

FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

REMOTE CONTROLLER

MODEL NUMBER: RXT1000-0801E

FCC ID: GT3FC010

REPORT NUMBER: 10J13168-1, REVISION A

ISSUE DATE: MAY 13, 2010

Prepared for SMK CORPORATION 5-5 TOGOSHI 6-CHOME SHINAGAWA-KU TOKYO 142-8511 JAPAN

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NVLAP LAB CODE 200065-0

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	04/28/10	Initial Issue	T. Chan
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SMK CORPORATION 5-5 TOGOSHI 6-CHOME SHINAGAWA-KU TOKYO 142-8511 JAPAN
EUT DESCRIPTION:	REMOTE CONTROLLER
MODEL:	RXT1000-0801E
SERIAL NUMBER:	1B (CONDUCTED); 1 (REMOTE CONTROLLER)
DATE TESTED:	DECEMBER 10, 2009 and APRIL 28, 2010
	APPLICABLE STANDARDS
STANDA	RD TEST RESULTS
CFR 47 Part 15	Subpart C Pass

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For CCS By:

Tested By:

THU CHAN EMC MANAGER COMPLIANCE CERTIFICATION SERVICES

MENGISTU MEKURIA EMC ENGINEER COMPLIANCE CERTIFICATION SERVICES

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, and FCC CFR 47 Part 15.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <u>http://www.ccsemc.com</u>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB) 36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a 2.4GHz Remote Controller, operating between 2.425-2.475GHz.

The radio module and remote control is manufactured by SMK.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum Peak conducted output power as follows:

Frequency Range	Mode	Peak Power	Peak Power
(MHz)		(dBm)	(mW)
2425-2475	802.15.4	-2.249	0.60

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PCB (Inverted) antenna, with a maximum gain of -4.4dBi.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 192TELECTEST_Sip100316 Ver. 0.1

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power. The worst-case position was determined to be in the X Orientation.

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5.6. DESCRIPTION OF TEST SETUP

RF CONDUCTED EMISSION TEST CONFIGURATION:

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST						
Description	Description Manufacturer Model Serial Number FCC ID					
-						
Laptop PC	HP	Pavillion	CNF63928VZ	DoC		
AC Adaptor	HP	DC359A	F3-0607269800b	DoC		

I/O CABLES

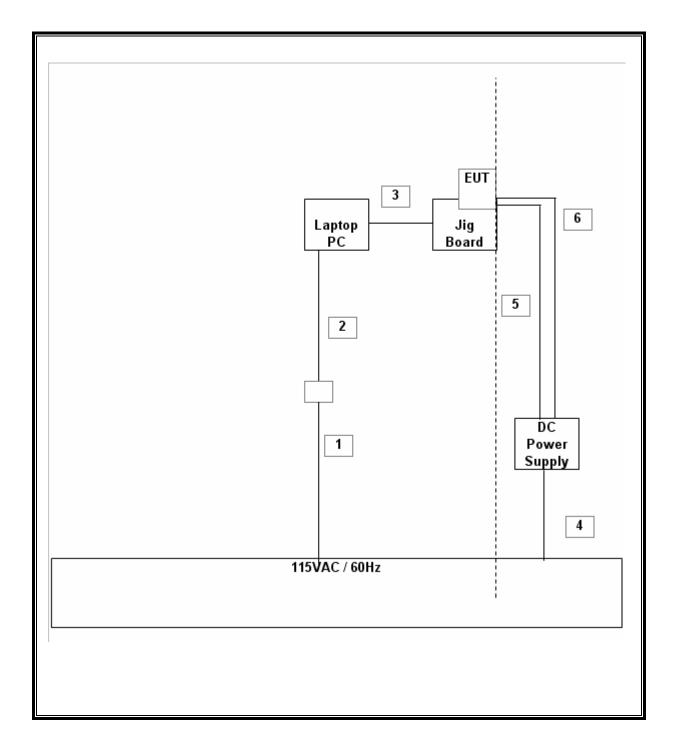
	I/O CABLE LIST							
Cable No.	Port	# of Identica Ports	Connector Type	Cable Type	Cable Length	Remarks		
1	AC	1	AC	Unshielded	1.7m			
2	DC	1	DC	Unshielded	1.7m			
3	USB	1	USB	Unshielded	1m			
4	AC	1	AC	Unshielded	1m			
5	DC	2	DC	Banana	2m			
6	DC	2	DC	Banana	2m			

TEST SETUP

The EUT is installed in a test board JIG, which is connected to the laptop via USB. Test software exercised the radio card.

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SETUP DIAGRAM FOR TESTS



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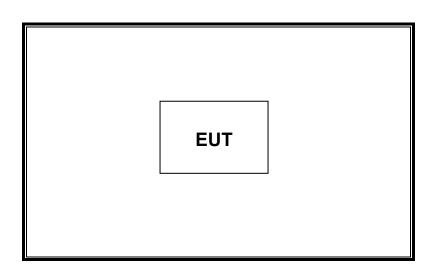
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RADIATED EMISSION TEST CONFIGURATION:

TEST SETUP

The EUT is a stand-alone unit. Test software exercised the radio card. EUT was powered from two 1.5 V Double A batteries.

SETUP DIAGRAM FOR TESTS



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6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST						
Description	Manufacturer	Model	Asset	Cal Due		
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	03/05/11		
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01179	08/24/10		
Peak Power Sensor	Boonton	57006	C01202	02/23/11		
Peak Power Meter	Boonton	4541	C01189	02/26/11		
Antenna, Horn, 18 GHz	EMCO	3115	C00945	07/29/10		
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	07/14/10		
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	07/06/10		
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	08/04/10		
Reject Filter, 2.0-2.9 GHz	Micro-Tronics	BRM50702	N02684	CNR		

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7. ANTENNA PORT TEST RESULTS

7.1. 802.15.4 MODE IN THE 2.4 GHz BAND

7.1.1. 6 dB BANDWIDTH

<u>LIMITS</u>

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

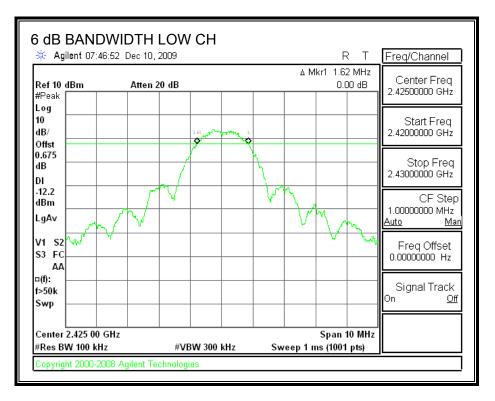
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

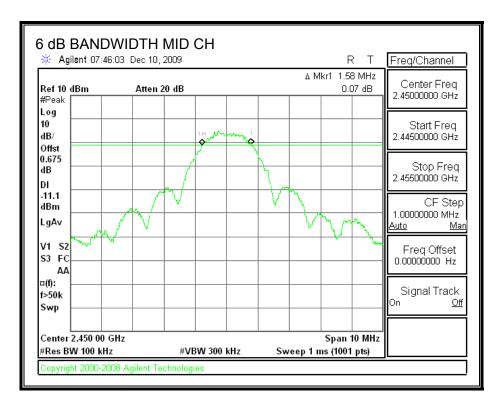
RESULTS

Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2425	1.62	0.5
Middle	2450	1.58	0.5
High	2475	1.66	0.5

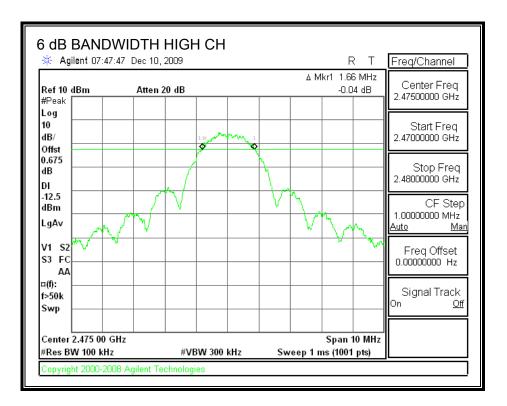
6 dB BANDWIDTH



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7.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

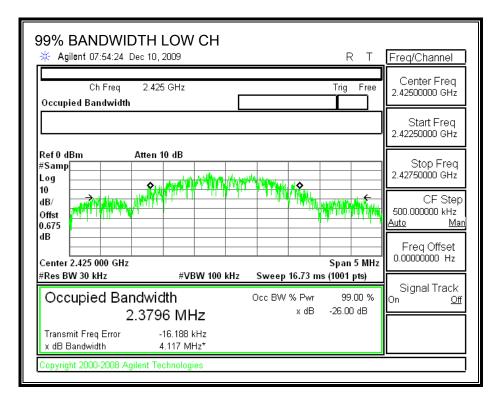
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

Channel	Frequency 99% Bandwid	
	(MHz)	(MHz)
Low	2425	2.3796
Middle	2450	2.3819
High	2475	2.3587

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99% BANDWIDTH



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99% BANDWIDTH MID CH	Freq/Channel
Ch Freq 2.45 GHz Trig Free Occupied Bandwidth	Center Freq 2.45000000 GHz
	Start Freq 2.44750000 GHz
Ref 0 dBm Atten 10 dB #Samp Log 10 dB/ Offst	Stop Freq 2.45250000 GHz CF Step 500.000000 kHz Auto Man
0.675 dB Center 2.450 000 GHz #Res BW 30 kHz #VBW 100 kHz Sweep 16.73 ms (1001 pts)	Freq Offset 0.00000000 Hz
Occupied Bandwidth Occ BW % Pwr 99.00 % 2.3819 MHz x dB -26.00 dB	Signal Track On <u>Off</u>
Transmit Freq Error -4.092 kHz x dB Bandwidth 4.237 MHz* Copyright 2000-2008 Agilent Technologies	

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99% BANDWIDTH HIGH CH	Amplitude
Ch Freq 2.475 GHz Trig Free Occupied Bandwidth	Ref Level 0.00 dBm
Ref 0 dBm Atten 10 dB #Samp Log 10 dB/ Offst	Attenuation 10.00 dB <u>Auto Man</u> Scale/Div 10.00 dB Scale Type Log Lin
dB Center 2.475 000 GHz #Res BW 30 kHz #VBW 100 kHz Sweep 16.73 ms (1001 pts)	Presel Center
Occupied Bandwidth Occ BW % Pwr 99.00 % 2.3587 MHz x dB -26.00 dB Transmit Freq Error 41.067 kHz x dB Bandwidth 4.021 MHz*	[3-26 GHz] 0.000 Hz More 1 of 3
Copyright 2000-2008 Agilent Technologies	

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7.1.3. OUTPUT POWER

<u>LIMITS</u>

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

The transmitter output is connected to a power meter.

<u>RESULTS</u>

The cable assembly insertion loss of 0.675dB was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Output	Limit	Margin
		Power		
	(MHz)	(dBm)	(dBm)	(dB)
Low	2425	-2.612	30	-32.61
Middle	2450	-2.354	30	-32.35
High	2475	-2.249	30	-32.25

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7.1.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 0.675 dB was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Power
	(MHz)	(dBm)
Low	2425	-2.825
Middle	2450	-2.559
High	2475	-2.441

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7.1.5. POWER SPECTRAL DENSITY

<u>LIMITS</u>

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST PROCEDURE

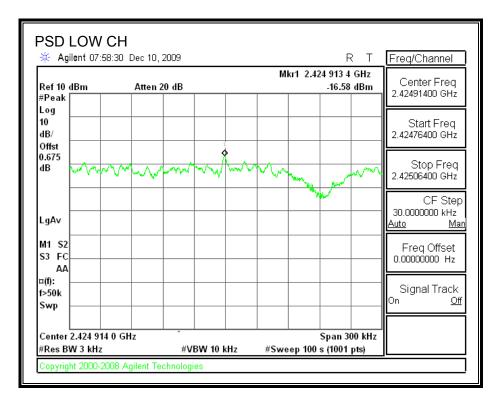
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

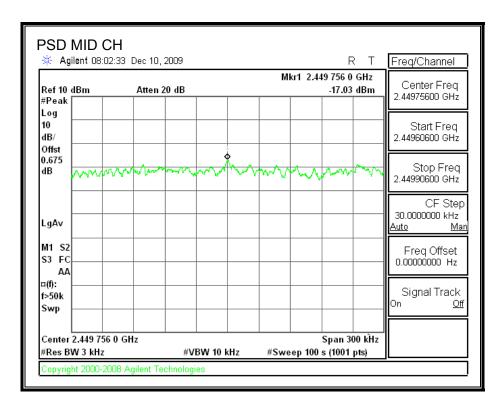
Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2425	-16.58	8	-24.58
Middle	2450	-17.03	8	-25.03
High	2475	-15.71	8	-23.71

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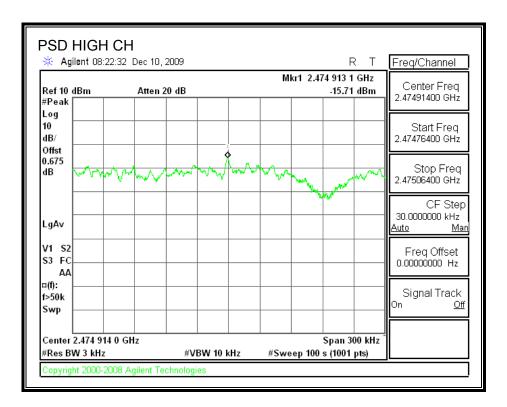
POWER SPECTRAL DENSITY



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7.1.6. CONDUCTED SPURIOUS EMISSIONS

<u>LIMITS</u>

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

TEST PROCEDURE

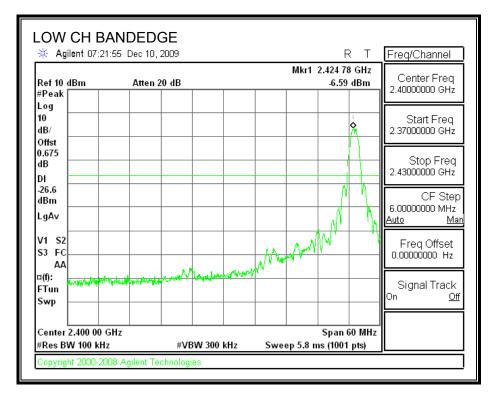
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL

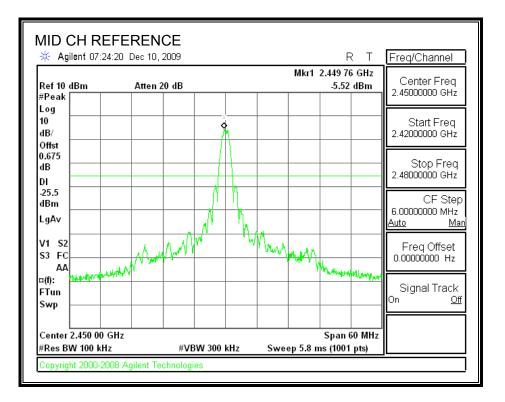


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Ref 10 dB #Peak	m	Atten 20	dB		Center Freq 13.0150000 GHz
Log 10 dB/ Offst	_⊥'				Start Freq 30.0000000 MHz
0.675 dB DI		2			Stop Freq 26.0000000 GHz
	and an a	harden	Martin Participation	and the second and the second and the second s	CF Ster 2.59700000 GHz
LgAv –					<u>Auto Ma</u>
Start 30 M #Res BW			#VBW 300 kHz	Stop 26.000 GH Sweep 2.482 s (1001 pts)	Freq Offset
Marker	Trace	Туре	X Axis 2.419 GHz	Amplitude -7.87 dBm	0.00000000 112
1 2	(1) (1)	Freq Freq	2.419 GHz 4.860 GHz	-7.87 dBm -46.41 dBm	Oi and Taxada
3	Ű	Freq	7.276 GHz	-51.33 dBm	Signal Track On <u>Of</u>

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SPURIOUS EMISSIONS, MID CHANNEL

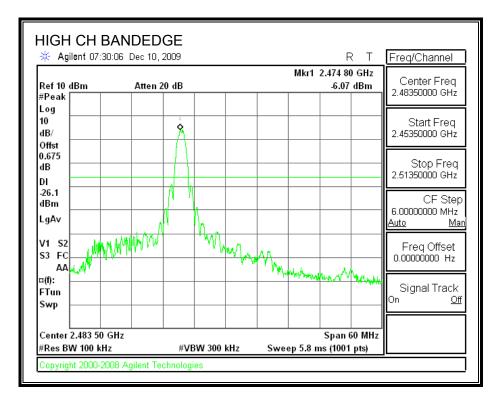


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Ref10dBı #Peak	m	Atten 20	dB			Center Freq 13.0150000 GHz
Log 10 dB/ Offst	¢					Start Freq 30.000000 MHz
0.675 dB DI						Stop Freq 26.000000 GHz
-25.5 dBm д LgAv —	and a second	-	and the second second	Concert Magne age Lating Ser		CF Step 2.59700000 GHz <u>Auto Ma</u>
Start 30 M #Res BW 1			#VBW 300 kHz	Stop Sweep 2.482 s	26.000 GHz (1001 pts)	Freq Offset
Marker 1 2 3	Trace (1) (1) (1)	Type Freq Freq Freq	X Axis 2.445 GHz 4.886 GHz 7.354 GHz	.: .5	Amplitude 9.05 dBm 1.15 dBm 0.20 dBm	0.00000000 Hz Signal Track On <u>Of</u>

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SPURIOUS EMISSIONS, HIGH CHANNEL



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Ref10dBr #Peak	n	Atten 20	dB			Center Freq 13.0150000 GHz
Log 10 dB/ Offst	↓					Start Freq 30.000000 MHz
0.675 dB DI		2 (Stop Freq 26.0000000 GHz
-26.1 dBm ,~ LgAv —			my m	80°		CF Step 2.59700000 GHz <u>Auto Ma</u>
Start 30 M #Res BW 1			#VBW 300 kHz	Sweep 2.482	top 26.000 GHz 2 s (1001 pts)	Freq Offset
Marker 1 2 3	Trace (1) (1) (1)	Type Freq Freq Freq	X Axis 2.471 GHz 4.938 GHz 7.431 GHz		Amplitude -6.61 dBm -54.34 dBm -48.93 dBm	Signal Track

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8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

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

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

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 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.

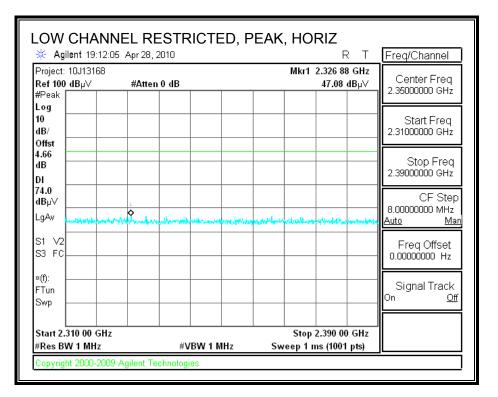
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each appplicable band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. 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 emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

8.2. TRANSMITTER ABOVE 1 GHz

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

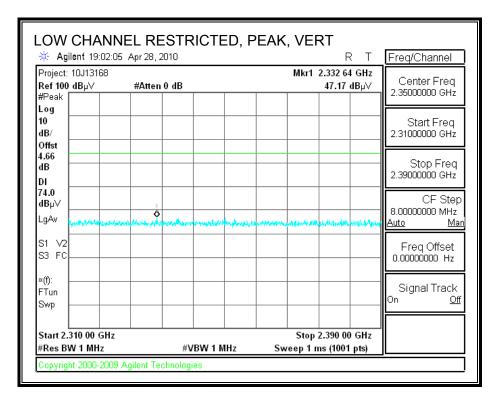


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🔆 Agilent 19:13:28	6 Apr 28, 2010			RT	Freq/Channel
Project: 10J13168 Ref 100 dB µ∨ #Peak	#Atten 0 dB		Mkr1 2	2.310 48 GHz 34.30 dBµ∨	Center Freq 2.35000000 GHz
Log 10 dB/ Offst					Start Freq 2.31000000 GHz
4.66 dB DI					Stop Freq 2.39000000 GHz
54.0 dBµ∨ LgAv					CF Step 8.0000000 MHz <u>Auto Ma</u> r
S1 V2 b S3 FC					Freq Offset 0.00000000 Hz
»(f): FTun Swp					Signal Track On <u>Off</u>
Start 2.310 00 GHz #Res BW 1 MHz		/BW 10 Hz	Stop 2 Sweep 6.238 s	2.390 00 GHz s (1001 pts)	

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RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



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Project: 10J13168		Mkr1 2.310 72 GHz	Freq/Channel
Ref 100 dBµ∨ #Peak	#Atten 0 dB	34.33 dBµ∨	2.35000000 GHz
Log 10 dB/			Start Freq 2.31000000 GHz
Offst 4.66 dB			Stop Freq 2.39000000 GHz
DI			CF Step 8.0000000 MHz <u>Auto Mar</u>
S1 V2 0 S3 FC			Freq Offset 0.00000000 Hz
×(f): FTun Swp			Signal Track On <u>Off</u>
Start 2.310 00 GHz #Res BW 1 MHz	#VBW 10 Hz	Stop 2.390 00 GHz Sweep 6.238 s (1001 pts)	

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RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

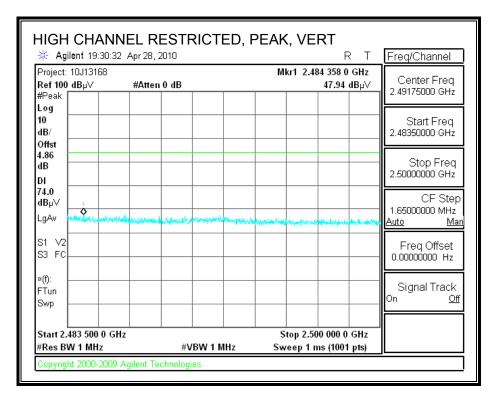
Agilent 19:23			ML 4 3 4	02 500 0 CU	Freq/Channel
Project: 10J13168 Ref 100 dBµ∨	#Atten 0 dB		WIKET 2.4	83 500 0 GHz 49.07 dBµ∀	Center Freq
#Peak					2.49175000 GHz
.og					
1B/					Start Freq 2.48350000 GHz
Offst					2.40000000 0112
I.86 IB					Stop Freq
					2.50000000 GHz
4.0					
iBµ∀ ¦					CF Step 1.6500000 MHz
_gAv	and an and the property and the	Manapathaliment	an and the second second	and the stranger	Auto Ma
s1 v2					-
S1 V2					
					0.00000000 Hz
×(f):					Signal Track
Tun					On Of
Swp					╢ <u>─────</u>
					-11
Start 2.483 500 0	GHZ		Stop 2.5	00 000 0 GHz	

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🔆 Agilent 19:24:08 /		D, AVG, HORIZ	Freq/Channel
Project: 10J13168 Ref 100 dB µ∨ #Peak	#Atten 0 dB	Mkr1 2.483 500 0 GHz 36.98 dBµ∀	Center Freq 2.49175000 GHz
Log 10 dB/ Offst			Start Freq 2.48350000 GHz
dB			- Stop Freq 2.5000000 GHz
54.0 dBµ∨ LgAv			CF Step 1.6500000 MHz <u>Auto Man</u>
S1 V2 S3 FC			Freq Offset 0.00000000 Hz
×(f): FTun Swp			Signal Track On <u>Off</u>
Start 2.483 500 0 GHz #Res BW 1 MHz	#VBW 10 H	Stop 2.500 000 0 GHz z Sweep 1.287 s (1001 pts)	^

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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



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🔆 Agilent 19:30:	56 Apr 28, 2010			RT	Freq/Channel
Project: 10J13168 Ref 100 dB µ∨ #Peak	#Atten 0 dB		Mkr1 2.48	33 516 5 GHz 35.88 dBµ∀	Center Freq 2.49175000 GHz
Log 10 dB/ Offst					Start Freq 2.48350000 GHz
dB					Stop Freq 2.5000000 GHz
54.0 dBµ∀ LgAv					CF Step 1.6500000 MHz <u>Auto Mar</u>
S1 V2 S3 FC					Freq Offset 0.00000000 Hz
»(f): FTun Swp					Signal Track On <u>Off</u>
Start 2.483 500 0 (#Res BW 1 MHz		#VBW 10 Hz	Stop 2.50 Sweep 1.287	0 000 0 GHz s (1001 pts)	

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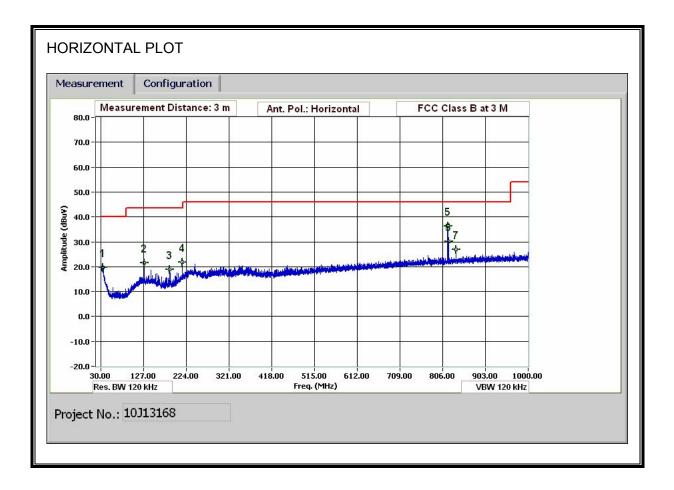
HARMONICS AND SPURIOUS EMISSIONS

omnli	~	- ·	[,] Measurem Services, Fr		5m Ch	amhar									
-			,		Ju en	amoer									
Company: SMK CORPORATION															
roject#: 10J13168 Date: 4/28/2010															
	gineer		4/28/2010 MENGISTU M	IEKURIA											
	ration:		EUT AND AL		-										
fode:			TX MODE												
est Eq	uipmer	<u>nt:</u>													
Horn 1-18GHz Pre-amplifer 1-26GHz					Pre-amplifer 26-40GHz Hor				orn > 18GHz			Limit			
T73; \$	S/N: 671	7 @3m	▼ T144 M	Aiteq 30	08A009	31 🖵				-				-	FCC 15.205
- Hi Fred	quency Ca	ables	1											-	
3' (cable 2	22807700	12' c	able 2	28076	00	20' cal	ble 22	807500		HPF	Re	ject Filte		<u>Measurements</u> W=VBW=1MHz
3' c	able 22	807700	12' ca	ıble 228	07600	•	20' cab	le 2280	7500			- R_	001		<u>ge Measurements</u> 1MHz ; VBW=10Hz
f	Dist	1	Read Avg.	AF	CL	Amp	D Corr	Fltr	Peak	Avg	Pk Lim			Avg Mar	Notes
GHz	(m)	dBuV 5.00 MHz)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	(V/H)
ow Char 850	mel (242 3.0	(5.00 MHz) 49.6	39.6	33.1	5.8	-36.5	0.0	0.0	52.0	42.0	74	54	-22.0	-12.0	v
275	3.0	44.9	34.3	35.2	7.2	-36.2	0.0	0.0	51.2	40.6	74	54	-22.8	-13.4	v
850	3.0	45.9	35.6	33.1	5.8	-36.5	0.0	0.0	48.3	38.0	74	54	-25.7	- 16.0	Н
275	3.0	41.9	30.6	35.2	7.2	-36.2	0.0	0.0	48.2	36.9	74	54	-25.8	-17.1	H
lid Char	inel (245	0.00 MHz)													
900	3.0	46.5	36.5	33.1	59	-36.5	0.0	0.0	49.0	39.0	74	54	- 25.0	-15.0	v
350	3.0 3.0	45.9	35.3	35.4	73	-36.2	0.0	0.0 0.0	52.3	41.7	74	54	-21.7	-12.3	V
900 350	3.0	44.0 42.9	34.6 31.9	33.1 35.4	59 73	-36.5 -36.2	0.0 0.0	0.0	46.5 49.3	37.1 38.3	74 74	54 54	-27.5 -24.7	-16.9 -15.7	H H
			010			-2014								-100	
		.00 MHz)													
950 425	3.0 3.0	42.6	33.2 36.8	33.2 35.5	59 73	-36.5 -36.2	0.0 0.0	0.0 0.0	45.2 53.8	35.8 43.3	74 74	54 54	-28.8 -20.2	-18.2 -10.7	v
42 5 950	3.0	4/.2	30.8	33.2	59	-30.2	0.0	0.0	53.8 44.3	43.3	74	54	-20.2	-10.7	ү Н
425	3.0	43.7	32.8	35.5	73	-36.2	0.0	0.0	50.3	39.4	74	54	-23.7	-14.6	Н
ev. 07.22	2.09														
	f	Measureme	ent Frequenc [,]	v		Amp	Preamp (Gain				Avg Lim	Average F	ield Strengtl	n Limit
	Dist	Distance to				-	-		ct to 3 mete	rs				l Strength Li	
		Analyzer R				Avg			Strength @					Average Li	
	AF	Antenna Fa				Peak	-		c Field Stre			-	-	Peak Limit	
	CL	Cable Loss				HPF	High Pas			2			3		

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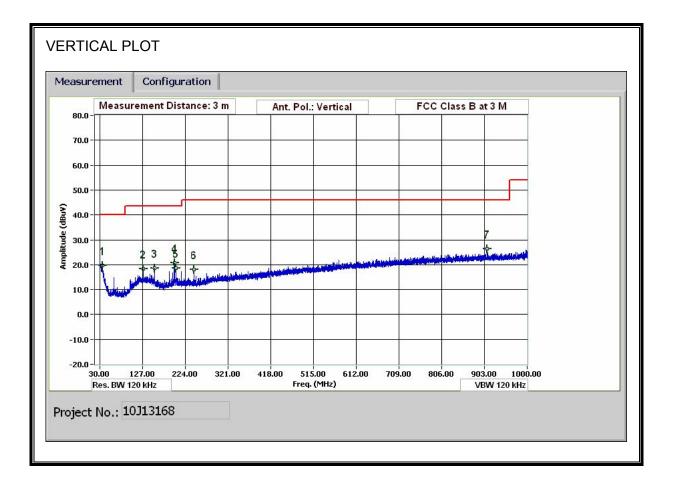
8.3. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



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SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)



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HORIZONTAL AND VERTICAL DATA

Test Engr: Date: Project #: Company: EUT Description: EUT M/N: Test Target: Mode Oper:		MENGIST 04/28/10 10J13168 SMK COI REMOTE RXT1000- FCC CLA TX MODE	RPORAT CONTR 0801E ASS B	IION									
-	f	Measurement Frequency Distance to Antenna Analyzer Reading Antenna Factor			Amp	Preamp Gain Margin Margin vs. Limit r Distance Correct to 3 meters Filter Insert Loss Calculated Field Strength							
	Dist				D Corr								
	Read				Filter								
	AF				Corr.								
	CL	Cable Loss Limit Field Strength Limit											
f	Dist	Read	AF	CL	Amp	D Corr		Corr.	Limit		Ant. Pol.		Notes
MHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
					-					+			
34.440	3.0	29.4	18.2	0.5	28.4	0.0	0.0	19.7	40.0	- 20. 3	Н	Р	
34.440 128.884	3.0	35.3	13.6	1.1	28.3	0.0	0.0	21.6	43.5	-21.9	H	Р	
34.440 128.884 186.126	3.0 3.0	35.3 34.6	13.6 11.3	1.1 1.2	28.3 28.2	0.0 0.0	0.0 0.0	21.6 18.8	43.5 43.5	-21.9 -24.7	H H	P P	
34.440 128.884 186.126 214.808	3.0 3.0 3.0	35.3 34.6 36.8	13.6 11.3 11.9	1.1 1.2 1.3	28.3 28.2 28.2	0.0 0.0 0.0	0.0 0.0 0.0	21.6 18.8 21.8	43.5 43.5 43.5	-21.9 -24.7 -21.7	H H H	P P P	
34.440 128.884 186.126 214.808 817.472	3.0 3.0 3.0 3.0	35.3 34.6 36.8 40.0	13.6 11.3 11.9 21.1	1.1 1.2 1.3 2.7	28.3 28.2 28.2 27.5	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	21.6 18.8 21.8 36.3	43.5 43.5 43.5 46.0	-21.9 -24.7 -21.7 -9.7	H H H H	P P P P	
34.440 128.884 186.126 214.808 817.472 819.633	3.0 3.0 3.0 3.0 3.0 3.0	35.3 34.6 36.8 40.0 33.7	13.6 11.3 11.9 21.1 21.1	1.1 1.2 1.3 2.7 2.7	28.3 28.2 28.2 27.5 27.5	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	21.6 18.8 21.8 36.3 30.0	43.5 43.5 43.5 46.0 46.0	-21.9 -24.7 -21.7 -9.7 -16.0	H H H H	P P P P P	
34.440 128.884 186.126 214.808 817.472 819.633 836.553	3.0 3.0 3.0 3.0 3.0 3.0 3.0	35.3 34.6 36.8 40.0 33.7 30.5	13.6 11.3 11.9 21.1 21.1 21.3	1.1 1.2 1.3 2.7 2.7 2.7	28.3 28.2 28.2 27.5 27.5 27.6	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	21.6 18.8 21.8 36.3 30.0 27.0	43.5 43.5 43.5 46.0 46.0 46.0	-21.9 -24.7 -21.7 -9.7 -16.0 -19.0	H H H H H	P P P P P P	
34,440 128,884 186,126 214,808 817,472 819,633 836,553 35,520	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	35.3 34.6 36.8 40.0 33.7 30.5 30.1	13.6 11.3 11.9 21.1 21.1 21.3 17.5	1.1 1.2 1.3 2.7 2.7 2.7 0.6	28.3 28.2 28.2 27.5 27.5 27.6 28.4	0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0	21.6 18.8 21.8 36.3 30.0 27.0 19.7	43.5 43.5 43.5 46.0 46.0 46.0 40.0	-21.9 -24.7 -21.7 -9.7 -16.0 -19.0 -20.3	H H H H H V	P P P P P P	
34.440 128.884 186.126 214.808 817.472 819.633 836.553 35.520 128.884	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	35.3 34.6 36.8 40.0 33.7 30.5 30.1 32.0	13.6 11.3 11.9 21.1 21.1 21.3 17.5 13.6	1.1 1.2 1.3 2.7 2.7 2.7 0.6 1.1	28.3 28.2 28.2 27.5 27.5 27.6 28.4 28.3	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	21.6 18.8 21.8 36.3 30.0 27.0 19.7 18.3	43.5 43.5 43.5 46.0 46.0 46.0 46.0 40.0 43.5	-21.9 -24.7 -21.7 -9.7 -16.0 -19.0 -20.3 -25.2	H H H H V V	P P P P P P P P P P P P P P P P P P P	
34.440 128.884 186.126 214.808 817.472 819.633 836.553 35.520 128.884 154.805	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	35.3 34.6 36.8 40.0 33.7 30.5 30.1 32.0 33.6	13.6 11.3 11.9 21.1 21.1 21.3 17.5 13.6 12.2	1.1 1.2 1.3 2.7 2.7 2.7 0.6 1.1 1.1	28.3 28.2 28.2 27.5 27.5 27.6 28.4 28.3 28.3	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	21.6 18.8 21.8 36.3 30.0 27.0 19.7 18.3 18.6	43.5 43.5 43.5 46.0 46.0 46.0 40.0 43.5 43.5	-21.9 -24.7 -9.7 -16.0 -19.0 -20.3 -25.2 -24.9	H H H H V V V V	P P P P P P P P P P P P P P P P P P P	
34.440 128.884 186.126 214.808 817.472 819.633 836.553 35.520 128.884 154.805 199.087	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	35.3 34.6 36.8 40.0 33.7 30.5 30.1 32.0 33.6 35.7	13.6 11.3 11.9 21.1 21.1 21.3 17.5 13.6 12.2 11.9	1.1 1.2 1.3 2.7 2.7 2.7 0.6 1.1 1.1 1.2	28.3 28.2 27.5 27.5 27.6 28.4 28.3 28.3 28.3	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	21.6 18.8 21.8 36.3 30.0 27.0 19.7 18.3 18.6 20.6	43.5 43.5 43.5 46.0 46.0 46.0 40.0 43.5 43.5 43.5	-21.9 -24.7 -9.7 -16.0 -19.0 -20.3 -25.2 -24.9 -22.9	H H H H V V V V V	P P	
34.440 128.884 186.126 214.808 817.472 819.633 836.553 35.520 128.884 154.805 199.087 202.687	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	35.3 34.6 36.8 40.0 33.7 30.5 30.1 32.0 33.6 35.7 33.5	13.6 11.3 11.9 21.1 21.1 21.3 17.5 13.6 12.2 11.9 12.0	1.1 1.2 1.3 2.7 2.7 0.6 1.1 1.1 1.2 1.3	28.3 28.2 27.5 27.5 27.6 28.4 28.3 28.3 28.2 28.2	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	21.6 18.8 21.8 36.3 30.0 27.0 19.7 18.3 18.6 20.6 18.5	43.5 43.5 44.0 46.0 46.0 40.0 43.5 43.5 43.5 43.5 43.5	-21.9 -24.7 -9.7 -16.0 -19.0 -20.3 -25.2 -24.9 -22.9 -25.0	H H H V V V V V V	P P	
34.440 128.884 186.126 214.808 817.472 819.633 836.553 35.520 128.884 154.805 199.087	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	35.3 34.6 36.8 40.0 33.7 30.5 30.1 32.0 33.6 35.7	13.6 11.3 11.9 21.1 21.1 21.3 17.5 13.6 12.2 11.9	1.1 1.2 1.3 2.7 2.7 2.7 0.6 1.1 1.1 1.2	28.3 28.2 27.5 27.5 27.6 28.4 28.3 28.3 28.3	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	21.6 18.8 21.8 36.3 30.0 27.0 19.7 18.3 18.6 20.6	43.5 43.5 43.5 46.0 46.0 46.0 40.0 43.5 43.5 43.5	-21.9 -24.7 -9.7 -16.0 -19.0 -20.3 -25.2 -24.9 -22.9	H H H H V V V V V	P P	

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9. MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	Averaging time (minutes)
(A) Lim	its for Occupational	l/Controlled Exposu	res	
).3–3.0	614	1.63	*(100)	6
.0–30	1842/f	4.89/f	*(900/f2)	6
0–300	61.4	0.163	1.0	6
00–1500			f/300	(
500–100,000			5	í.
(B) Limits	for General Populati	on/Uncontrolled Exp	oosure	
).3–1.34	614	1.63	*(100)	30
1.34–30	824 <i>/</i> f	2.19/f	*(180/f ²)	30

TABLE 1-LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

TABLE 1-LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)-Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	Averaging time (minutes)
30–300 300–1500 1500–100,000	27.5	0.073	0.2 f/1500 1.0	30 30 30

f = frequency in MHz

* = Plane-wave equivalent power density NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occu-tions where a transient through a location where occu-

pational/controlled limits apply provided he or she is made aware of the potential for exposure. NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be ex-posed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

EQUATIONS

Power density is given by:

S = EIRP / (4 * Pi * D^2)

where

S = Power density in W/m² EIRP = Equivalent Isotropic Radiated Power in W D = Separation distance in m

Power density in units of W/m² is converted to units of mWc/m² by dividing by 10.

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

<u>LIMITS</u>

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm²

<u>RESULTS</u>

Band	Mode	Mode Separation		Antenna	FCC Power
		Distance	Power	Gain	Density
		(m)	(dBm)	(dBi)	(mW/cm^2)
2.4 GHz	802.15.4	0.20	-2.249	-4.40	0.0000