

RFI / EMI TEST REPORT

EUT Name	: RF-Headset
Model No.	: PRH-308
FCC ID.	: YFCPRH308
Applicant	: Pocket Device Corporation
Address	: 23F, No. 94, Sec. 1, Hsin Tai Wu Rd., Hsi Chi, Taipei, Taiwan, R. O. C. (Tuntex Scientific Park Building C)
Regulation	: CFR 47, Part 15 Subpart C
Test Site	: PEP Testing Laboratory
Test Engineer	: NICK LEE
Test Date	: MAR. 29, 2010 – MAY 18, 2010
Issued Date	: MAY 20, 2010
Report No.	: E990313

VERIFICATION

WE HEREBY VERIFY THAT :

The EUT listed below has completed RFI testing by PEP Testing Laboratory and it does comply with the limitation of FCC Part 15 subpart C, Section 15.247 limitations.

The tested configurations and the facility comply with the radiated and AC line conducted test site criteria in ANSI C63. 4 - 2009.

Any data in this RFI report is “ **reference** ” only.

APPLICANT	:	<u>Pocket Device Corporation</u>
PRODUCT	:	<u>RF-Headset</u>
FCC ID.	:	<u>YFCPRH308</u>
MODEL NO.	:	<u>PRH-308</u>



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1. Product Information

EUT Name:	RF-Headset
Channel No. :	17 Channel
Frequency Range:	2.41426GHz~2.46825GHz
Modulation:	FHSS
Data Rate:	2kHz
Duty Cycle	9.75 %
Internal Crystal / Osc. :	16MHz, 18MHz
Power Rating:	DC 3.7V --- supplied by battery
Antenna Type:	Integral
Antenna Gain :	0.5 dBi (numeric 1.1)
Case:	ABS

2. General Information

2.1 Test Mode and Procedure

Test Channel: As required by FCC Part15, Section 15.31(m) measurements on intentional radiators or receiver should be performed at three frequencies for operating frequency over 10MHz, one near top, one near middle and one near bottom.

Due to the support channels are 17 channels, the selected three frequencies for testing would be 2.414GHz near top for CH LOW, 2.441GHz near middle for CH MID and 2.468GHz near bottom for CH HIGH.

Mode	Operation Modes of EUT for Preliminary test
Channel Low Mode (2.414GHz)	Using controller that is customer provides to control EUT test in the status of Channel Low frequency and transmit continuously.
Channel Mid Mode (2.441GHz)	Using controller that is customer provides to control EUT test in the status of Channel Mid frequency and transmit continuously.
Channel High Mode (2.468GHz)	Using controller that is customer provides to control EUT test in the status of Channel High frequency and transmit continuously.

After preliminary test, the worst-case test result was recorded and provided in the report.

Test step:

- 1.EUT connect with PC via controller, and set up on the table according to regulation.
- 2.Turning on the EUT and peripheral. Then execute EUT's main function and enable peripheral which is EUT connection.
- 3.Execute BurnAP program to choose test channel and make EUT transmit continuously.
- 4.Starting to test.
- 5.When test, modulation should turn on.

2.2 Test Software(s) Used

BurnAP: Through controller to control transmit frequency of EUT.

2.3 Modification(s)

N/A

3. Support Equipment Used

Personal Computer (PC4)	CPU : Intel Pentium 4 3.06GHz FCC ID : Declaration of Conformity(DoC) Manufacturer : ACER Model Number : Aspire T650 Power Supply : Switching Power Cord : Non-Shielded, Detachable, 1.8m Data Cable : N/A
LCD (LCD1 17")	FCC ID : Declaration of Conformity(DoC) Manufacturer : SAMSUNG Model Number : 740B Power Supply : Switch, 12Vdc Power Cord : Non-Shielded, Detachable, 1.8m Data Cable : 1 > Shielded , Detachable,1.7m 2 > Back Shell : Metal
Printer (PRN1)	FCC ID : B94C2642X Manufacturer : Hewlett-Packard Model Number : C2642E Power Supply : Linear, 30Vdc O/P Power Cable : Non-Shielded , Detachable,1.8m Data Cable : 1 > Shielded , Detachable,1.2m 2 > Back Shell : Metal
Keyboard (KBS1 PS/2)	FCC ID : E5XKB5121WTH0110 Manufacturer : BTC Model Number : 5121W Power Supply : +5Vdc from PS2 of PC Power Cord : N/A Data Cable : 1 > Shielded , Non-detachable,1.6m 2 > Back Shell : Metal
Mouse (MOUS/1 PS/2)	FCC ID : DZL211106 Manufacturer : LOGITECH Model Number : M-S43 Power Supply : +5Vdc from PS2 of PC Power Cord : N/A Data Cable : 1 > Shielded , Non-detachable,1.8m 2 > Back Shell : Metal

Modem (MOD1)	FCC ID : IFAXDM1414 Manufacturer : ACEEX Model Number : 1414 Power Supply : Linear, 9Vac O/P Power Cable : Non-Shielded , Detachable,1.7m Data Cable : 1 > Shielded , Detachable,1m 2 > Back Shell : Metal
RF-Headset (Rx)	Manufacturer : Pocket Device Corporation Model Number : PRH-308

4. Measurement Result Summary

Test Item	Result
§15.247(b)(4) Antenna gain < 6dBi	Yes No Read: <u>0.5</u> dBi
Channel Listing	Ok
§15.247(a)(1) Hopping Channel Frequency Separated Limit > 25KHz or -20dB Bandwidth, whichever is greater	N/A Pass Fail Read: <u>3384</u> kHz
§15.247(a)(1)(iii) Dwell Time Limit(t) < 0.4(s)	N/A Pass Fail Read: <u>0.039</u> s
§15.247(a)(2) -6dB Bandwidth Limit > 500KHz	N/A Pass Fail Read: _____ kHz
§15.247(b)(2) Maximum peak radiated output power Non-overlapping channel < 75 > 75 Limit < 0.125 Watt < 1 Watt	N/A Pass Fail Low: <u>22.13x10⁻³</u> W Mid : <u>22.75x10⁻³</u> W High: <u>24.55x10⁻³</u> W
§15.247(b)(3) Maximum peak conducted output power Limit < 1 Watt	N/A Pass Fail Read: _____ W
§15.247(d) 100KHz outside band test (i) Band edge measurement (ii) 30MHz~25GHz spurious emission [conducted] (iii) Restrict band spurious emission [radiated]	Pass Fail
§15.247(e) The power spectral density Limit < 8dBm (in 3KHz)	N/A Pass Fail Read: _____ dBm
§15.247(e)(i) RF Exposure Compliance Requirements	Pass N/A

5. Channel Listing

a. EUT Type : RF-Headset		
b. EUT Model : PRH-308		
c. TX Channel No. : 17		
Channel 01: 2.414260 GHz	Channel 07: 2.434500 GHz	Channel 13: 2.454750 GHz
Channel 02: 2.417625 GHz	Channel 08: 2.437875 GHz	Channel 14: 2.458125 GHz
Channel 03: 2.421000 GHz	Channel 09: 2.441260 GHz	Channel 15: 2.461500 GHz
Channel 04: 2.424375 GHz	Channel 10: 2.446250 GHz	Channel 16: 2.464875 GHz
Channel 05: 2.42775 GHz	Channel 11: 2.448000 GHz	Channel 17: 2.468250 GHz
Channel 06: 2.431125 GHz	Channel 12: 2.451375 GHz	

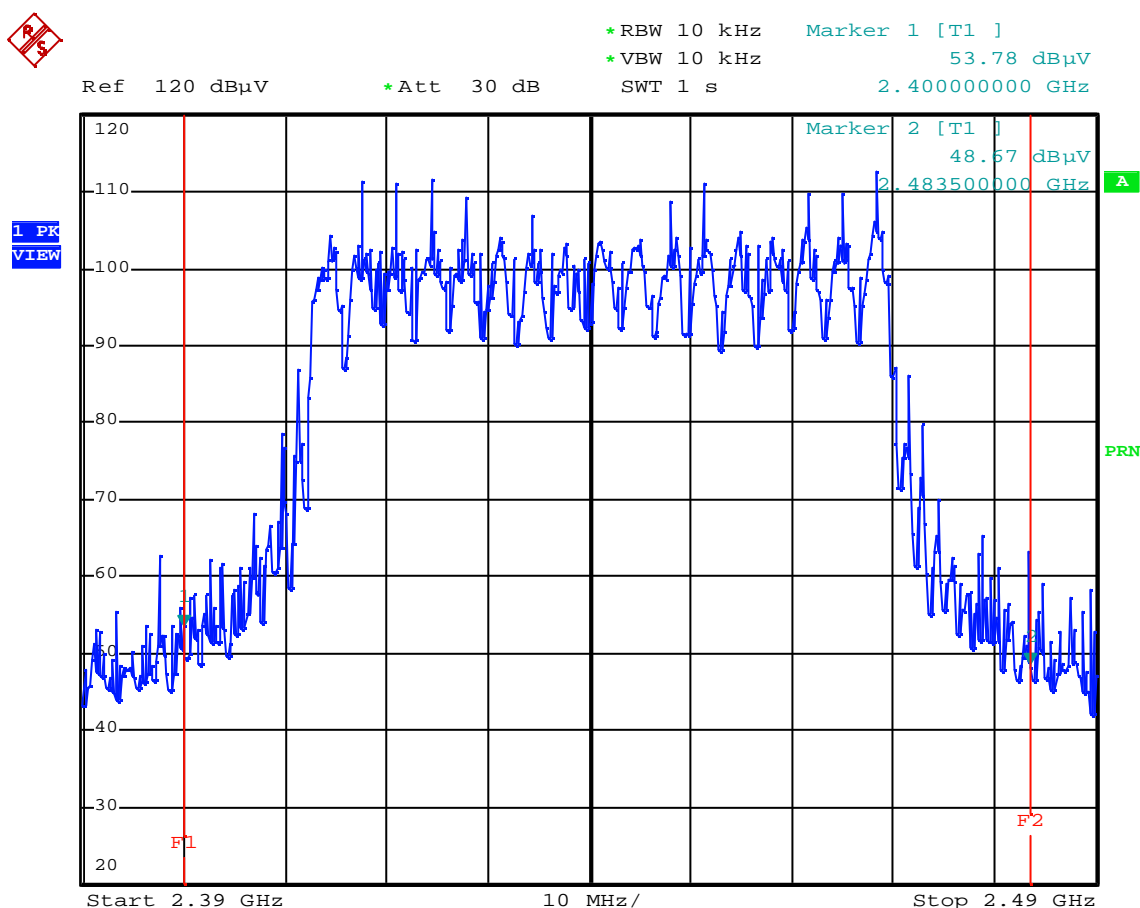
5.1 Spectrum Plot

Operating Frequency Range: 2.402 GHz to 2.480 GHz

Test Condition : Hopping on off Modulation : can off can't off

Typical Channel for testing:

Channel	Channel Number	Frequency (GHz)
LOW	1	2.41426
MID	9	2.44126
HIGH	17	2.46825



Date: 13.MAY.2010 12:21:08

6. §15.247(a)(1): Hopping Channel Frequency Separation

Limit > 25KHz or -20dB Bandwidth, whichever is greater

6.1 Test Procedure

(1) Spectrum Analyzer setting :

Span = wide enough to capture the peaks of two adjacent channels.

Resolution (or IF) Bandwidth (RBW) = 100kHz ($\geq 1\%$ of the span)

RBW \geq VBW

Sweep = auto

Detector function = peak

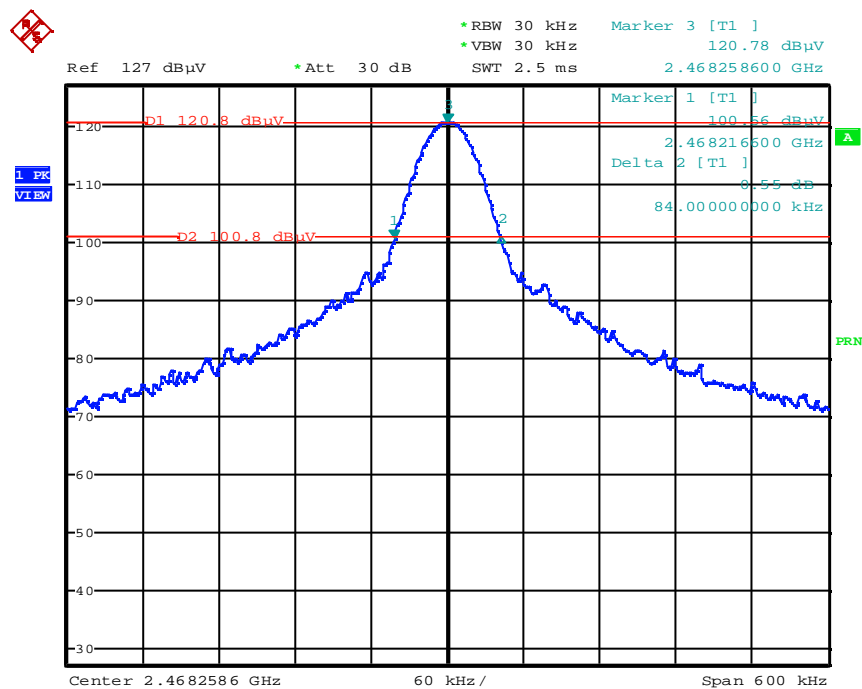
(2) Plot Spectrum Data show the Frequency Separation test results.

6.2 Test Result of Frequency Separation

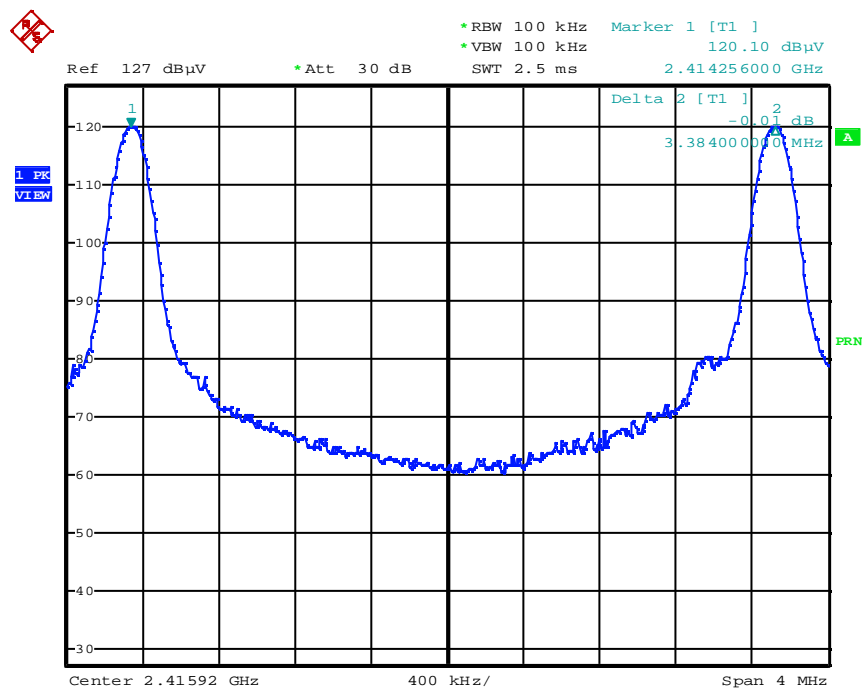
	Measured Separation (kHz)	Separation at -20dB (kHz)	Limit (kHz)	Test Result
Channel Separation	3384	84	25	PASS

6.3 Spectrum Plot Data

(A) -20dB bandwidth = 84kHz



(B) Channel Separate = 3384kHz



7. §15.247(a)(1): Time of Occupancy (Dwell Time)

Limit (t) <0.4(s)

7.1 Test Procedure

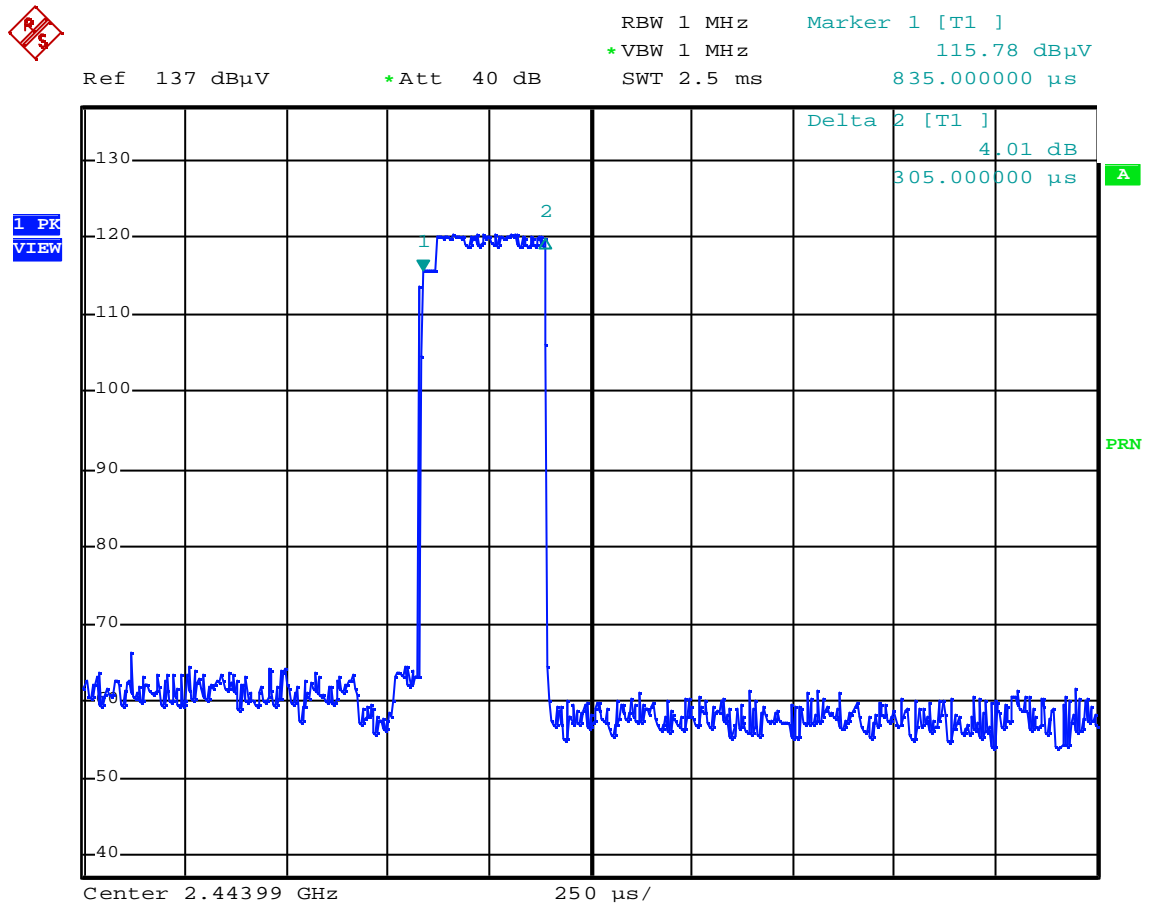
- (1) The Time of Occupancy was measured in “max hold” analyzer mode with zero span and different sweep time to calculate the Time of Occupancy.
- (2) Set the Spectrum as RBW=VBW=1MHz
- (3) Plot Spectrum Data show the Time of Occupancy test results.

7.2 Test Result of Dwell Time

Dwell Time= $305.000 \mu\text{s} \times 128/\text{channel} = 39.04\text{ms} = 0.039\text{s} < 0.4 \text{ s}$

Duty Cycle (%) = $(0.039\text{s} \div 0.4 \text{ s}) = 9.75 \%$

7.3 Spectrum Plot Data



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8. §15.247(b)(2): Maximum Peak Radiated Output Power

Non-overlapping channel < 75 , Limit < 0.125 Watt

Non-overlapping channel > 75 , Limit < 1 Watt

8.1 Testing Description

- (A) The testing procedures followed "Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems under Section DA 00-705 (2000)"
- (B) Three channels were tested: CH LOW, CH MID AND CH HIGH Measurements were taken by using RF conducted manner, with a direct connection between the antenna port of the EUT and the measuring instrument.

8.2 Test Result of Fundamental Emissions

Temperature: 26 Humidity: 60 %

Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel

RBW = 100kHz (> the 20 dB bandwidth of the emission being measured)

VBW = 100kHz (\geq RBW)

SWT = AUTO

Detector function = peak

Channel	Frequency (GHz)	Measurement (dBm)	Measurement (W)	Limit (W)	Test Result
1	2.41426	13.45	22.13×10^{-3}	125×10^{-3}	PASS
9	2.44126	13.57	22.75×10^{-3}	125×10^{-3}	PASS
17	2.46825	13.92	24.55×10^{-3}	125×10^{-3}	PASS

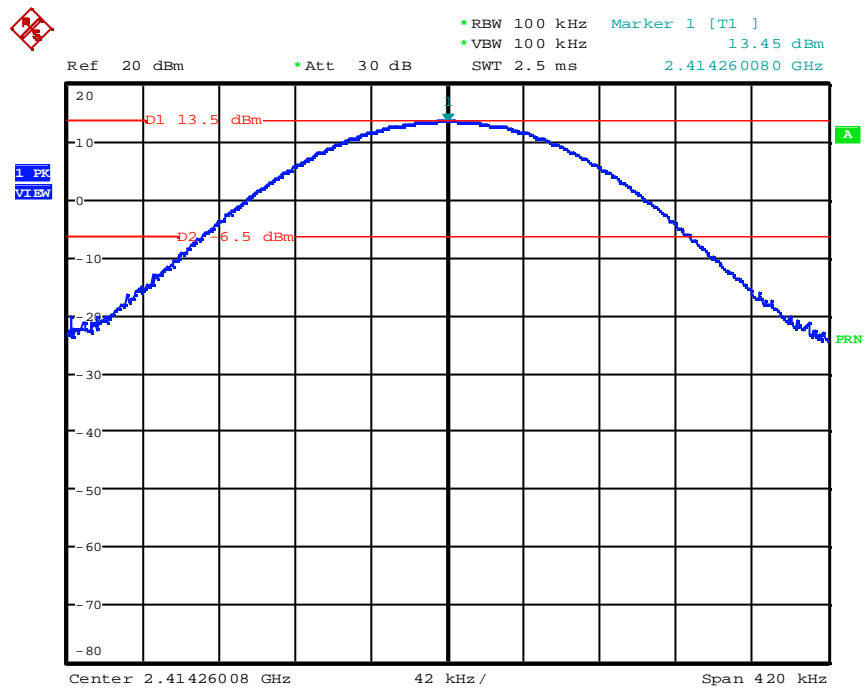
Average E.I.R.P calculation :

Channel	Frequency (GHz)	Peak output Power (dBm)	Peak E.I.R.P		Average E.I.R.P	
			(dBm)	(mW)	(dBm)	(mW)
1	2.41426	13.45	13.95	24.83	3.95	2.48
9	2.44126	13.57	14.07	25.53	4.07	2.55
17	2.46825	13.92	14.42	27.67	4.42	2.77

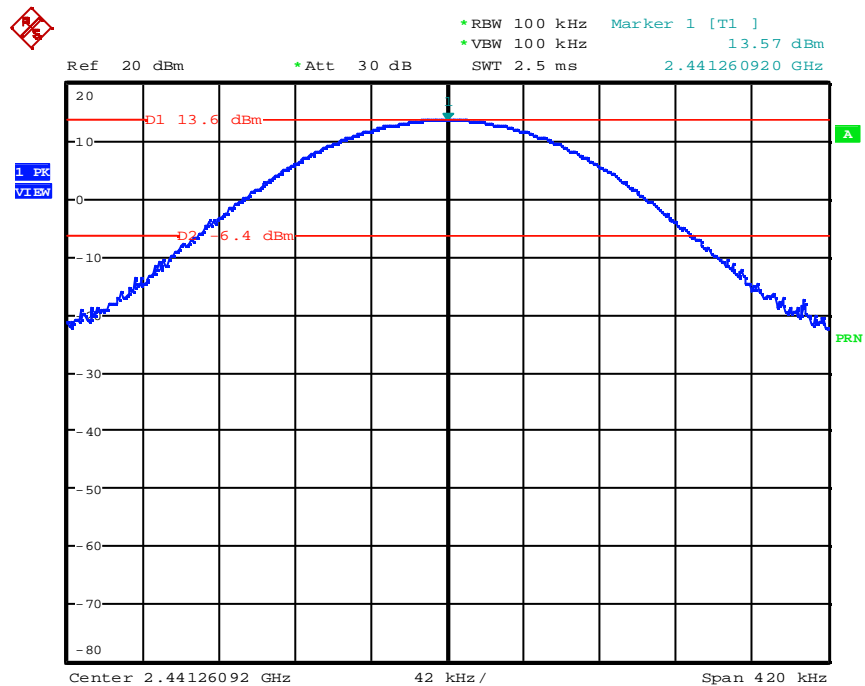
Note : Average E.I.R.P(dBm) = Peak E.I.R.P(dBm) + Duty Cycle (dB)

8.3 Spectrum Plot Data

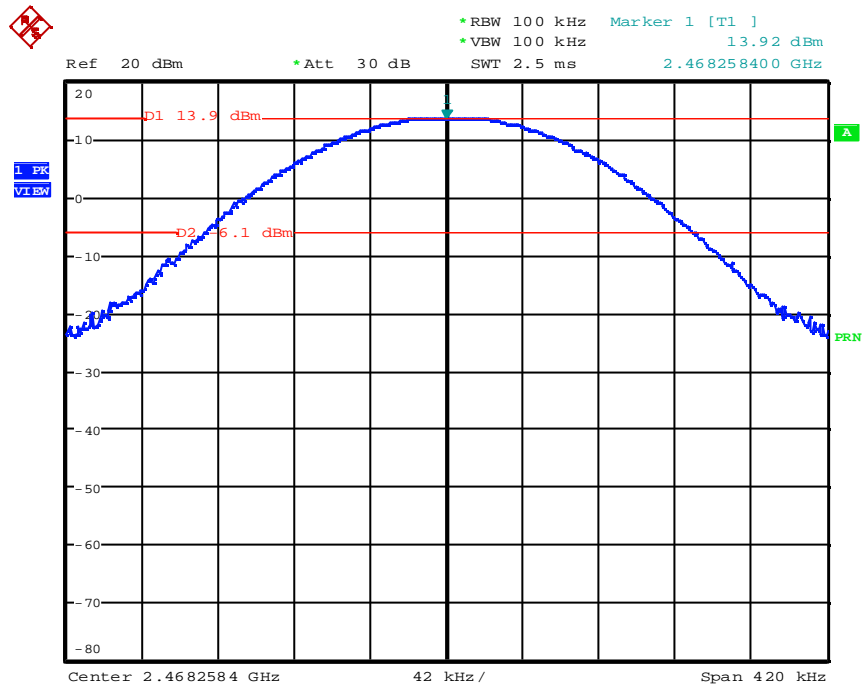
Channel : 1



Channel : 9



Channel : 17



8.4 Test Setup Photo



9. §15.247(d): 100KHz Outside Band Test

Span = wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation.

RBW = 300kHz \geq 1% of the span)

VBW \geq RBW

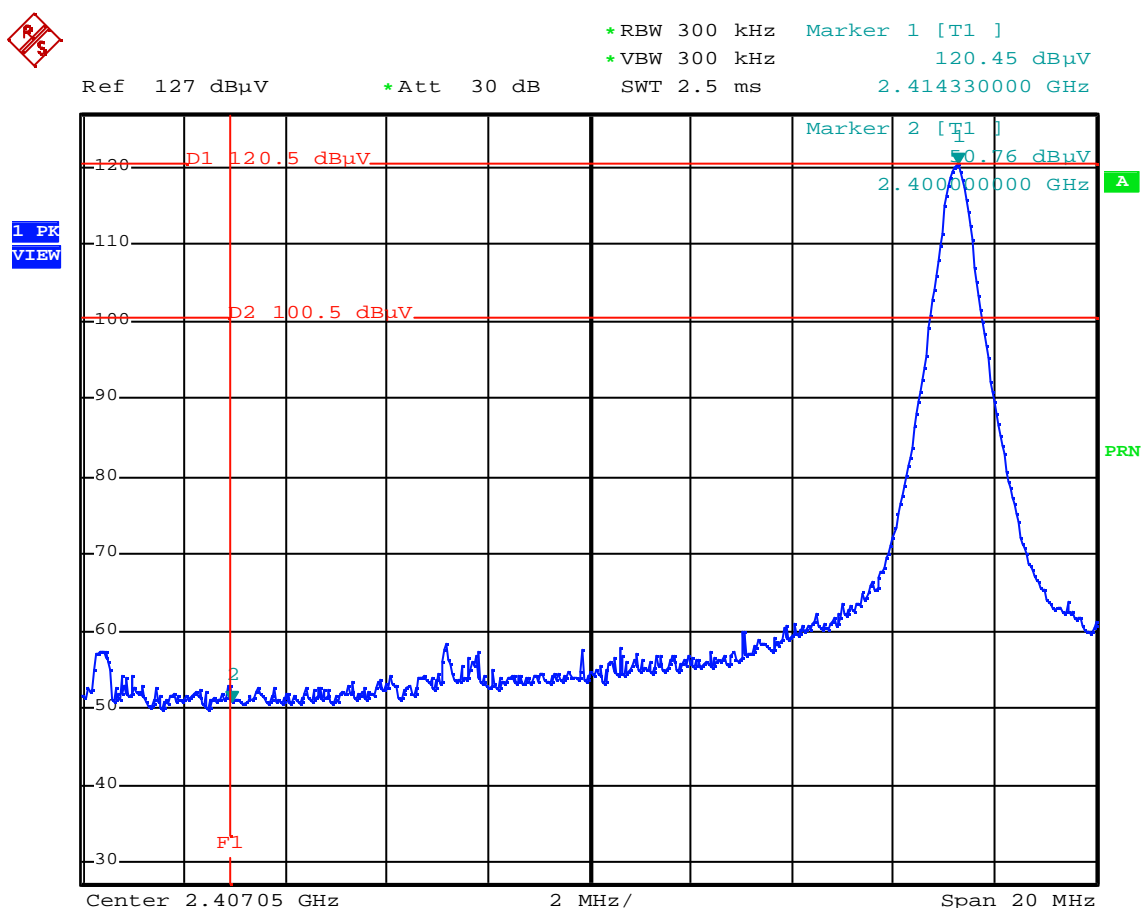
Sweep = auto

Detector function = peak

9.1 [§15.247(d)(i)] Band Edge Measurement

Channel: 1 limit < 100.5 dB μ V

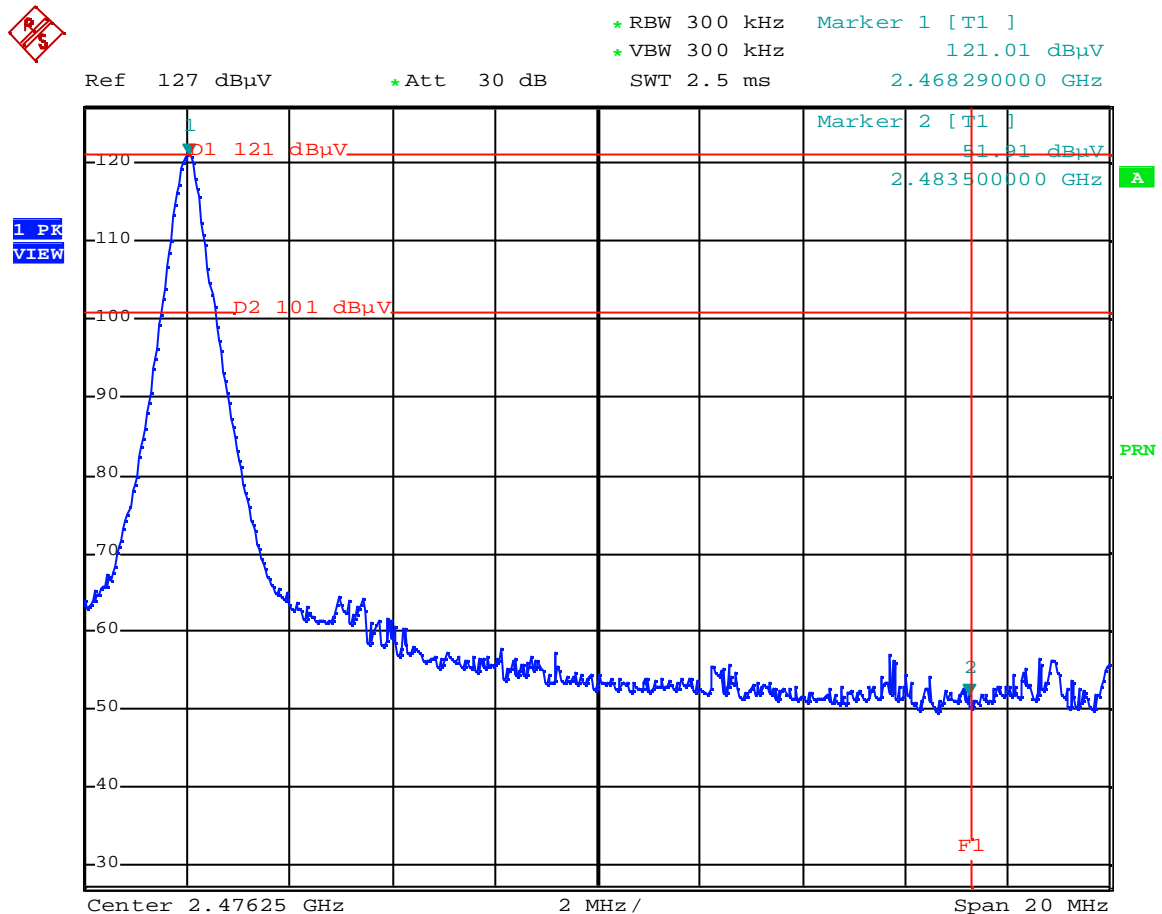
Band-edges: 2.4GHz Peak read: 0.76 dB μ V < 100.5 dB μ V



Date: 15.MAY.2010 23:26:16

Channel: 17 limit < 101 dBμV

Band-edges: 2.4835GHz Peak read: 51.91 dBμV < 101 dBμV



Date: 16.MAY.2010 00:36:46

9.2 [§15.247(d)(ii)] Spurious Emissions [Conducted]

RBW = 100 kHz

VBW ≥ RBW

Sweep = auto

Detector function = peak

Test Results:

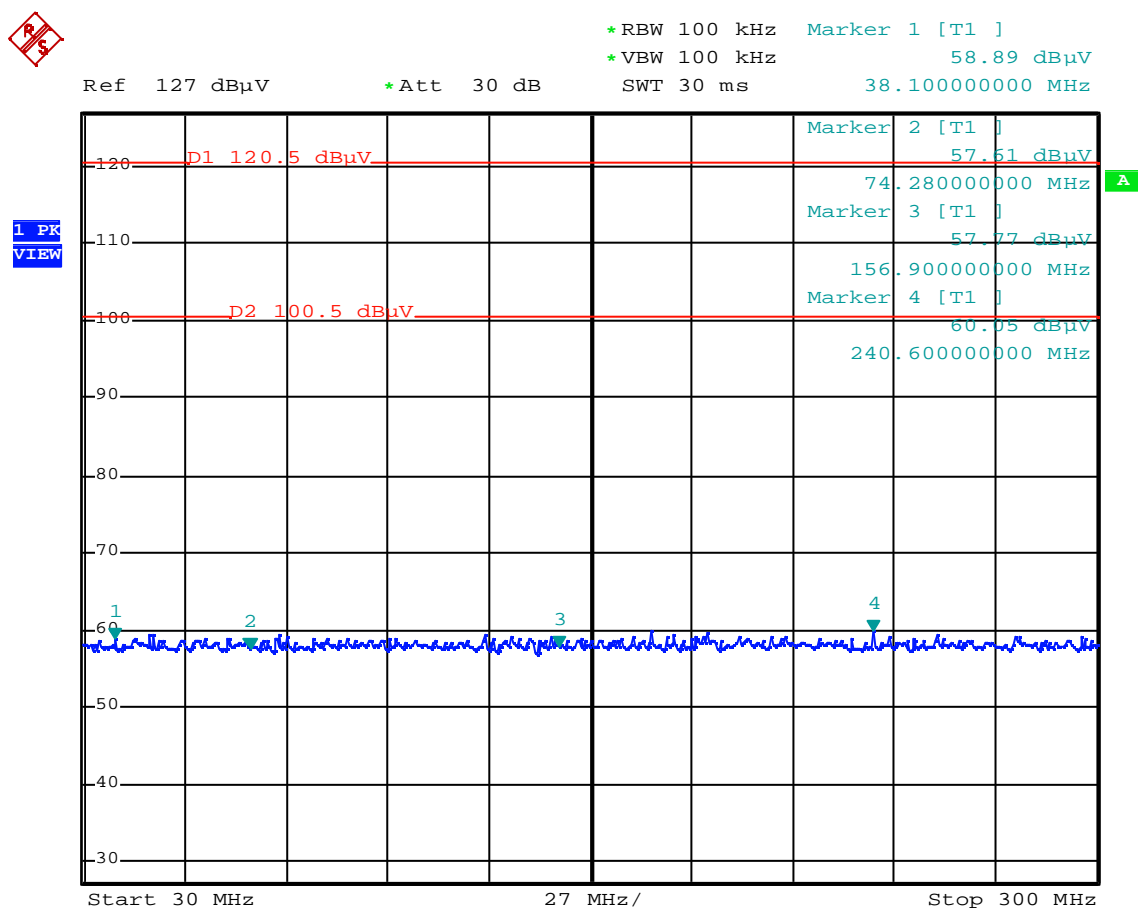
Model No. : PRH-308

Frequency range : 30MHz to 300MHz

Temperature : 26

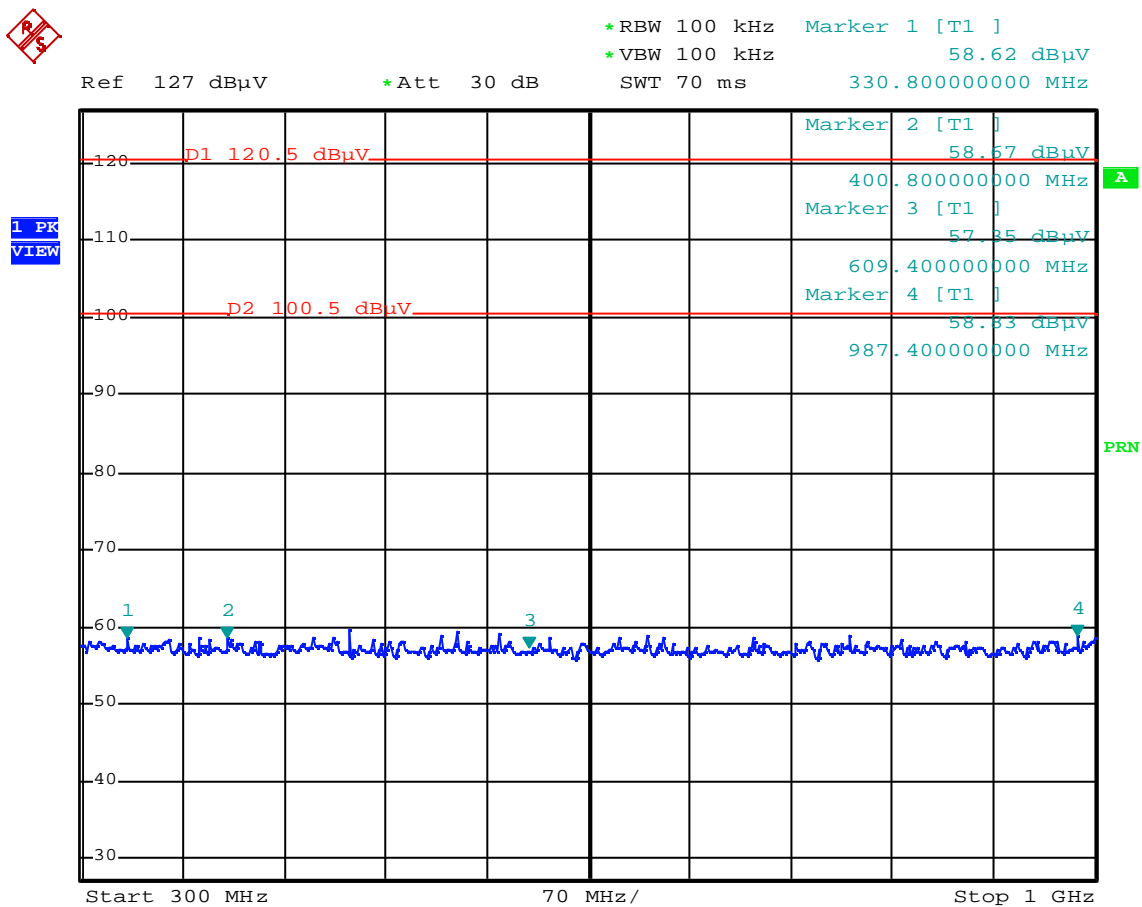
Detector : Peak Value

Humidity : 60 %



Date: 17.MAY.2010 11:52:57

Model No. : PRH-308
Frequency range : 300MHz to 1GHz
Temperature : 26
Detector : Peak Value
Humidity : 60 %

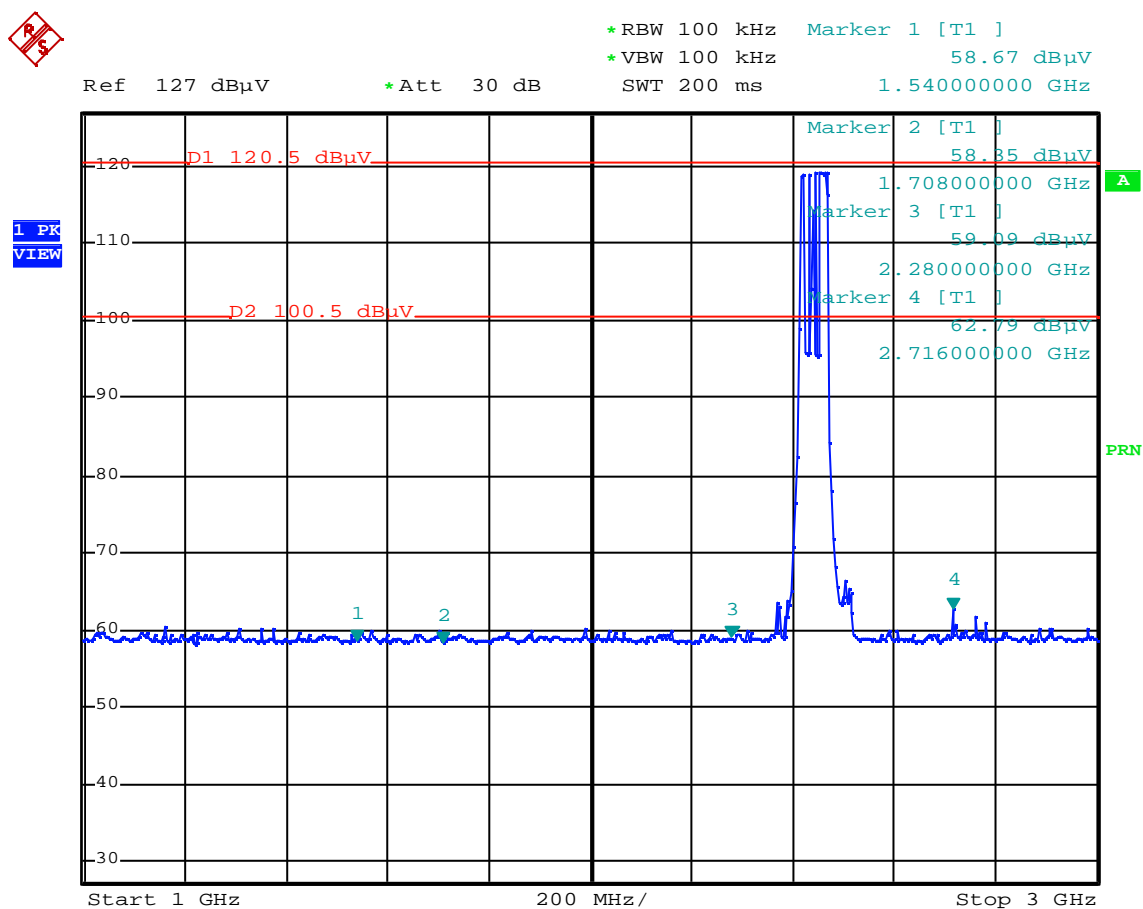


Date: 17.MAY.2010 11:56:46

Test Results:

Model No. : PRH-308
Frequency range : 1GHz to 3GHz
Temperature : 26

Detector : Peak Value
Humidity : 60 %



Date: 17.MAY.2010 12:35:58

Test Results:

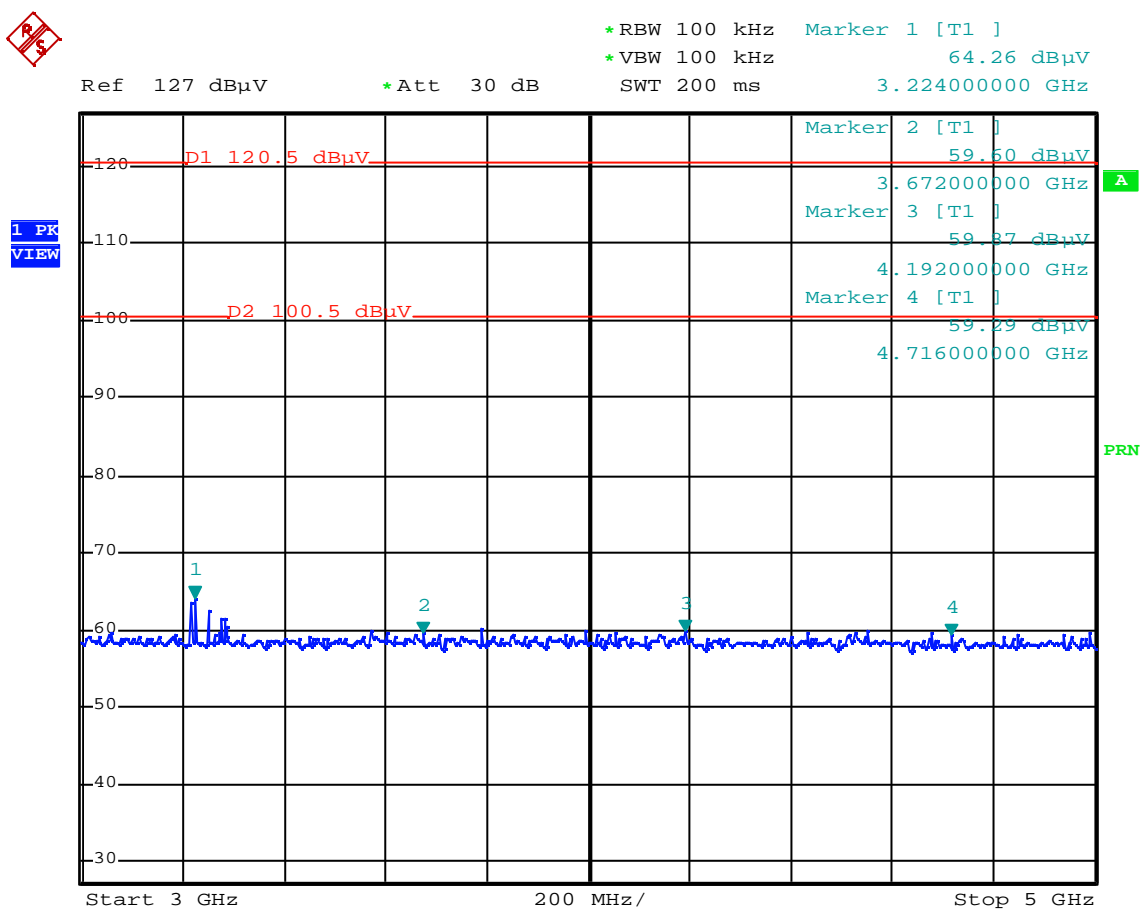
Model No. : PRH-308

Frequency range : 3GHz to 5GHz

Temperature : 26

Detector : Peak Value

Humidity : 60 %



Date: 17.MAY.2010 12:42:31

Test Results:

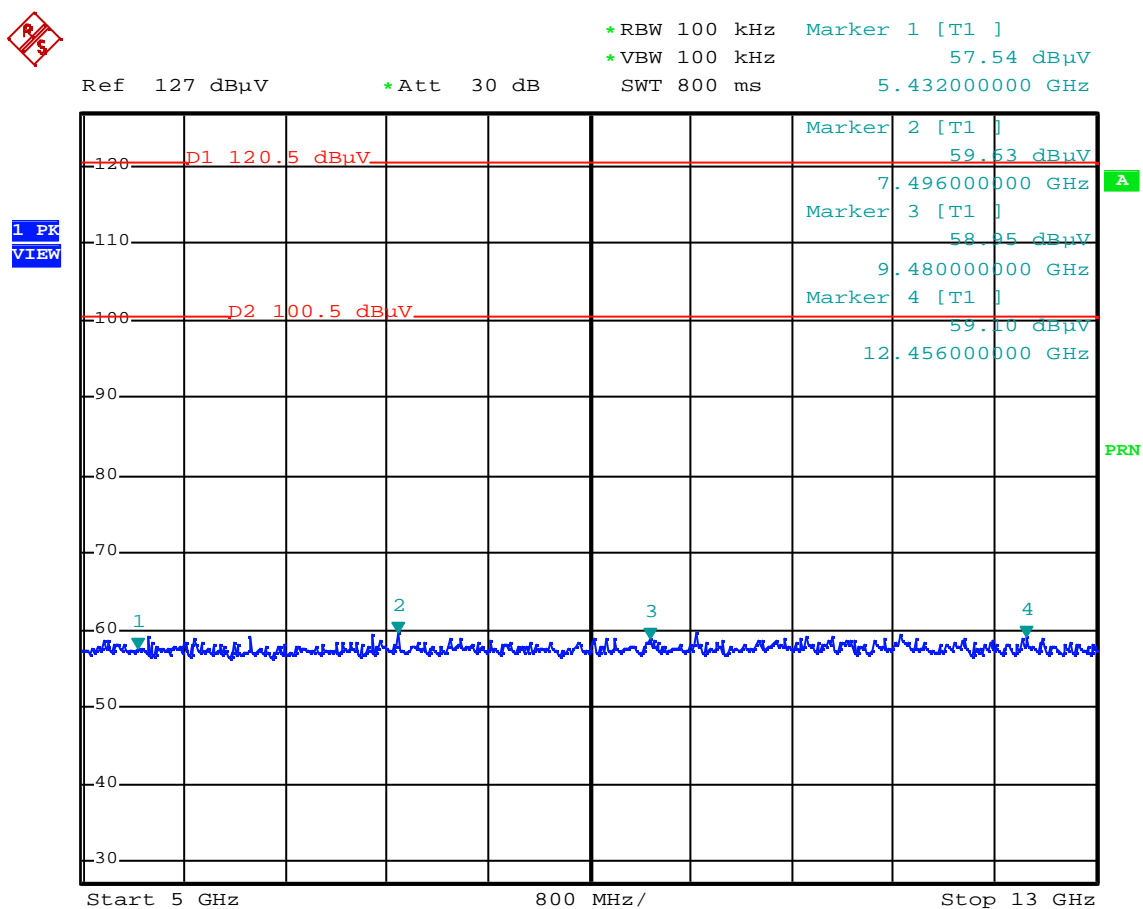
Model No. : PRH-308

Frequency range : 5GHz to 13GHz

Temperature : 26

Detector : Peak Value

Humidity : 60 %



Date: 17.MAY.2010 13:40:02

Test Results:

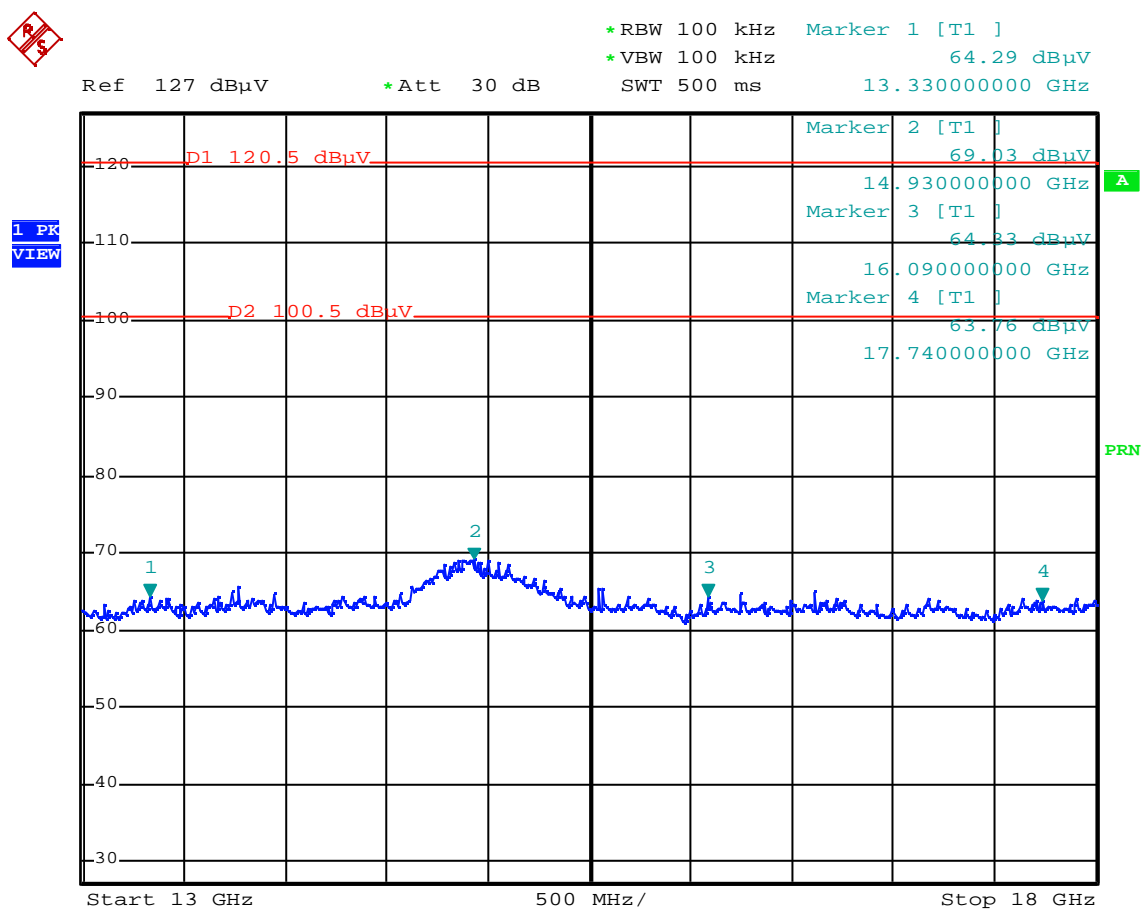
Model No. : PRH-308

Frequency range : 13GHz to 18GHz

Temperature : 26

Detector : Peak Value

Humidity : 60 %



Date: 17.MAY.2010 13:42:41

Test Results:

Model No. : PRH-308

Frequency range : 18GHz to 25GHz

Temperature : 26

Detector : Peak Value

Humidity : 60 %



Ref 127 dBuV

* Att 30 dB

* RBW 100 kHz

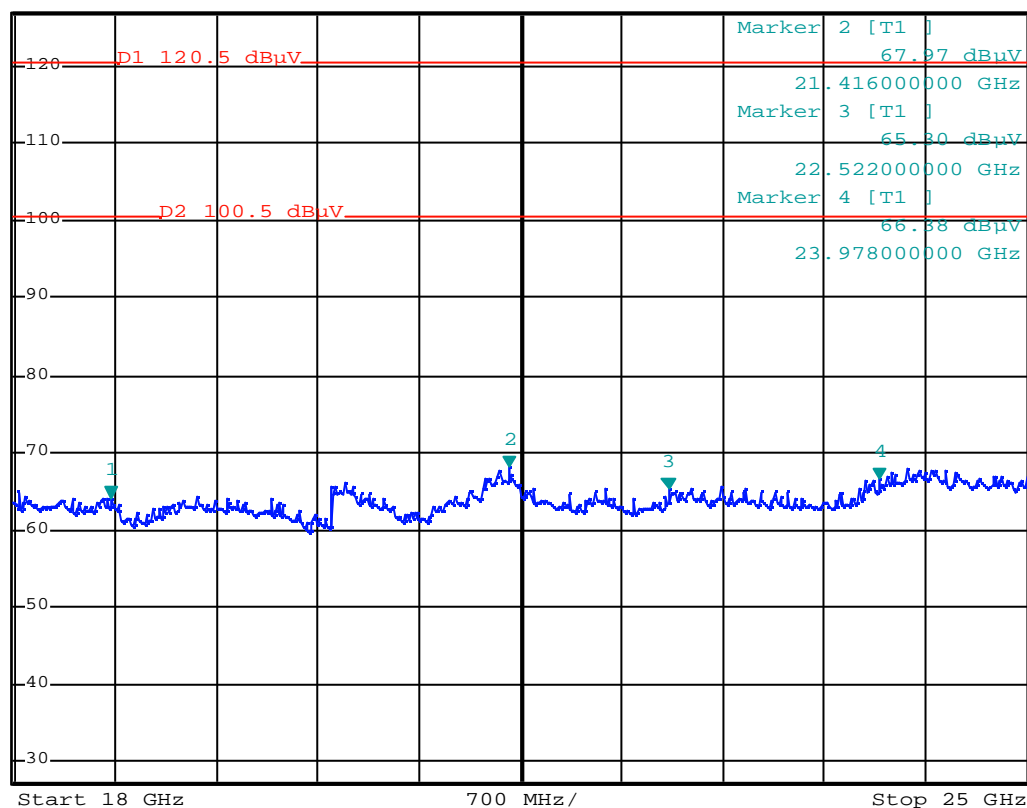
Marker 1 [T1]

* VBW 100 kHz

64.27 dBuV

SWT 700 ms

18.67200000 GHz

1 PK
VIEW

Date: 17.MAY.2010 13:46:04

9.3 [§15.247(d)(iii)]**Spurious Emissions For Restrict Band [Radiated]**

Test method:

According to ANSI C63.4 (2003) paragraph 10.1.8.2, we indicate restrict band (§15.205) emission relative to the limit (§15.209), as result.

When we performed “Spurious Radiated Emission For Restrict Band”, the EUT was under continuous transmitting condition. It means hopping on . Then the worst case data can be detected and recorded in this report .

To avoid the pre-amplifier saturation by fundamental frequency, we added a “natch filter” (bandwidth from 2.4GHz to 2.4835GHz) between receiving antenna RF output and pre-amplifier’s RF input to bypass fundamental frequency , and only detected spurious emission.

Test result:

Measurement Range: 30MHz~25GHz

Resolution Bandwidth: 30MHz~1GHz, RBW=120KHz

Above 1GHz, RBW=1MHz

Temperature: 26Humidity: 60 %**Antenna polarization: HORIZONTAL ; Test distance : 3m ;**

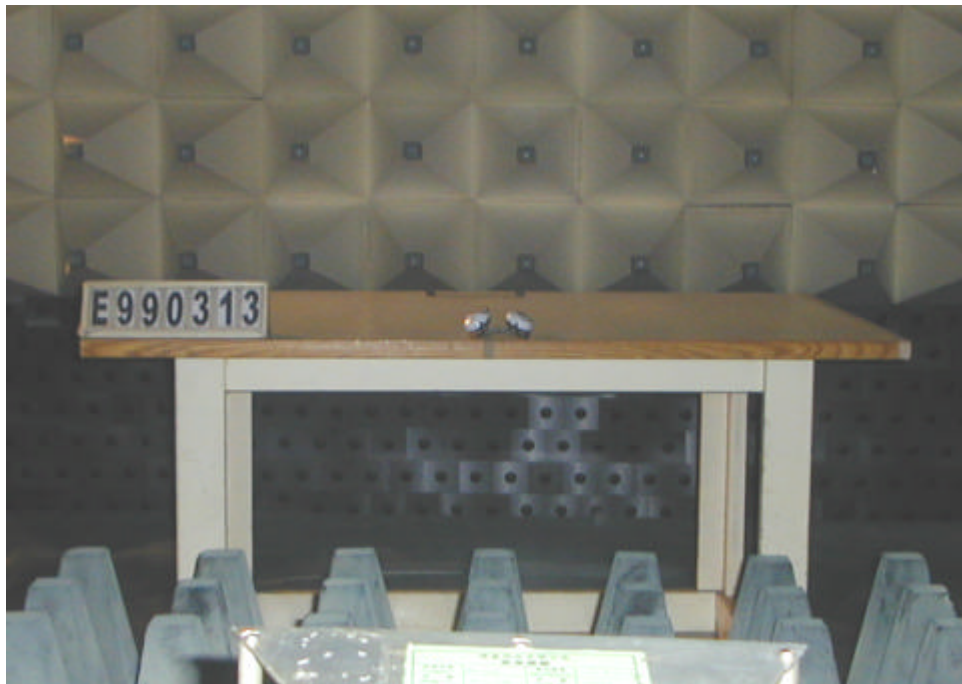
Freq. (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Detector Mode
3927.9	48.81	-25.19	74.00	43.28	31.51	7.23	33.21	Peak
3927.9	45.29	- 8.71	54.00	39.76	31.51	7.23	33.21	Average
4854.0	49.00	-25.00	74.00	41.64	32.57	7.99	33.20	Peak
4854.0	46.32	- 7.68	54.00	38.96	32.57	7.99	33.20	Average
11968.0	61.19	-12.81	74.00	43.93	39.75	10.50	32.99	Peak
11968.0	48.61	- 5.39	54.00	31.35	39.75	10.50	32.99	Average

Antenna polarization: VERTICAL ; Test distance : 3m ;

Freq. (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Detector Mode
4798.7	48.98	-25.02	74.00	41.59	32.44	7.95	33.20	Peak
4798.7	46.21	- 7.79	54.00	39.02	32.44	7.95	33.20	Average
9600.0	57.66	-16.34	74.00	40.84	39.60	9.92	32.70	Peak
9600.0	44.75	- 9.25	54.00	29.82	37.83	9.70	32.60	Average
12000.0	59.30	-14.70	74.00	42.10	39.70	10.50	33.00	Peak
12000.0	48.20	- 5.80	54.00	31.00	39.70	10.50	33.00	Average

Note: If the Peak level under Average limit, the Average detector will not be perform.

9.4 Test Setup Photo



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10. §15.247(e)(i): RF Exposure Compliance Requirements

The routine environment evaluation of this portable transmitter has been made as statement below :

- (a) The transmitter is categorically excluded from routine environmental evaluation for RF exposure as § 2.1093 (c) specified .
- (b) The transmitter is low peak power output (24.55mW) and low antenna gain number (1.1 or 0.5dBi) which average E.I.R.P. (2.77mW) < 60/2.4GHz (mW) . therefore , according to KDB 447498 D01 1)c) , the SAR evaluation is unnecessary .

11. List of Test Instruments

Test Site	Instrument	Manufacturer	Model No.	S/N	Next Cal. Date	Cal. Interval
Chamber (No. 1)	Spectrum Analyzer	R & S	FSP	830180/006	Nov. 16, 2010	1 Year
	9KHz~30GHz Spectrum Analyzer	R & S	FSP	100157	Dec. 22, 2010	1 Year
	30MHz~1GHz RF Cable	N/A	N/A	N/A	Jan. 18, 2011	1 Year
	1GHz~25GHz RF Cable	HUBER SUHNER	SUCOFLEX 104	201404/4	Sep. 21, 2010	1 Year
	Antenna	SCHWARZBECK	VULB 9161	4078	Jan. 20, 2011	1 Year
	Horn Antenna 1GHz~18GHz	COM-POWER	AH-118	10056	Mar. 12, 2011	1 Year
	Horn Antenna 18GHz~26GHz	COM-POWER	AH-826	081000	Mar. 12, 2011	1 Year
	Pre-Amplifier	Schaffner	CPA-9232	1082	Jan. 20, 2011	1 Year
	Preamplifier 1GHz~18GHz	MITEQ	28-5A	513015	Oct. 14, 2010	1 Year
	Preamplifier 18GHz~26GHz	MITEQ	30-5A	808329	Oct. 14, 2010	1 Year

12. EUT Photos

FCC ID. : YFCPRH308

EUT FRONT VIEW



EUT REAR VIEW



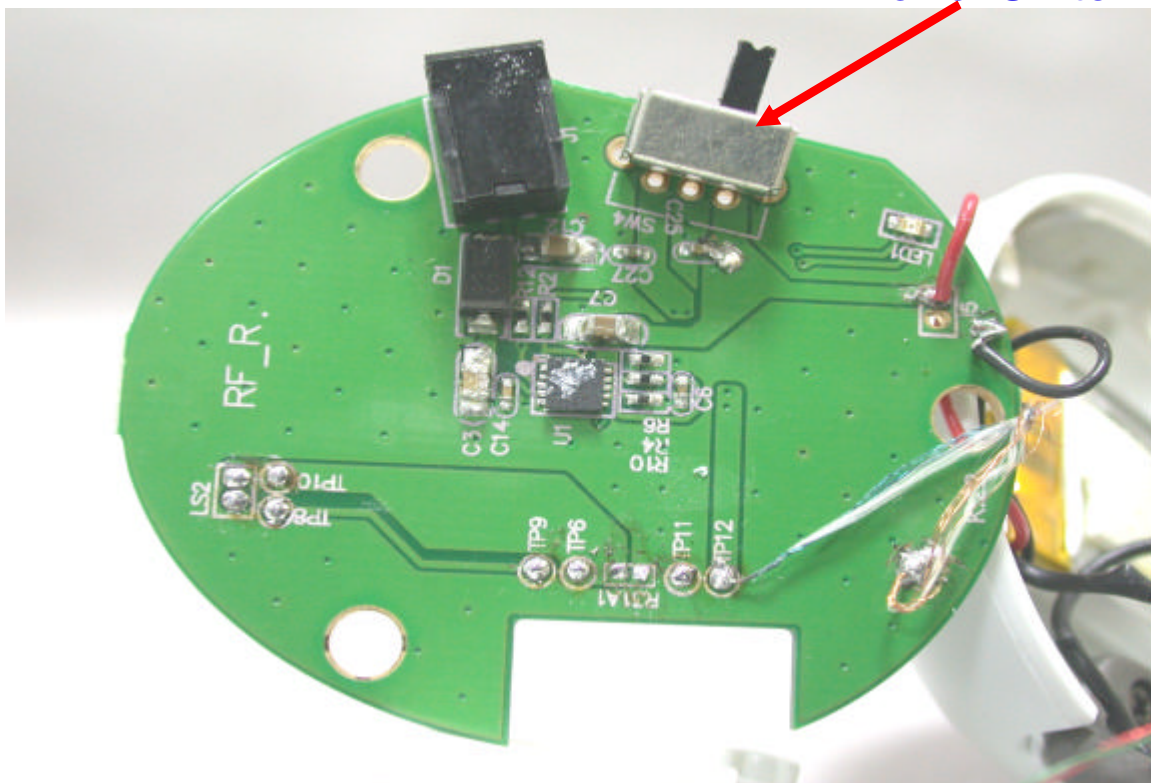
EUT INSIDE VIEW



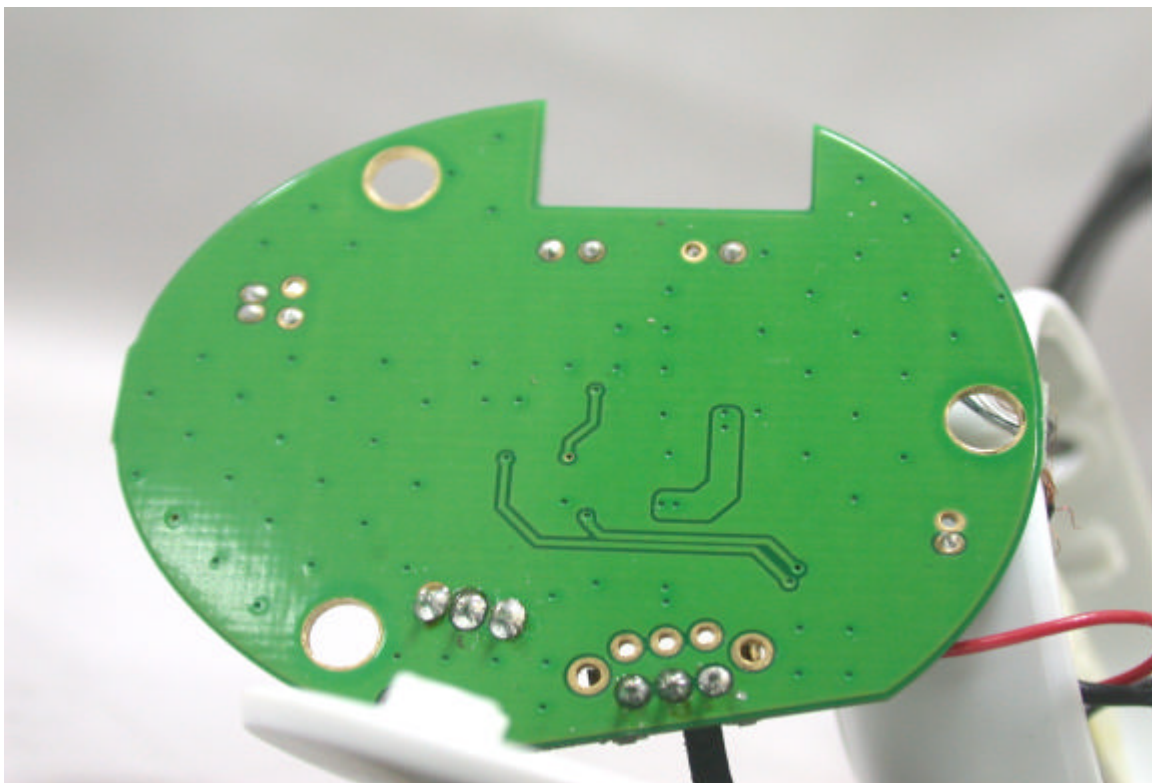
EUT INSIDE VIEW



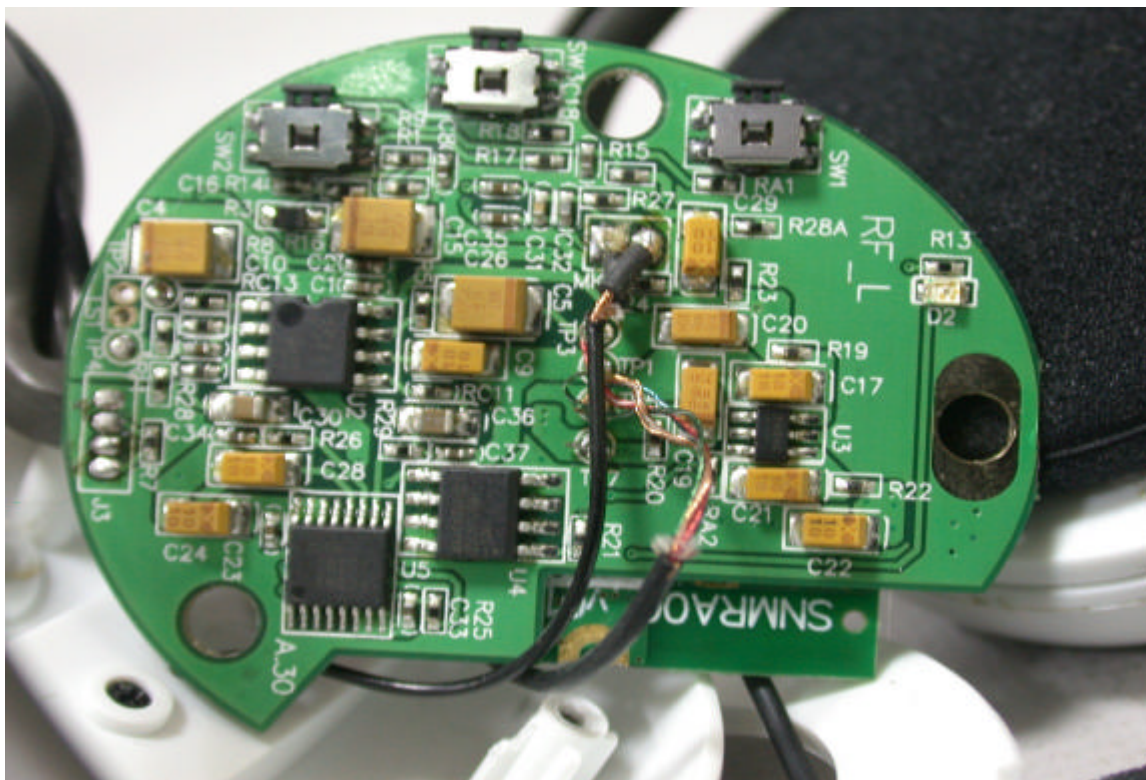
EUT COMPONENT VIEW



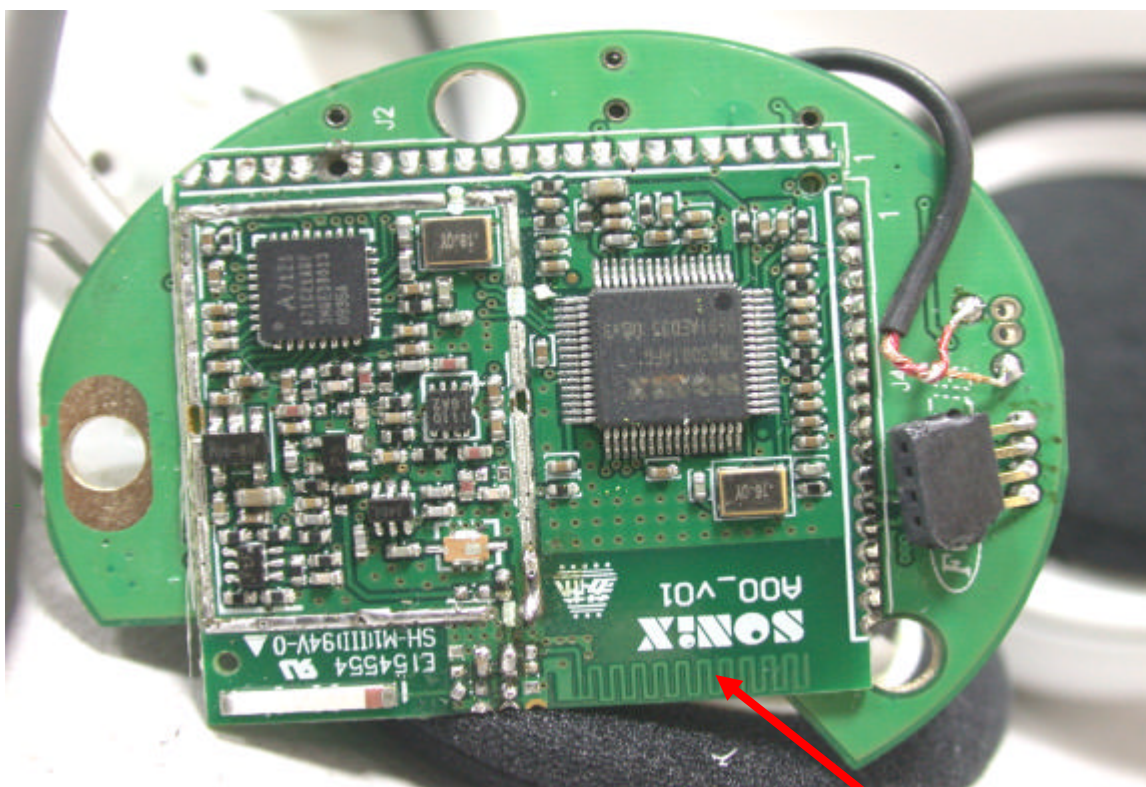
EUT SOLDERING VIEW



EUT COMPONENT VIEW



EUT SOLDERING VIEW



Antenna

EUT MODULE VIEW

