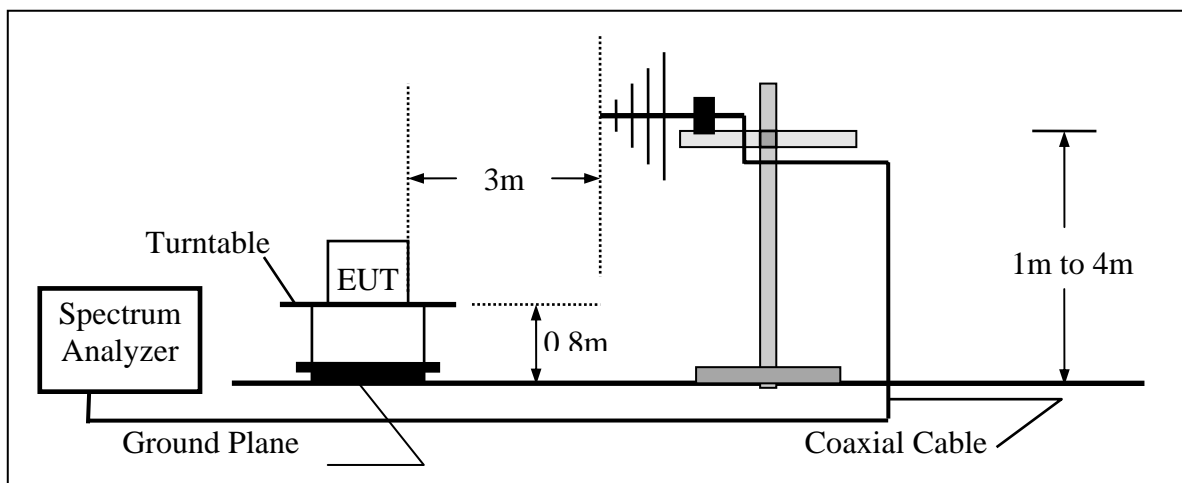
5. Radiated Emission Test

5.1 Measurement Procedure

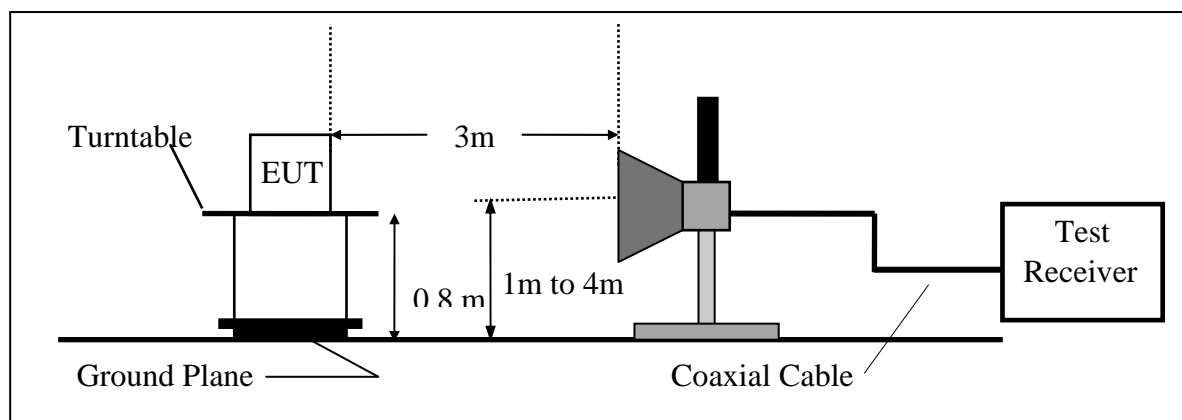
1. The EUT was placed on a turntable that is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

5.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



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5.3 Measurement Equipment Used:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2007	05/26/2008
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2006	08/27/2007
Bilog Antenna	SCHWAZBECK	VULB9160	3224	11/14/2006	13/11/2007
Bilog Antenna	SCHWAZBECK	VULB9160		06/03/2007	06/02/2008
Horn Antenna	SCHWAZBECK	BBHA 9120D	309/320	08/16/2006	08/15/2007
Pre-Amplifier	HP	8447D	2944A09469	07/19/2006	07/18/2007
Pre-Amplifier	HP	8449B	3008A00578	02/26/2007	02/25/2008
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNE R	SUCOFLEX 104PEA-10M	10m	10/09/2006	10/08/2007
Low Loss Cable	HUBER+SUHNE R	SUCOFLEX 104PEA-3M	3m	10/09/2006	10/08/2007
Site NSA	SGS	966 chamber	N/A	11/17/2006	11/16/2007

5.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

5.5 Measurement Result

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX	Test Date	Jun. 04, 2007
Fundamental Frequency	CH Low / 2402MHz	Test By	Danny
Temperature	25	Pol	Ver./Hor
Humidity	65 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
30.00	V	Peak	50.63	-14.97	35.66	40.00	-4.34
41.64	V	Peak	46.76	-13.76	33.00	40.00	-7.00
99.84	V	Peak	43.77	-17.01	26.76	43.50	-16.74
196.84	V	Peak	40.57	-15.51	25.06	43.50	-18.44
232.73	V	Peak	37.41	-14.37	23.04	46.00	-22.96
431.58	V	Peak	35.54	-9.09	26.45	46.00	-19.55
41.64	H	Peak	48.01	-13.76	34.25	40.00	-5.75
67.83	H	Peak	45.78	-15.60	30.18	40.00	-9.82
167.74	H	Peak	42.80	-13.85	28.95	43.50	-14.55
196.84	H	Peak	44.90	-15.51	29.39	43.50	-14.11
332.64	H	Peak	43.23	-12.16	31.07	46.00	-14.93
431.58	H	Peak	39.50	-9.09	30.41	46.00	-15.59

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz。
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- (3) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX	Test Date	Jun. 04, 2007
Fundamental Frequency	CH Mid / 2441MHz	Test By	Danny
Temperature	25	Pol	Ver./Hor
Humidity	65 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
30.00	V	Peak	50.54	-14.97	35.57	40.00	-4.43
41.64	V	Peak	46.68	-13.76	32.92	40.00	-7.08
111.48	V	Peak	42.55	-16.10	26.45	43.50	-17.05
196.84	V	Peak	40.28	-15.51	24.77	43.50	-18.73
288.99	V	Peak	36.19	-13.23	22.96	46.00	-23.04
465.53	V	Peak	38.68	-8.55	30.13	46.00	-15.87
31.94	H	Peak	47.73	-14.82	32.91	40.00	-7.09
67.83	H	Peak	45.81	-15.60	30.21	40.00	-9.79
114.39	H	Peak	42.14	-15.87	26.27	43.50	-17.23
167.74	H	Peak	44.34	-13.85	30.49	43.50	-13.01
332.64	H	Peak	42.79	-12.16	30.63	46.00	-15.37
431.58	H	Peak	38.99	-9.09	29.90	46.00	-16.10

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz °
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- (3) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX	Test Date	Jun. 04, 2007
Fundamental Frequency	CH High / 2479MHz	Test By	Danny
Temperature	25	Pol	Ver./Hor
Humidity	65 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
31.94	V	Peak	49.98	-14.82	35.16	40.00	-4.84
48.43	V	Peak	45.89	-13.98	31.91	40.00	-8.09
109.54	V	Peak	42.53	-16.25	26.28	43.50	-17.22
196.84	V	Peak	40.84	-15.51	25.33	43.50	-18.17
366.59	V	Peak	39.64	-11.17	28.47	46.00	-17.53
465.53	V	Peak	38.41	-8.55	29.86	46.00	-16.14
30.00	H	Peak	48.23	-14.97	33.26	40.00	-6.74
41.64	H	Peak	46.67	-13.76	32.91	40.00	-7.09
67.83	H	Peak	45.93	-15.60	30.33	40.00	-9.67
167.74	H	Peak	44.65	-13.85	30.80	43.50	-12.70
196.84	H	Peak	44.17	-15.51	28.66	43.50	-14.84
332.64	H	Peak	41.69	-12.16	29.53	46.00	-16.47

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz .
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- (3) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: TX
 Fundamental Frequency: CH Low / 2402MHz
 Temperature : 25
 Humidity : 65 %

Test Date : Jun. 04, 2007
 Test By: Danny
 Pol: Vertical

Freq. (MHz)	Ant.Pol. H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Factor (dB)	Actual Peak FS (dBuV/m)	Actual AV FS (dBuV/m)	Peak Limit at 3m (dBuV/m)	AV Limit at 3m (dBuV/m)	Margin (dB)	
2402.0	V	90.84	--	-1.36	89.48	--	114.00	94.00	-4.52	F
1802.2	V	--	--			--	74.00	54.00		S
4804.0	V	--	--			--	74.00	54.00		H
7206.0	V	--	--			--	74.00	54.00		H
9608.0	V	--	--			--	74.00	54.00		H
12010.0	V	--	--			--	74.00	54.00		H
14412.0	V	--	--			--	74.00	54.00		H
16814.0	V	--	--			--	74.00	54.00		H
19216.0	V	--	--			--	74.00	54.00		H
21618.0	V	--	--			--	74.00	54.00		H
24020.0	V	--	--			--	74.00	54.00		H
2400.0	V	46.69	--	-1.36	45.33	--	74.00	54.00	-8.67	S

Remark :

- (1) Measuring frequencies from 30MHz to the 10th of fundamental frequency .
- (2) Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB
- (3) "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- (4) Datas of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- (6) Spectrum AV mode IF B bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: TX
 Fundamental Frequency: CH Low / 2402MHz
 Temperature : 25
 Humidity : 68 %

Test Date : Jun. 04, 2007
 Test By: Danny
 Pol: Horizontal

Freq. (MHz)	Ant.Pol. H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Factor (dB)	Actual Peak FS (dBuV/m)	Actual AV FS (dBuV/m)	Peak Limit at 3m (dBuV/m)	AV Limit at 3m (dBuV/m)	Margin (dB)	
2402.0	H	94.83	--	-1.36	93.47	--	114.00	94.00	-0.53	F
1351.4	H	42.94	--	-6.56	36.38	--	74.00	54.00	-17.62	S
1793.0	H	39.52	--	-4.47	35.05	--	74.00	54.00	-18.95	S
1802.2	H	--	--			--	74.00	54.00		S
4804.0	H	--	--			--	74.00	54.00		H
7206.0	H	--	--			--	74.00	54.00		H
9608.0	H	--	--			--	74.00	54.00		H
12010.0	H	--	--			--	74.00	54.00		H
14412.0	H	--	--			--	74.00	54.00		H
16814.0	H	--	--			--	74.00	54.00		H
19216.0	H	--	--			--	74.00	54.00		H
21618.0	H	--	--			--	74.00	54.00		H
24020.0	H	--	--			--	74.00	54.00		H
2400.0	H	55.20	--	-1.36	53.84	--	74.00	54.00	-0.16	F

Remark :

- (1) Measuring frequencies from 30MHz to the 10th of fundamental frequency .
- (2) Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB
- (3) "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- (4) Datas of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- (6) Spectrum AV mode IF B bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: TX
 Fundamental Frequency: CH Mid / 2441MHz
 Temperature : 25
 Humidity : 65 %

Test Date : Jun. 04, 2007
 Test By: Danny
 Pol: Vertical

Freq. (MHz)	Ant.Pol. H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Factor (dB)	Actual Peak FS (dBuV/m)	Actual AV FS (dBuV/m)	Peak Limit at 3m (dBuV/m)	AV Limit at 3m (dBuV/m)	Margin (dB)	
2441.0	V	87.33	--	-1.13	86.20	--	114.00	94.00	-7.80	F
1802.2	V	--	--			--	74.00	54.00		S
4882.0	V	--	--			--	74.00	54.00		H
7323.0	V	--	--			--	74.00	54.00		H
9764.0	V	--	--			--	74.00	54.00		H
12205.0	V	--	--			--	74.00	54.00		H
14646.0	V	--	--			--	74.00	54.00		H
17087.0	V	--	--			--	74.00	54.00		H
19528.0	V	--	--			--	74.00	54.00		H
21969.0	V	--	--			--	74.00	54.00		H
24410.0	V	--	--			--	74.00	54.00		H

Remark :

- (1) Measuring frequencies from 30MHz to the 10th of fundamental frequency .
- (2) Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB
- (3) "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- (4) Datas of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- (6) Spectrum AV mode IF B bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: TX
 Fundamental Frequency: CH Mid / 2441MHz
 Temperature : 25
 Humidity : 68 %

Test Date : Jun. 04, 2007
 Test By: Danny
 Pol: Horizontal

Freq. (MHz)	Ant.Pol. H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Factor (dB)	Actual Peak FS (dBuV/m)	Actual AV FS (dBuV/m)	Peak Limit at 3m (dBuV/m)	AV Limit at 3m (dBuV/m)	Margin (dB)	
2441.0	H	94.70	--	-1.13	93.57	--	114.00	94.00	-0.43	F
1123.5	H	43.62	--	-7.62	36.00	--	74.00	54.00	-18.00	S
1351.0	H	43.19	--	-6.56	36.63	--	74.00	54.00	-17.37	S
1793.0	H	39.66	--	-4.47	35.19	--	74.00	54.00	-18.81	S
1802.2	H	--	--			--	74.00	54.00		S
4882.0	H	--	--			--	74.00	54.00		H
7323.0	H	--	--			--	74.00	54.00		H
9764.0	H	--	--			--	74.00	54.00		H
12205.0	H	--	--			--	74.00	54.00		H
14646.0	H	--	--			--	74.00	54.00		H
17087.0	H	--	--			--	74.00	54.00		H
19528.0	H	--	--			--	74.00	54.00		H
21969.0	H	--	--			--	74.00	54.00		H
24410.0	H	--	--			--	74.00	54.00		H

Remark :

- (1) Measuring frequencies from 30MHz to the 10th of fundamental frequency .
- (2) Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB
- (3) "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- (4) Datas of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- (6) Spectrum AV mode IF B bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: TX
 Fundamental Frequency: CH High / 2479MHz
 Temperature : 25
 Humidity : 65 %

Test Date : Jun. 04, 2007
 Test By: Danny
 Pol: Vertical

Freq. (MHz)	Ant.Pol. H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Factor (dB)	Actual Peak FS (dBuV/m)	Actual AV FS (dBuV/m)	Peak Limit at 3m (dBuV/m)	AV Limit at 3m (dBuV/m)	Margin (dB)	
2479.0	V	86.10	--	-0.92	85.18	--	114.00	94.00	-8.82	F
4958.0	V	--	--			--	74.00	54.00		H
7437.0	V	--	--			--	74.00	54.00		H
9916.0	V	--	--			--	74.00	54.00		H
12395.0	V	--	--			--	74.00	54.00		H
14874.0	V	--	--			--	74.00	54.00		H
17353.0	V	--	--			--	74.00	54.00		H
19832.0	V	--	--			--	74.00	54.00		H
22311.0	V	--	--			--	74.00	54.00		H
24790.0	V	--	--			--	74.00	54.00		H
2483.5	V	43.90	--	-0.92	42.98	--	74.00	54.00	-11.02	S

Remark :

- (1) Measuring frequencies from 30MHz to the 10th of fundamental frequency .
- (2) Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB
- (3) "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- (4) Datas of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- (6) Spectrum AV mode IF B bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: TX
 Fundamental Frequency: CH High / 2479MHz
 Temperature : 25
 Humidity : 68 %

Test Date : Jun. 04, 2007
 Test By: Danny
 Pol: Horizontal

Freq. (MHz)	Ant.Pol. H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Factor (dB)	Actual Peak FS (dBuV/m)	Actual AV FS (dBuV/m)	Peak Limit at 3m (dBuV/m)	AV Limit at 3m (dBuV/m)	Margin (dB)	
2479.0	H	92.71	--	-0.92	91.79	--	114.00	94.00	-2.21	F
1351.0	H	42.92	--	-6.56	36.36	--	74.00	54.00	-17.64	S
1500.5	H	38.97	--	-5.90	33.07	--	74.00	54.00	-20.93	S
1793.0	H	39.23	--	-4.47	34.76	--	74.00	54.00	-19.24	S
1802.2	H	--	--			--	74.00	54.00		S
4958.0	H	--	--			--	74.00	54.00		H
7437.0	H	--	--			--	74.00	54.00		H
9916.0	H	--	--			--	74.00	54.00		H
12395.0	H	--	--			--	74.00	54.00		H
14874.0	H	--	--			--	74.00	54.00		H
17353.0	H	--	--			--	74.00	54.00		H
19832.0	H	--	--			--	74.00	54.00		H
22311.0	H	--	--			--	74.00	54.00		H
24790.0	H	--	--			--	74.00	54.00		H
2483.5	H	43.65	--	-0.92	42.73	--	74.00	54.00	-11.27	S

Remark :

- (1) Measuring frequencies from 30MHz to the 10th of fundamental frequency .
- (2) Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB
- (3) "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- (4) Datas of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- (6) Spectrum AV mode IF B bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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6. 26 dB Band Width Measurement

6.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set ETU normal operating mode.
3. Set SPA Center Frequency = fundamental frequency, RBW, VBW = 100KHz, Span = 3MHz.
4. Set SPA Max hold. Mark peak, -26dB.

6.2 Test SET-UP (Block Diagram of Configuration)

Same as 4.2 Radiated Emission Measurement.

6.3 Measurement Equipment Used:

Same as 4.2 Radiated Emission Measurement.

6.4 Measurement Results:

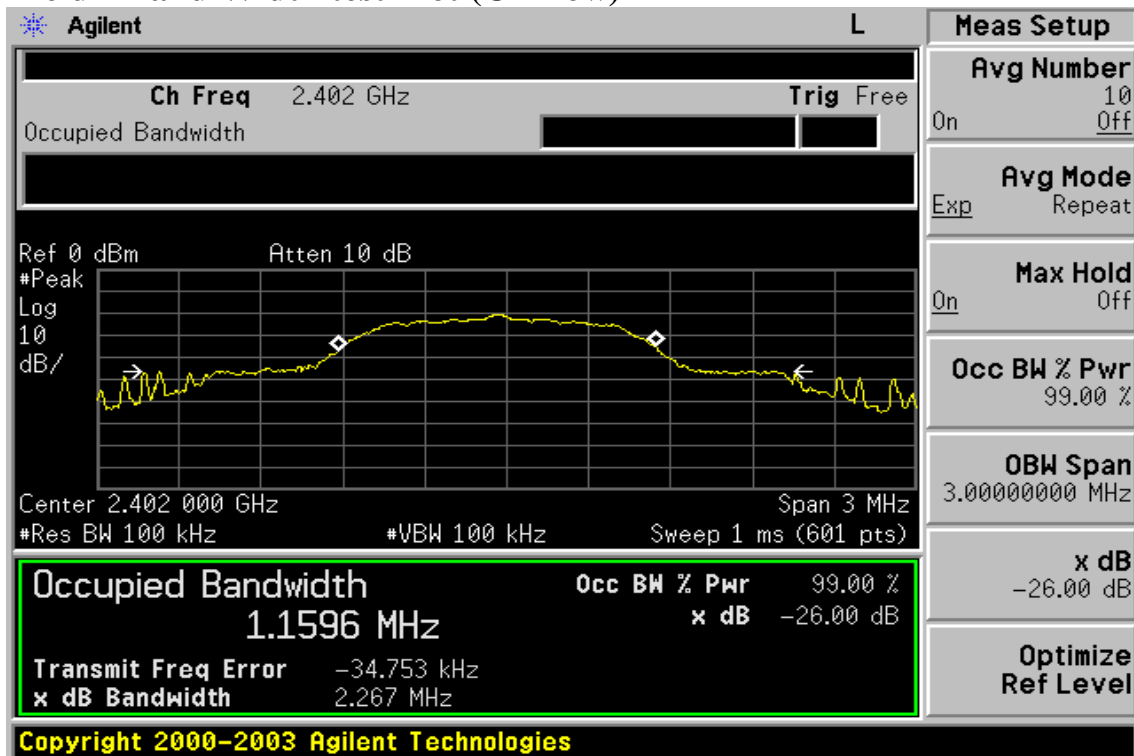
Ch Low 26dB Bandwidth = 2.267MHz

Ch Mid 26dB Bandwidth = 1.961MHz

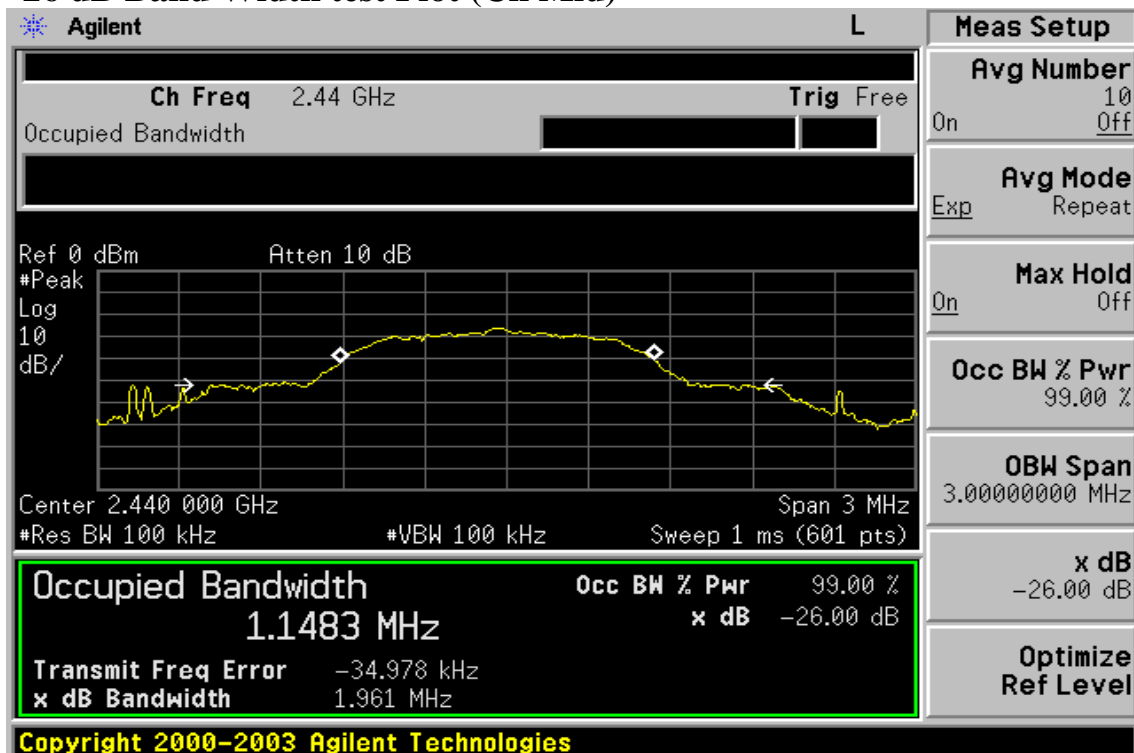
Ch High 26dB Bandwidth = 2.018MHz

Refer to attached data chart.

26 dB Band Width test Plot (Ch Low)

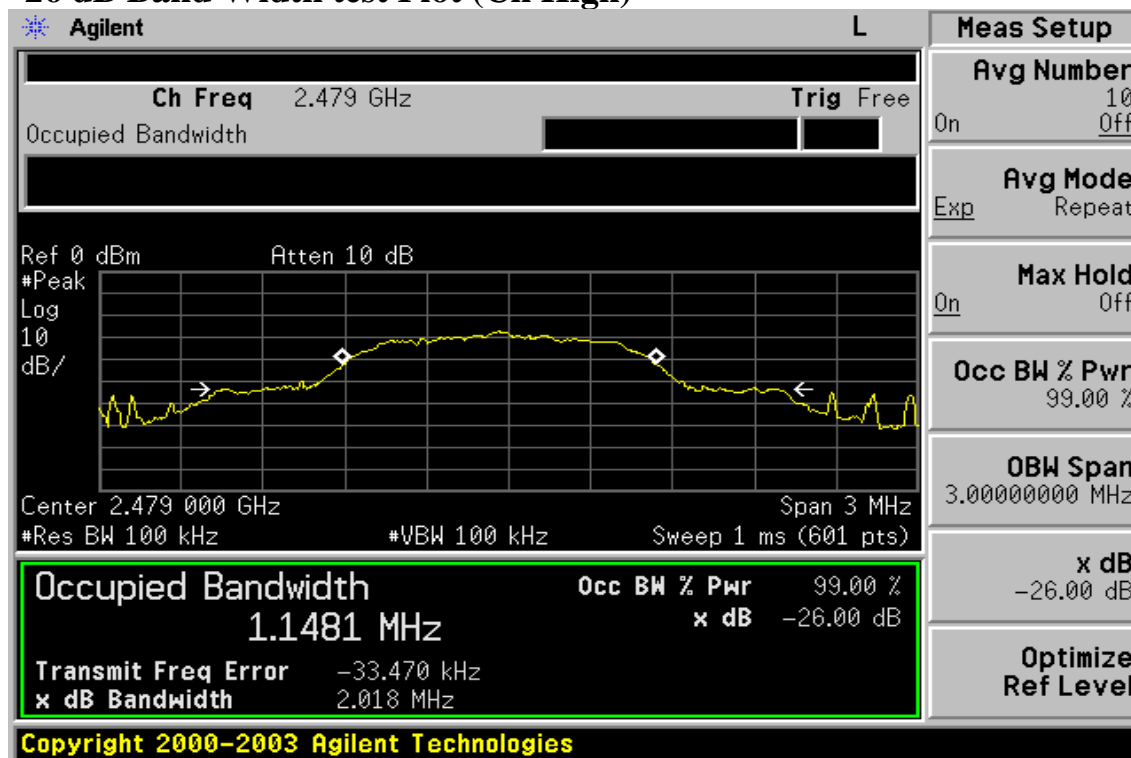


26 dB Band Width test Plot (Ch Mid)



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26 dB Band Width test Plot (Ch High)



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