TEST REPORT

Your Ref: 56Q0601400

Date: 30 Nov 2006

Our Ref: B2-01439B/EMC/01

DID: +65-6885 1459

Fax: +65-6774 1459

FORMAL REPORT ON TESTING IN ACCORDANCE WITH
FCC Parts 15B & C : 2006
OF A
SoundScape Bridge – Standalone Wireless Audio Kit
[Model : VC4030TX and VC4030RX]
[FCC IDs : UMMVC430H06M and UMMVC430H06S]

TEST FACILITY	Telecoms & EMC, Testing Group, PSB Corporation Pte Ltd 1 Science Park Drive, Singapore 118221
FCC REG. NO.	90937 (3m & 10m OATS) 99142 (10m Anechoic Chamber) 871638 (5m Anechoic Chamber) 325572 (10m Anechoic Chamber)
IND. CANADA REG. NO.	IC 4257 (3m and 10m Anechoic Chambers)
PREPARED FOR	PSB Technologies Pte Ltd Product Design and Engineering Centre #03-03, The Franklin No 3, Science Park Drive. Singapore - 118223. Tel : 65-68851493 Fax : 65-67783951
JOB NUMBER	B2-01439B
TEST PERIOD	10 Aug 2006 – 14 Aug 2006

PREPARED BY

Alvin leong
Associate Engineer

APPROVED BY

Lim Cher Hwee
Assistant Vice President

PSB TEST ® Your Peace of Mind

ISO 9001 JQA-QMA 10040

LA-2001-0212-A LA-2001-0213-F LA-2001-0214-E LA-2001-0215-B LA-2001-0216-G LA-2001-0217-G	The results reported herein have been performed in accordance with the laboratory's terms of accreditation under the Singapore Accreditation Council - Singapore Laboratory Accreditation Scheme. Tests marked "Not SAC-SINGLAS Accredited" in this Report are not included in the SAC-SINGLAS Accreditation Schedule for our laboratory.

The product was tested in accordance with the customer's specifications.

Test Results Summary

Test Standard	Description	Pass / Fail
FCC Part 15: 2006		
15.107(a), 15.207	Conducted Emissions	Pass
15.109(a), 15.205, 15.209	Radiated Emissions (Spurious Emissions inclusive Restricted Bands Requirement)	Pass
15.247(a)(1)	Carrier Frequency Separation	Pass
	Spectrum Bandwidth (20dB Bandwidth Measurement)	Pass
15.247(a)(1)(iii)	Number of Hopping Frequencies	Pass
	Average Frequency Dwell Time	Pass
15.247(b)(1)	Maximum Peak Power	Pass
15.247(d)	RF Conducted Spurious Emissions	Pass
15.247(d)	Band Edge Compliance (Conducted)	Pass
15.247(d)	Band Edge Compliance (Radiated)	Pass
15.247(e)	Peak Power Spectral Density	Pass
1.1310	Maximum Permissible Exposure	Pass
15.35(c)	Duty Cycle Factor Computation	Refer to pages 55 and 56 for details

Notes

1. Three channels as listed below, which respectively represent the lower, middle and upper channels of the Equipment Under Test (EUT) were chosen and tested. For each channel, the EUT was configured to operate in the test mode.

Transmit Channel	Frequency (GHz)
Channel 0	2.404
Channel 18	2.440
Channel 37	2.478

2. All the measurements in section 15.247 were done based on conducted measurements except band edge compliance (radiated) test.

3. As the RF modules used for transmitter (a RF transceiver) and receiver (a transceiver) are the same, as such, the requirements under section 15.247 was done based on transmitter which is the worst unit which shows longer packet on time as compared to receiver.

4. The EUT is a Class B device when in non-transmitting state and meets the FCC Part15B Class B requirements.

5. All measurements procedures were according to ANSI C63.4 : 2003.

Modifications

1. No modifications were made.

Description	:	The Equipment Under Test (EUT) is a **SoundScape Bridge - Standalone Wireless Audio Kit**. The EUT consists of two units, namely a transmitter (a RF transceiver) and receiver (a RF transceiver). Both the transmitter and receiver using the same RF module to achieve handshaking communication.
Manufacturer	:	PSB Technologies Pte Ltd Product Design and Engineering Centre #03-03, The Franklin No 3, Science Park Drive. Singapore - 118223
Model Number	:	Transmitter VC4030TX Receiver VC4030RX
FCC IDs	:	UMMVC430H06M (VC4030TX) UMMVC430H06S (VC4030RX)
Serial Number	:	Nil
Microprocessor	:	Baseband Microprocessor - NRF24Z1 (Single Chip Wireless Audio Streamer)
Operating / Transmitting Frequency	:	2.404GHz (lower channel) to 2.478GHz (upper channel)
Clock / Oscillator Frequency	:	16MHz
Modulation	:	Gaussian Frequency Shift Keying (GFSK)
Port / Connectors	:	RCA L/R port, Stereo Jack & DC Jack
Rated Input Power	:	110V 60Hz
Accessories	:	Hon-Kwang Power Adapter Model D4560 Input 110V 60Hz, 9W Output 4.5V, 600mA

Equipment Description (Including Brand Name)	**Model, Serial & FCC ID Number**	**Cable Description** (List Length, Type & Purpose)
Sony Radio Cassette Player	M/N: CFS-W319S S/N: Nil FCC ID: Verification	1.80m unshielded power cable 0.80m audio cable
JVC DVD Player	M/N: XV/N312S S/N: 119T2400 FCC ID: Verification	1.80m unshielded power cable 0.80m audio cable
Daiyo Microphone	M/N: DM-121 S/N: Nil FCC ID: Nil	1.60m standard microphone cable
Ear Phone (No Brand)	M/N: Nil S/N: Nil FCC ID: Nil	1.00m standard earphone cable

FCC Part 15
1. Conducted Emissions **2. Radiated Emissions (Spurious Emissions inclusive Restricted Bands Requirement)** **3. Spectrum Bandwidth (20dB Bandwidth Measurement)** **4. Maximum Peak Power** **5. RF Conducted Spurious Emissions** **6. Peak Power Spectral Density** **7. Maximum Permissible Exposure** **8. Duty Cycle Factor Computation**
The EUT was exercised by operating in maximum continuous transmission with frequency hopping off, i.e transmitting at lower, middle and upper channels respectively at one time.
FCC Part 15
1. Carrier Frequency Separation **2. Number of Hopping Frequencies** **3. Average Frequency Dwell Time** **4. Band Edge Compliance (Conducted)** **5. Band Edge Compliance (Radiated)**
The EUT was exercised by operating in maximum continuous transmission with frequency hopping on.

FCC Parts 15.107(a) and 15.207 Conducted Emission Limits

Frequency Range (MHz)	Limit Values (dBµV)	
	Quasi-peak (QP)	Average (AV)
0.15 - 0.5	66 – 56 *	56 – 46 *
0.5 - 5.0	56	46
5.0 - 30.0	60	50
* Decreasing linearly with the logarithm of the frequency		

FCC Parts 15.107(a) and 15.207 Conducted Emission Test Instrumentation

Instrument	Model	S/No	Cal Due Date
R&S Test Receiver – ESI1	ESI40	100010	04 Aug 2007
R&S Pulse Limiter – PL2	ESH3-Z2	100347	15 Apr 2007
Schaffner LISN – LISN7 (for EUT)	NNB42	00008	15 May 2007

FCC Parts 15.107(a) and 15.207 Conducted Emission Test Setup

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table.
2. The power supply for the EUT was fed through a 50Ω/50µH EUT LISN, connected to filtered mains.
3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.
4. All other supporting equipment were powered separately from another LISN.

FCC Parts 15.107(a) and 15.207 Conducted Emission Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. A scan was made on the NEUTRAL line over the required frequency range using an EMI test receiver.
3. High peaks, relative to the limit line, were then selected.
4. The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10kHz. Both Quasi-peak and Average measurements were made.
5. Steps 2 to 4 were then repeated for the LIVE line.

Sample Calculation Example

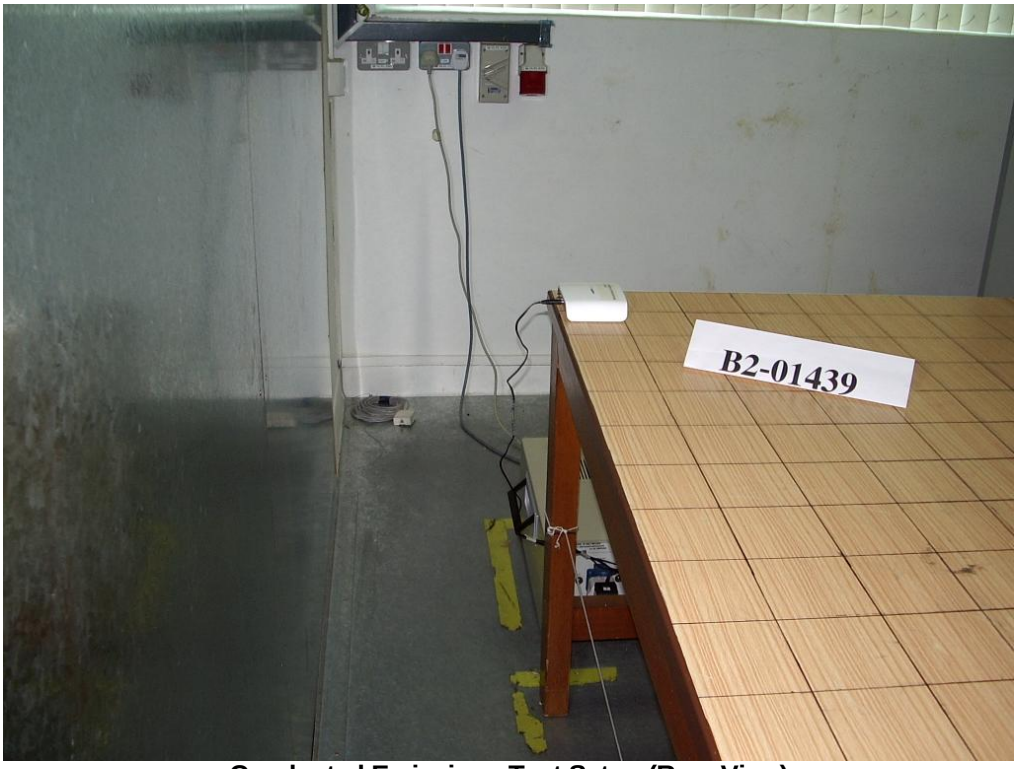
At 20 MHz Q-P limit (Class B) = 1000 µV = 60.0 dBµV

Transducer factor of LISN, pulse limiter & cable loss at 20 MHz = 11.2 dB

Q-P reading obtained directly from EMI Receiver = 40.0 dBµV
(Calibrated for system losses)

Therefore, Q-P margin = 40.0 - 60.0 = -20.0 i.e. **20.0 dB below Q-P limit**

Conducted Emissions Test Setup (Front View)



Conducted Emissions Test Setup (Rear View)

FCC Parts 15.107(a) and 15.207 Conducted Emission Results

Test Input Power	110V 60Hz	Temperature	24°C
Line Under Test	AC Mains	Relative Humidity	59%
EUT	Transmitter	Atmospheric Pressure	1030mbar
		Tested By	Johnsen Tia

Frequency (MHz)	Q-P Value (dBμV)	Q-P Margin (dB)	AV Value (dBμV)	AV Margin (dB)	Line	Channel
0.2146	49.3	-13.7	43.6	-9.4	Neutral	0
0.3225	29.3	-30.3	22.9	-26.7	Neutral	0
1.2648	26.6	-29.4	16.6	-29.4	Live	0
1.2825	30.3	-25.7	19.6	-26.4	Neutral	0
2.5630	18.0	-38.0	8.8	-37.2	Live	0
13.5628	28.9	-31.1	23.5	-26.5	Neutral	0

Test Input Power	110V 60Hz	Temperature	24°C
Line Under Test	AC Mains	Relative Humidity	59%
EUT	Receiver	Atmospheric Pressure	1030mbar
		Tested By	Johnsen Tia

Frequency (MHz)	Q-P Value (dBμV)	Q-P Margin (dB)	AV Value (dBμV)	AV Margin (dB)	Line	Channel
0.2134	50.5	-12.6	44.8	-8.3	Live	0
0.2540	25.2	-36.4	19.1	-32.5	Live	0
0.3209	27.3	-32.4	21.0	-28.7	Live	0
1.2859	31.3	-24.7	25.3	-20.7	Live	0
2.5653	19.2	-36.8	8.9	-37.1	Neutral	0
13.5616	32.2	-27.8	27.2	-22.8	Neutral	0

Notes

1. All possible modes of operation were investigated from 150kHz to 30MHz. Only the worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
3. EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings:
   9kHz - 30MHz
   RBW: 10kHz VBW: 30kHz
4. Conducted Emissions Measurement Uncertainty
   All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2, in the range 9kHz – 30MHz (Average & Quasi-peak) is ±2.4dB.

FCC Part 15.205 Restricted Bands

MHz			MHz			MHz			GHz		
0.090	-	0.110	16.42	-	16.423	399.9	-	410	4.5	-	5.15
0.495	-	0.505	16.69475	-	16.69525	608	-	614	5.35	-	5.46
2.1735	-	2.1905	16.80425	-	16.80475	960	-	1240	7.25	-	7.75
4.125	-	4.128	25.5	-	25.67	1300	-	1427	8.025	-	8.5
4.17725	-	4.17775	37.5	-	38.25	1435	-	1626.5	9.0	-	9.2
4.20725	-	4.20775	73	-	74.6	1645.5	-	1646.5	9.3	-	9.5
6.215	-	6.218	74.8	-	75.2	1660	-	1710	10.6	-	12.7
6.26775	-	6.26825	108	-	121.94	1718.8	-	1722.2	13.25	-	13.4
6.31175	-	6.31225	123	-	138	2200	-	2300	14.47	-	14.5
8.291	-	8.294	149.9	-	150.05	2310	-	2390	15.35	-	16.2
8.362	-	8.366	156.52475	-	156.52525	2483.5	-	2500	17.7	-	21.4
8.37625	-	8.38675	156.7	-	156.9	2690	-	2900	22.01	-	23.12
8.41425	-	8.41475	162.0125	-	167.17	3260	-	3267	23.6	-	24.0
12.29	-	12.293	167.72	-	173.2	3332	-	3339	31.2	-	31.8
12.51975	-	12.52025	240	-	285	3345.8	-	3358	36.43	-	36.5
12.57675	-	12.57725	322	-	335.4	3600	-	4400	Above 38.6		
13.36	-	13.41									

FCC Parts 15.109(a) and 15.209 Radiated Emission Limits

Frequency Range (MHz)	Quasi-Peak Limit Values (dBµV/m) @ 3m
30 - 88	40.0
88 - 216	43.5
216 - 960	46.0
Above 960	54.0*
* Above 1GHz, average detector was used. A peak limit of 20dB above the average limit does apply.	

FCC Parts 15.109(a) and 15.209 Radiated Emission Test Instrumentation

Instrument	Model	S/No	Cal Due Date
R&S Test Receiver (20Hz–26.5GHz) – ESMI2 (Ref)	ESMI	829214/006 829550/001	02 May 2007
HP Preamplifier (100kHz-1.3GHz) – PA2	8447D	2944A08173	01 Apr 2007
MITEQ Preamplifier (0.1-26.5GHz) – PA11	NSP2650-N	728231	01 Apr 2007
Schaffner Bilog Antenna –BL3	CBL6112B	2549	12 May 2007
EMCO Horn Antenna – H14	3115	0003-6087	19 May 2007
Bandstop Filter (2.4-2.5 GHz)	BRM50701	017	Output Monitor

FCC Parts 15.109(a) and 15.209 Radiated Emission Test Setup

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m X 1.0m X 0.8m high, non-metallic table.
2. The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable.
3. The relevant broadband antenna was set at the required test distance away from the EUT and supporting equipment boundary.

FCC Parts 15.109(a) and 15.209 Radiated Emission Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. A prescan was carried out to pick the worst emission frequencies from the EUT. For EUT which is a portable device, the prescan was carried out by rotating the EUT through three orthogonal axes to determine which attitude and equipment arrangement produces such emissions.
3. The test was carried out at the selected frequency points obtained from the prescan in step 2. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
   a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
   b. The EUT was then rotated to the direction that gave the maximum emission.
   c. Finally, the antenna height was adjusted to the height that gave the maximum emission.
4. A Quasi-peak measurement was made for that frequency point if it was less than or equal to 1GHz. For frequency point that above 1GHz, both Peak and Average measurements were carried out.
5. Steps 3 and 4 were repeated for the next frequency point, until all selected frequency points were measured.
6. The frequency range covered was from 30MHz to 10th harmonics of the EUT fundamental frequency, using the Bi-log antenna for frequencies from 30MHz up to 3GHz, and the Horn antenna above 3GHz.

Sample Calculation Example

At 300 MHz	Q-P limit (Class B) = 200 μV/m = 46.0 dBμV/m
Log-periodic antenna factor & cable loss at 300 MHz = 18.5 dB	
Q-P reading obtained directly from EMI Receiver = 40.0 dBμV/m (Calibrated level including antenna factors & cable losses)	
Therefore, Q-P margin = 40.0 - 46.0 = -6.0	i.e. **6 dB below Q-P limit**

Radiated Emissions Test Setup (Front View) - Transmitter

Radiated Emissions Test Setup (Rear View) - Transmitter

Radiated Emissions Test Setup (Front View) - Receiver

Radiated Emissions Test Setup (Rear View) - Receiver

FCC Parts 15.109(a), 15.205 and 15.209 Radiated Emission Results

Test Input Power	110V 60Hz	Temperature	23°C
Test Distance	3m	Relative Humidity	60%
Mode	Transmitter	Atmospheric Pressure	1030mbar
		Tested By	Chang Wai Kit

Spurious Emissions ranging from 30MHz – 1GHz

Frequency (MHz)	Q-P Value (dBμV/m)	Q-P Margin (dB)	Azimuth (Degrees)	Height (cm)	Polarisation (H/V)	Channel
30.3560	17.0	-23.0	231	100	V	0
44.1360	23.8	-16.2	166	100	V	0
69.2100	25.0	-15.0	225	100	V	0
84.7900	26.8	-13.2	162	102	V	0
96.3400	31.8	-11.7	154	100	V	0
105.0800	31.7	-11.8	172	100	V	0

Spurious Emissions above 1GHz

Frequency (GHz)	Peak Value (dBμV/m)	Average Value (dBμV/m)	Average Margin (dB)	Azimuth (Degrees)	Height (cm)	Pol (H/V)	Channel
4.8080	61.8	47.2	-6.8	86	100	H	0
4.8800	62.5	47.6	-6.4	88	102	H	18
4.9560	61.9	48.1	-5.9	65	100	H	38
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--

FCC Parts 15.109(a), 15.205 and 15.209 Radiated Emission Results

Test Input Power	110V 60Hz	Temperature	23°C
Test Distance	3m	Relative Humidity	60%
Mode	Receiver	Atmospheric Pressure	1030mbar
		Tested By	Chang Wai Kit

Spurious Emissions ranging from 30MHz – 1GHz

Frequency (MHz)	Q-P Value (dBμV/m)	Q-P Margin (dB)	Azimuth (Degrees)	Height (cm)	Polarisation (H/V)	Channel
67.5100	22.6	-17.4	135	100	V	0
84.8300	22.5	-17.5	115	109	V	0
96.7300	26.9	-16.6	359	100	V	0
107.8100	26.7	-16.8	164	107	V	0
354.9800	8.5	-37.5	257	100	V	0
619.8600	11.3	-34.7	288	100	H	0

Spurious Emissions above 1GHz

Frequency (GHz)	Peak Value (dBμV/m)	Average Value (dBμV/m)	Average Margin (dB)	Azimuth (Degrees)	Height (cm)	Pol (H/V)	Channel
1037.0000	30.7	19.2	-34.8	56	104	H	0
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--

Notes

1. All possible modes of operation were investigated. Only the worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
2. The average margin indicates the margin of the measured peak value below the average limit.
3. "--" indicates no emissions were found and shows compliance to the limits.
4. Quasi-peak measurement was used for frequency measurement up to 1GHz. Average and peak measurements were used for emissions above 1GHz. The average measurement was done by averaging over a complete cycle of the pulse train, including the blanking interval as the pulse train duration does not exceed 0.1 second.
5. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
6. EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings:
   30MHz - 1GHz
   RBW: 120kHz VBW: 1MHz
   >1GHz
   RBW: 1MHz VBW: 1MHz

7. The upper frequency of radiated emission investigations was according to requirements stated in Section 15.33(a) for intentional radiators & Section 15.33(b) for unintentional radiators.
8. The channel in the table refers to the transmit channel of the EUT.
9. Radiated Emissions Measurement Uncertainty
   All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2, in the range 30MHz – 25GHz (QP only @ 3m & 10m) is ±4.3dB (for EUTs < 0.5m X 0.5m X 0.5m).

FCC Part 15.247(a)(1) Carrier Frequency Separation Limits

The EUT shows compliance to the requirements of this section, which states the adjacent carrier frequencies must be separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, the EUT may have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125mW (21dBm).

FCC Part 15.247(a)(1) Carrier Frequency Separation Test Instrumentation

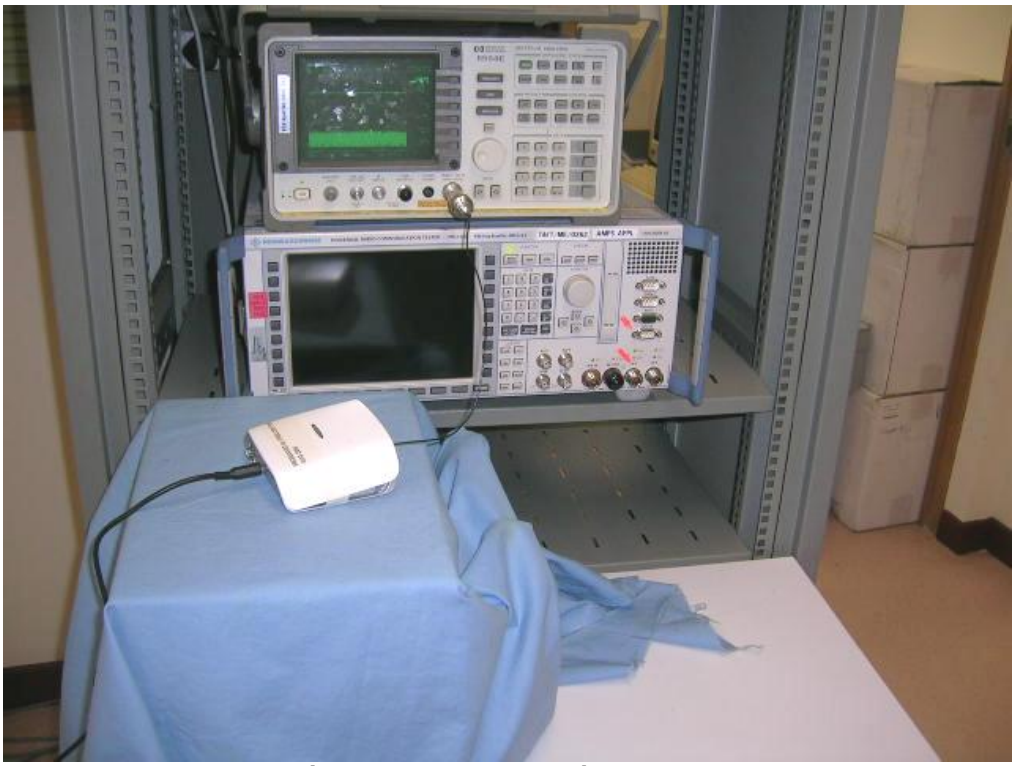
Instrument	Model	S/No	Cal Due Date
HP Spectrum Analyser – SA10	8564E	3846A01433	28 Apr 2007

FCC Part 15.247(a)(1) Carrier Frequency Separation Test Setup

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the spectrum analyser via a low-loss coaxial cable.
4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 100kHz and 100kHz.
5. All other supporting equipment were powered separately from another filtered mains.

FCC Part 15.247(a)(1) Carrier Frequency Separation Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode with frequency hopping sequence on.
2. The start and stop frequencies of the spectrum analyser were set to 2.401GHz and 2.408GHz.
3. The spectrum analyser was set to max hold to capture the two adjacent transmitting frequencies within the span. The signal capturing was continuous until no further signals were detected.
4. The carrier frequency separation of the two adjacent transmitting / operating frequency was measured by finding the carrier frequency difference between the two adjacent channels.
5. The steps 2 to 4 were repeated with the following start and stop frequencies settings:
   a. 2.437GHz to 2.441GHz
   b. 2.441GHz to 2.445GHz
   c. 2.475GHz to 2.479GHz



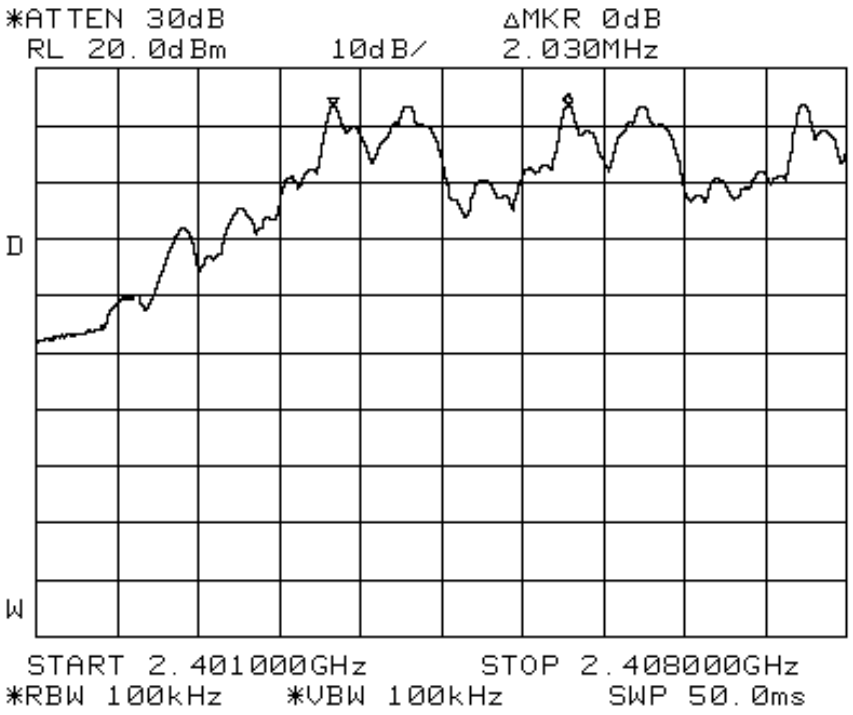
Carrier Frequency Separation Test Setup

FCC Part 15.247(a)(1) Carrier Frequency Separation Results

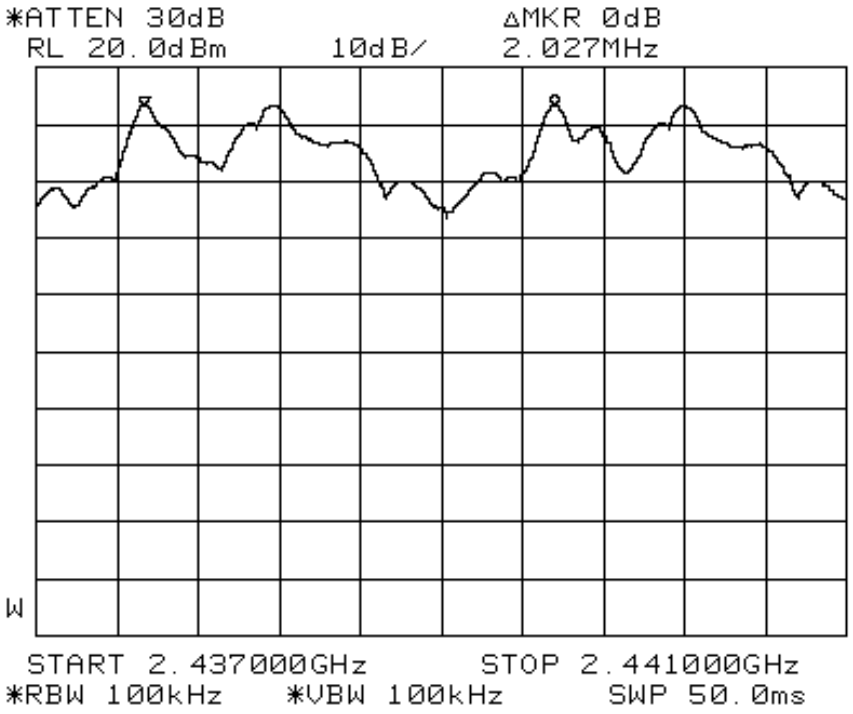
Test Input Power	110V 60Hz	Temperature	23°C
Attached Plots	1 - 4	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chang Wai Kit

Adjacent Channels	Channel Separation (MHz)
0 and 1 (2.404GHz and 2.406GHz)	2.030
17 and 18 (2.438GHz and 2.440GHz)	2.027
19 and 20 (2.442GHz and 2.444GHz)	2.020
36 and 37 (2.476GHz and 2.478GHz)	2.013

Carrier Frequency Separation Plots

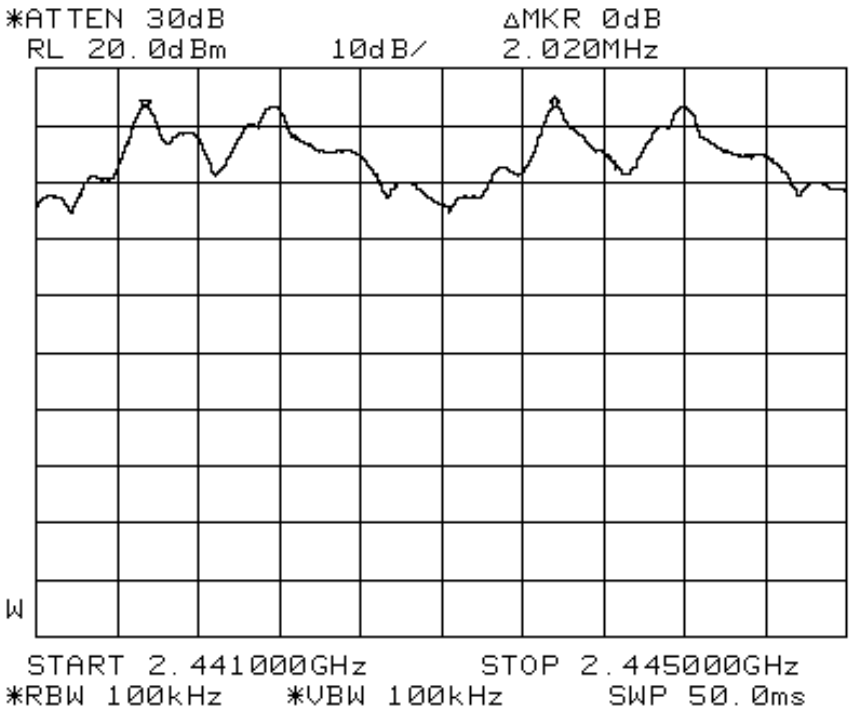


Plot 1 - Channels 0 and 1 Separation

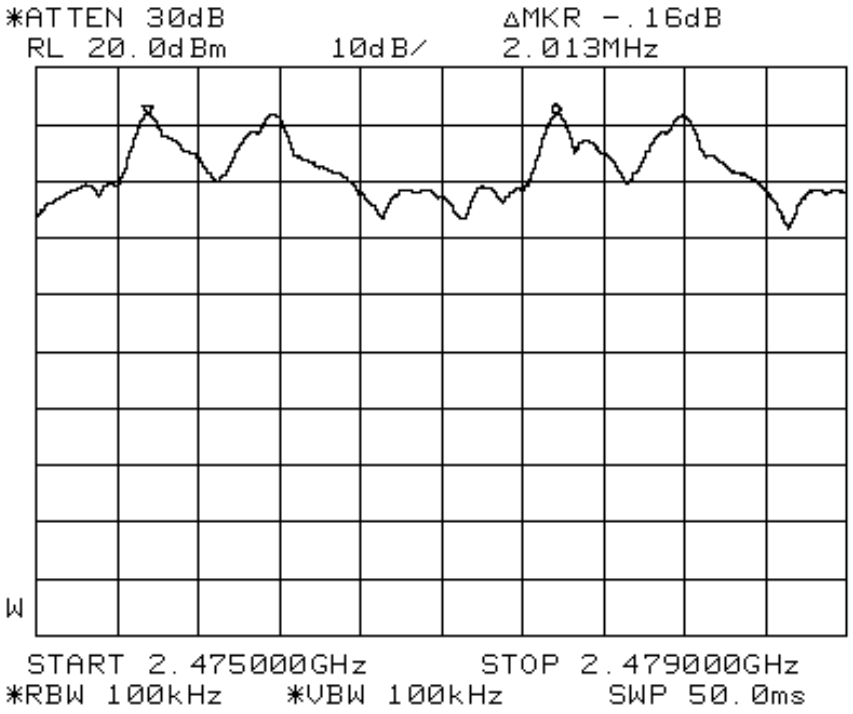


Plot 2 – Channels 17 and 18 Separation

Carrier Frequency Separation Plots



Plot 3 - Channels 19 and 20 Separation



Plot 4 - Channels 36 and 37 Separation

FCC Part 15.247(a)(1) Spectrum Bandwidth (20dB Bandwidth Measurement) Limits

The EUT shows compliance to the requirements of this section, which states that the 20dB bandwidth of the hopping channel shall be the channel frequency separation by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping of the EUT may have hopping channel carrier frequencies that are separated by 25kHz or two-third of the 20dB bandwidth of the hopping channel, which ever is greater, provided the EUT operates with an output power no greater than 125mW.

FCC Part 15.247(a)(1) Spectrum Bandwidth (20dB Bandwidth Measurement) Test Instrumentation

Instrument	Model	S/No	Cal Due Date
HP Spectrum Analyser – SA10	8564E	3846A01433	28 Apr 2007

FCC Part 15.247(a)(1) Spectrum Bandwidth (20dB Bandwidth Measurement) Test Setup

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the spectrum analyser via a low-loss coaxial cable.
4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 10kHz and 30kHz.
5. All other supporting equipment were powered separately from another filtered mains.

FCC Part 15.247(a)(1) Spectrum Bandwidth (20dB Bandwidth Measurement) Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode, non-hopping with transmitting frequency at Channel 0 (2.404GHz).
2. The center frequency of the spectrum analyser was set to the transmitting frequency with the frequency span wide enough to capture the 20dB bandwidth of the transmitting frequency.
3. The spectrum analyser was set to max hold to capture the transmitting frequency. The signal capturing was continuous until no further changes were observed.
4. The peak of the transmitting frequency was detected with the marker peak function of the spectrum analyser. The frequencies below the 20dB peak frequency at lower (f_L) and upper (f_H) sides of the transmitting frequency were marked and measured by using the marker-delta function of the spectrum analyser.
5. The 20dB bandwidth of the transmitting frequency is the frequency difference between the marked lower and upper frequencies, $| f_H - f_L |$.
6. The steps 2 to 5 were repeated with the transmitting frequency was set to Channel 18 (2.440GHz) and Channel 37 (2.478GHz) respectively.

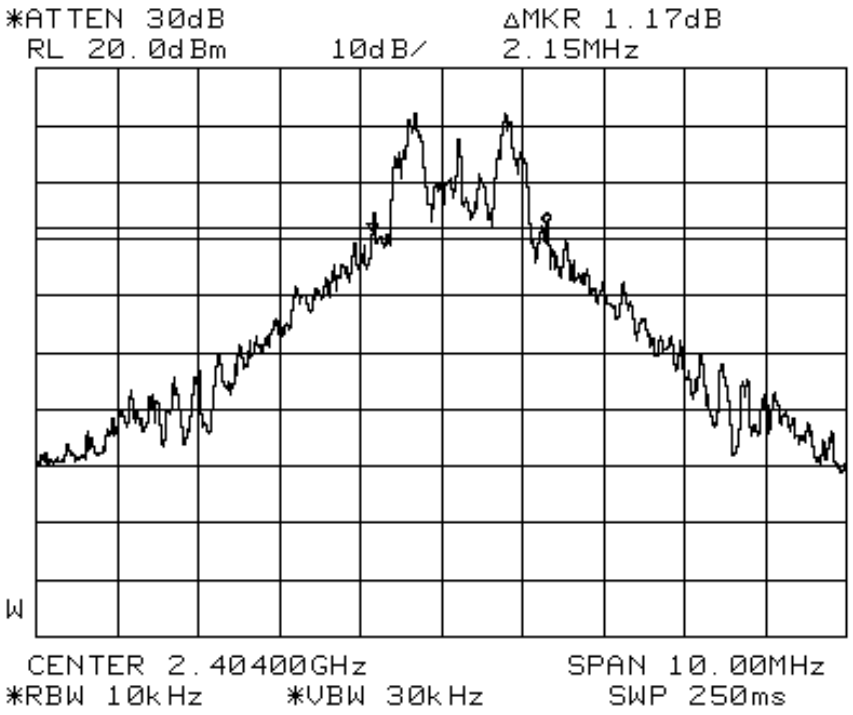
Spectrum Bandwidth (20dB Bandwidth Measurement) Test Setup

FCC Part 15.247(a)(1) Spectrum Bandwidth (20dB Bandwidth Measurement) Results

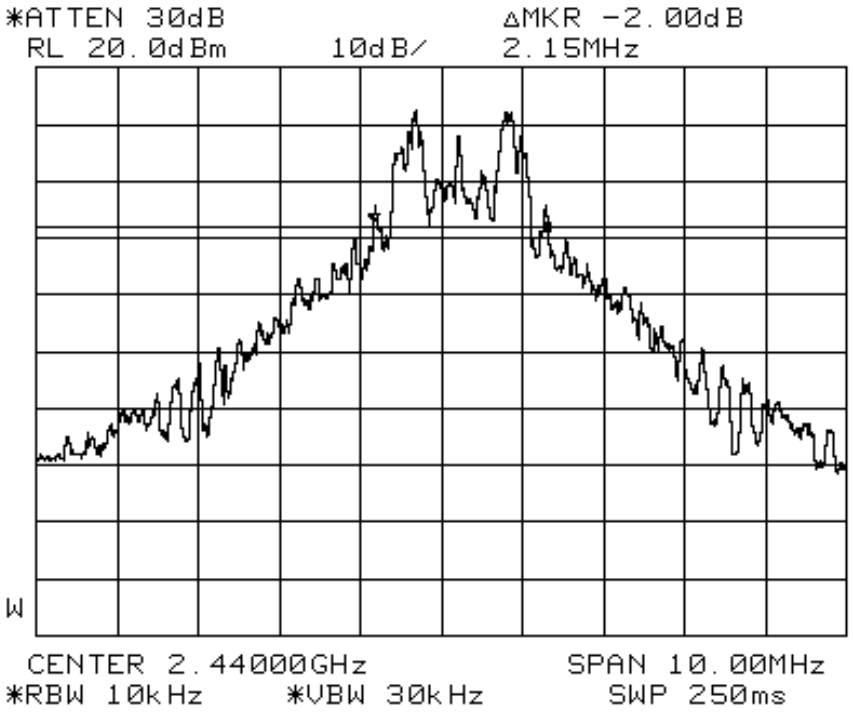
Test Input Power	110V 60Hz	Temperature	23°C
Attached Plots	5 - 7	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chang Wai Kit

Channel	Channel Frequency (GHz)	20dB Bandwidth (MHz)
0	2.404	2.150
18	2.440	2.150
37	2.478	2.220

Spectrum Bandwidth (20dB Bandwidth Measurement) Plots

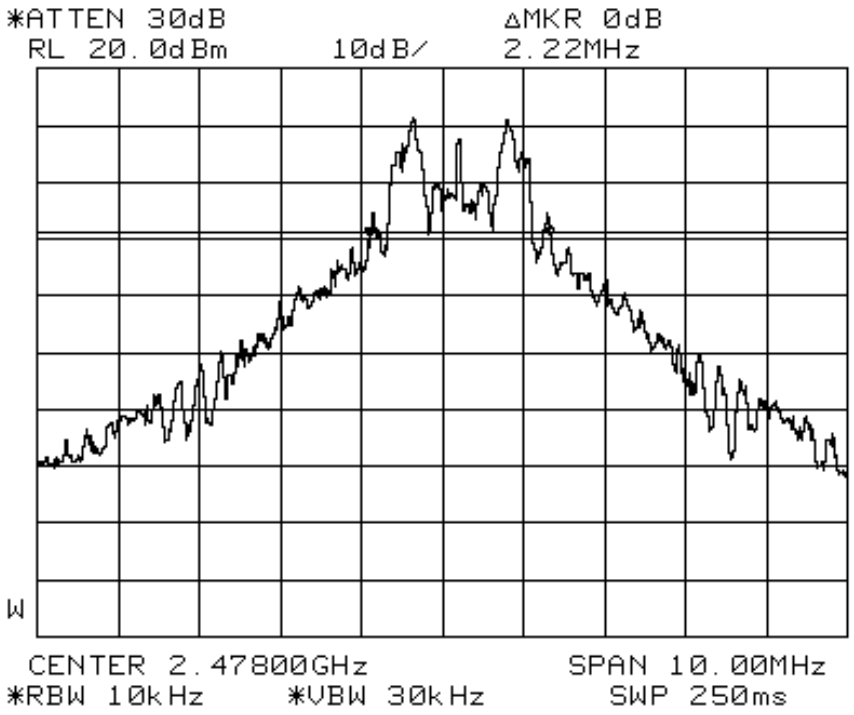


Plot 5 – Channel 0



Plot 6 – Channel 18

Spectrum Bandwidth (20dB Bandwidth Measurement) Plots



Plot 7 – Channel 37

FCC Part 15.247(a)(1)(iii) Number of Hopping Frequencies Limits

The EUT shows compliance to the requirements of this section, which states the EUT shall use at least 15 channels.

FCC Part 15.247(a)(1)(iii) Number of Hopping Frequencies Test Instrumentation

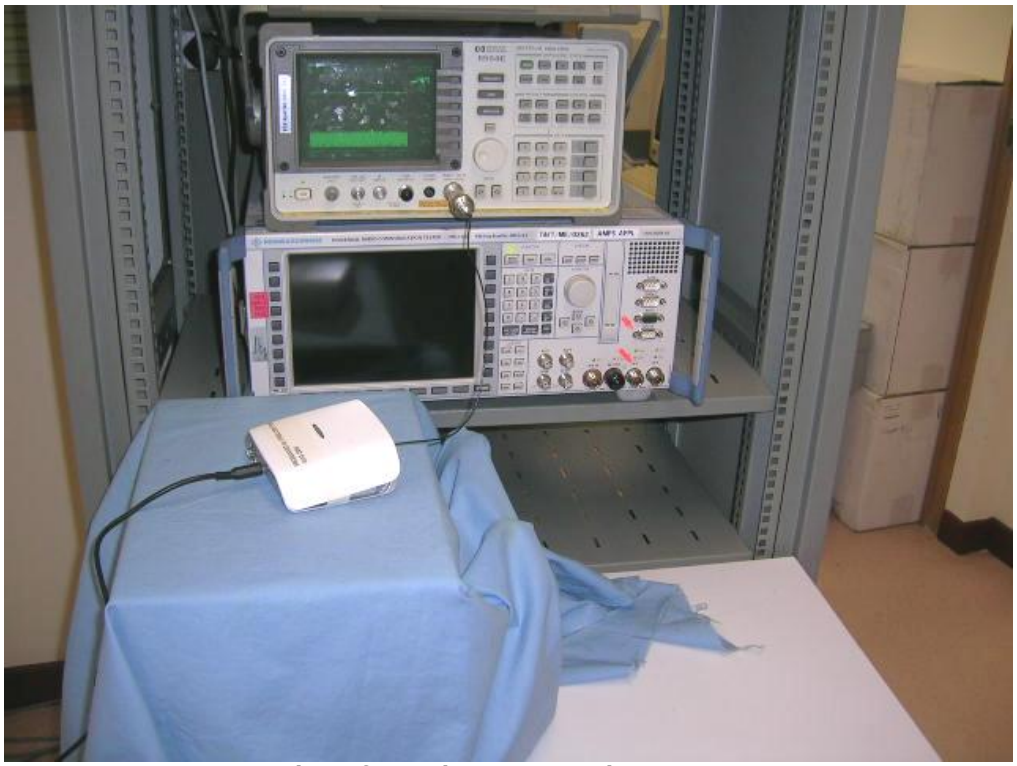
Instrument	Model	S/No	Cal Due Date
HP Spectrum Analyser – SA10	8564E	3846A01433	28 Apr 2007

FCC Part 15.247(a)(1)(iii) Number of Hopping Frequencies Test Setup

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the spectrum analyser via a low-loss coaxial cable.
4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 100kHz and 100kHz.
5. All other supporting equipment were powered separately from another filtered mains.

FCC Part 15.247(a)(1)(iii) Number of Hopping Frequencies Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode with frequency hopping sequence on.
2. The start and stop frequencies of the spectrum analyser were set to 2.400GHz and 2.440GHz.
3. The spectrum analyser was set to max hold to capture all the transmitting frequencies within the span. The signal capturing was continuous until all the transmitting frequencies were captured and no further signals were detected.
4. The numbers of transmitting frequencies were counted and recorded.
5. The steps 2 to 4 were repeated with the following start and stop frequencies settings:
   a. 2.441GHz to 2.480GHz
6. The total number of hopping frequencies is the sum of the number of the hopping frequencies found for each span.



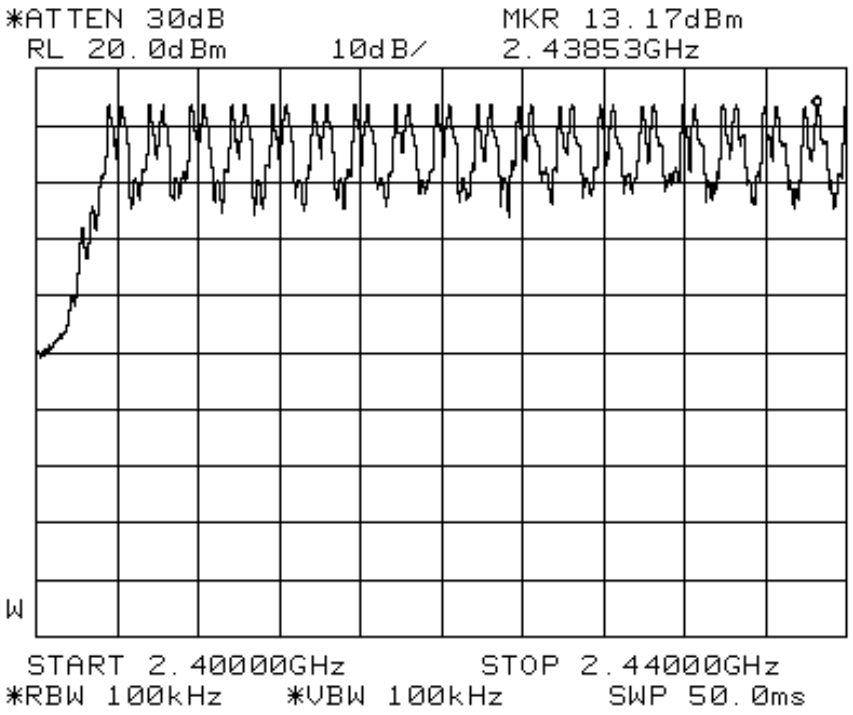
Number of Hopping Frequencies Test Setup

FCC Part 15.247(a)(1)(iii) Number of Hopping Frequencies Results

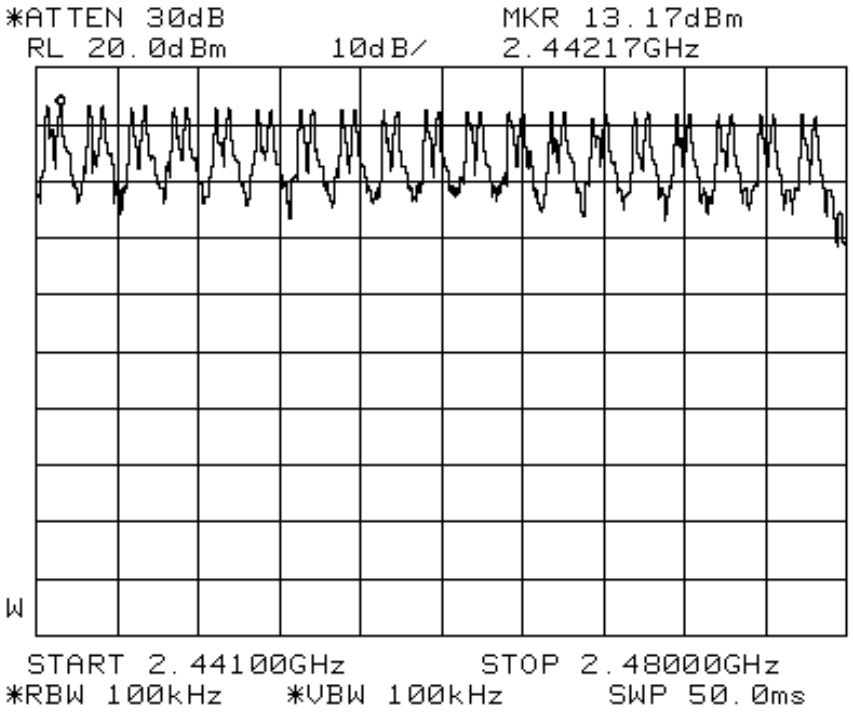
Test Input Power	110V 60Hz	Temperature	23°C
Attached Plots	8 - 9	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chang Wai Kit

The EUT was found to have 38 hopping frequencies. Please refer to the attached plots.

Number Of Hopping Frequencies Plots



Plot 8 - Channels 0 to 18



Plot 9 - Channels 19 to 37

FCC Part 15.247(a)(1)(iii) Average Frequency Dwell Time Limits

The EUT shows compliance to the requirements of this section, which states the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

FCC Part 15.247(a)(1)(iii) Average Frequency Dwell Time Test Instrumentation

Instrument	Model	S/No	Cal Due Date
HP Spectrum Analyser – SA10	8564E	3846A01433	28 Apr 2007

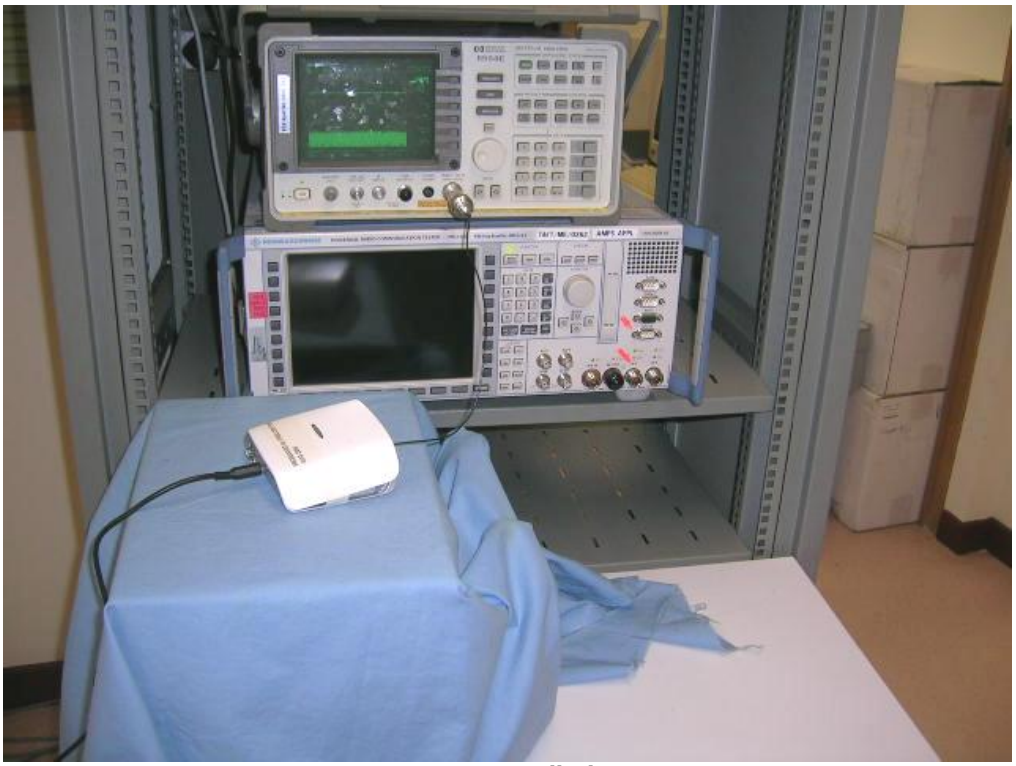
FCC Part 15.247(a)(1)(iii) Average Frequency Dwell Test Setup

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the spectrum analyser via a low-loss coaxial cable.
4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 1MHz and 3MHz.
5. All other supporting equipment were powered separately from another filtered mains.

FCC Part 15.247(a)(1)(iii) Average Frequency Dwell Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode with frequency hopping sequence on.
2. The center frequency of the spectrum analyser was set to 2.404GHz with zero frequency span (spectrum analyser acts as an oscilloscope).
3. The sweep time of the spectrum analyser was adjusted until a stable signal can be seen on the spectrum analyser.
4. The duration (dwell time) of a packet was measured using the marker-delta function of the spectrum analyser. The average dwell time of the transmitting frequency was computed based on general expression as shown below:

   Average Frequency Dwell Time = [measured time slot length x hopping rate / number of hopping channels] x [0.4 x number of hopping channels]
5. The steps 2 to 4 were repeated with the center frequency of the spectrum analyser were set to 2.440GHz and 2.478GHz respectively.



Average Frequency Dwell Time Test Setup

FCC Part 15.247(a)(1)(iii) Average Frequency Dwell Time Results

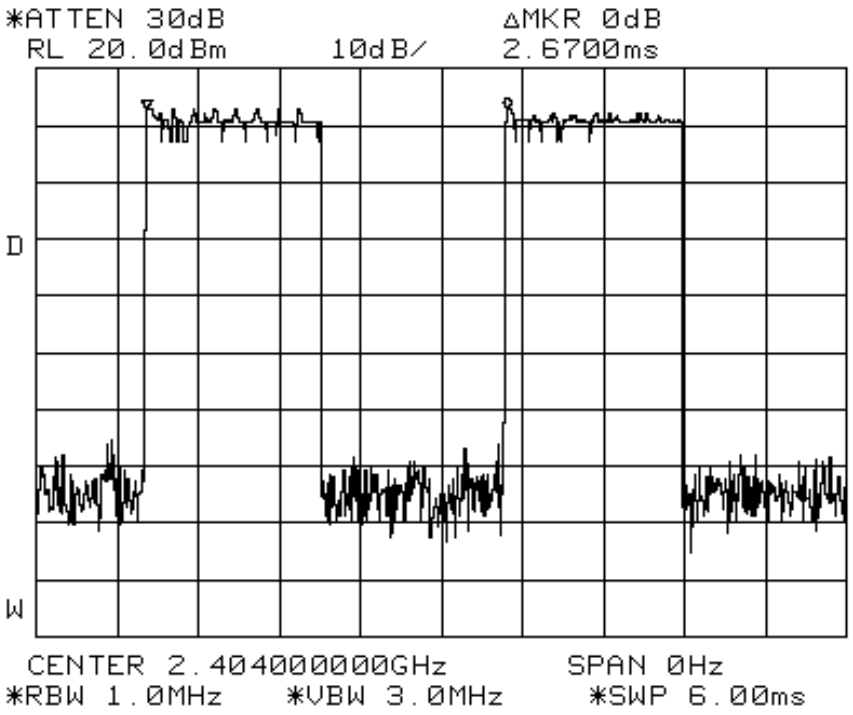
Test Input Power	110V 60Hz	Temperature	23°C
Attached Plots	10 - 12	Relative Humidity	60%
Hopping Rate	375 hops / s	Atmospheric Pressure	1030mbar
Number of Hopping Channels	38 channels	Tested By	Chang Wai Kit

Channel	Channel Frequency (GHz)	Average Frequency Dwell Time (s)	Average Occupancy Limit (s)
0	2.404	0.100125	0.4
18	2.440	0.100125	0.4
37	2.478	0.100500	0.4

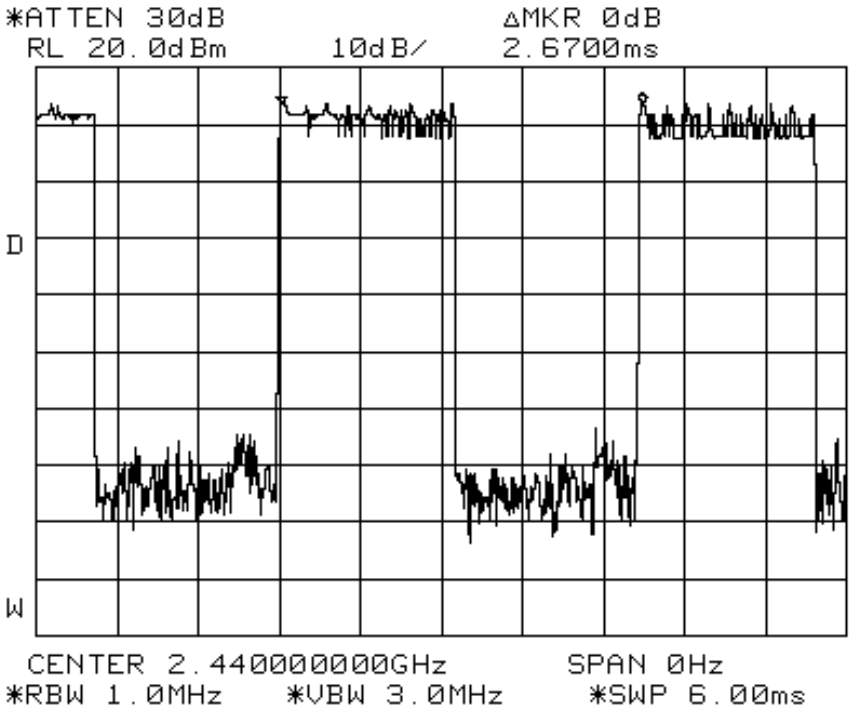
Notes

1. The EUT operates based on 1-slot transmission and 1-slot reception basis. As such, there are [375 / (1 + 1)] transmissions per second and the time occupancy per channel is [measured time slot length / 2].
2. Average Frequency Dwell Time = [measured time slot length / 2 x hopping rate / 2 / number of hopping channels] x [0.4 x number of hopping channels]

Average Frequency Dwell Time Plots

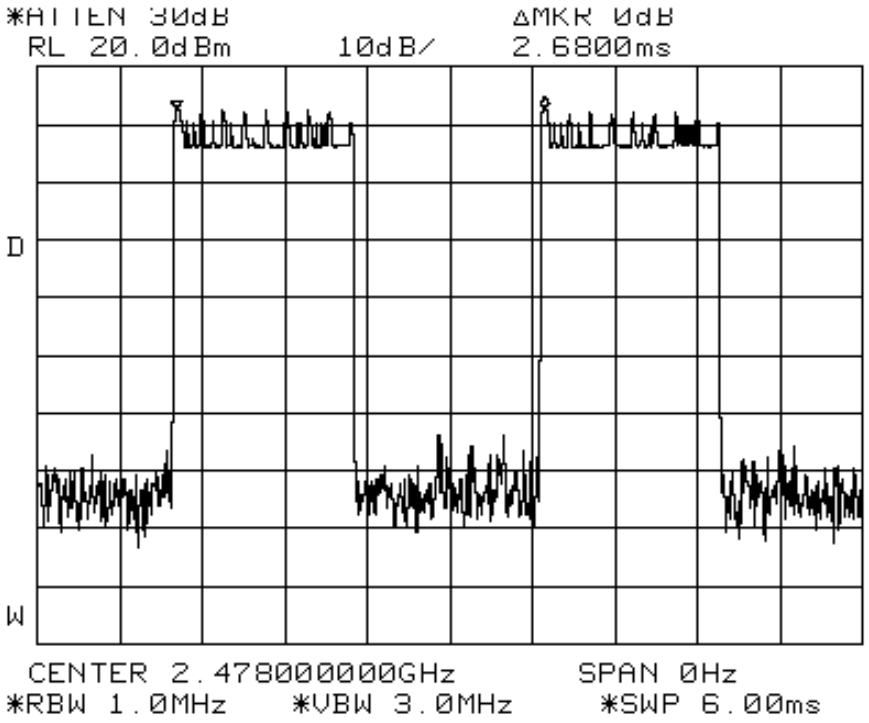


Plot 10 – Channel 0



Plot 11 – Channel 18

Average Frequency Dwell Time Plots



Plot 12 – Channel 37

FCC Part 15.247(b)(1) Maximum Peak Power Limits

The EUT shows compliance to the requirements of this section, which states the EUT employing at least 75 non-overlapping hopping channels shall not exceed 1W (30dBm). For the EUT employs other frequency hopping systems, the peak power shall not greater than 0.125W (21dBm).

FCC Part 15.247(b)(1) Maximum Peak Power Test Instrumentation

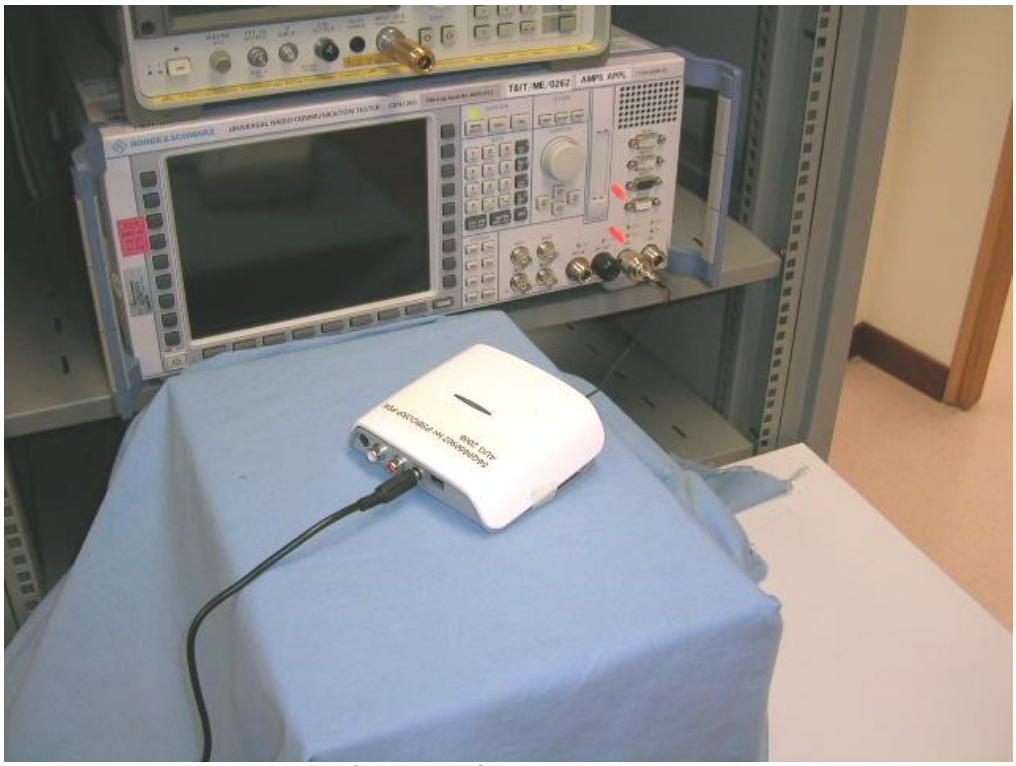
Instrument	Model	S/No	Cal Due Date
R&S Universal Radio Communication Tester	CMU 200	837587/068	24 Mar 2007

FCC Part 15.247(b)(1) Maximum Peak Power Test Setup

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the Universal Radio Communication Tester, which set into power analyser mode via a low-loss coaxial cable.
4. All other supporting equipment were powered separately from another filtered mains.

FCC Part 15.247(b)(1) Maximum Peak Power Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode, non-hopping with transmitting frequency at Channel 0 (2.404GHz).
2. The maximum peak power of the transmitting frequency was detected and recorded.
3. The step 2 was repeated with the transmitting frequency was set to Channel 18 (2.440GHz) and Channel 37 (2.478GHz) respectively.



Maximum Peak Power Test Setup

FCC Part 15.247(b)(1) Maximum Peak Power Results

Test Input Power	110V 60Hz	Temperature	23°C
		Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chang Wai Kit

Channel	Channel Frequency (GHz)	Maximum Peak Power (W)	Limit (W)
0	2.404	0.0281	0.125
18	2.440	0.0292	0.125
37	2.478	0.0310	0.125

Notes

1. Power analyser of Universal Radio Communication Tester was used for power measurement with peak detection as mode of measurement. The power analyser mode supports a wideband power measurement ranging from 100kHz to 2700MHz.

FCC Part 15.247(d) RF Conducted Spurious Emissions Limits

The EUT shows compliance to the requirements of this section, which states in any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator (EUT) is operating, the radio frequency power that is produced by the EUT shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of desired power.

FCC Part 15.247(d) RF Conducted Spurious Test Instrumentation

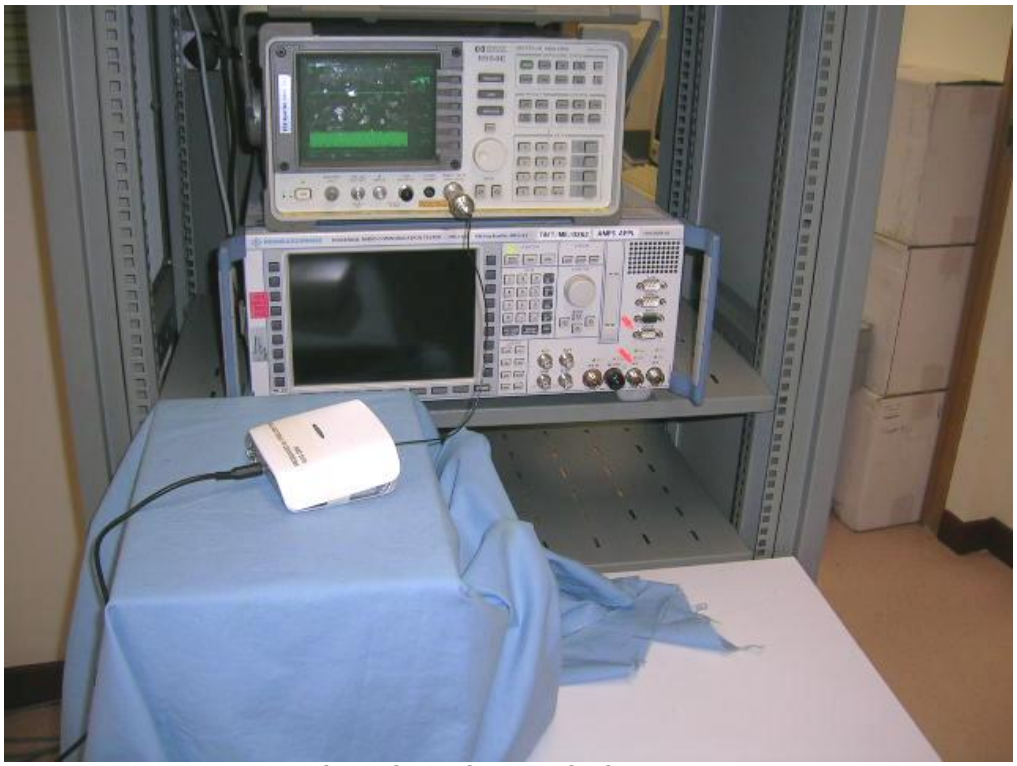
Instrument	Model	S/No	Cal Due Date
HP Spectrum Analyser – SA10	8564E	3846A01433	28 Apr 2007

FCC Part 15.247(d) RF Conducted Spurious Emissions Test Setup

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the spectrum analyser via a low-loss coaxial cable.
4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 100kHz and 300kHz.
5. All other supporting equipment were powered separately from another filtered mains.

FCC Part 15.247(d) RF Conducted Spurious Emissions Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode, non-hopping with transmitting frequency at Channel 0 (2.404GHz).
2. The start and stop frequencies of the spectrum analyser were set to 30MHz and 10GHz.
3. The spectrum analyser was set to max hold to capture any spurious emissions within the span. The signal capturing was continuous until no further spurious emissions were detected.
4. The steps 2 to 3 were repeated with frequency span was set from 10GHz to 25GHz.
5. The steps 2 to 4 were repeated with the transmitting frequency was set to Channel 18 (2.440GHz) and Channel 37 (2.478GHz) respectively.



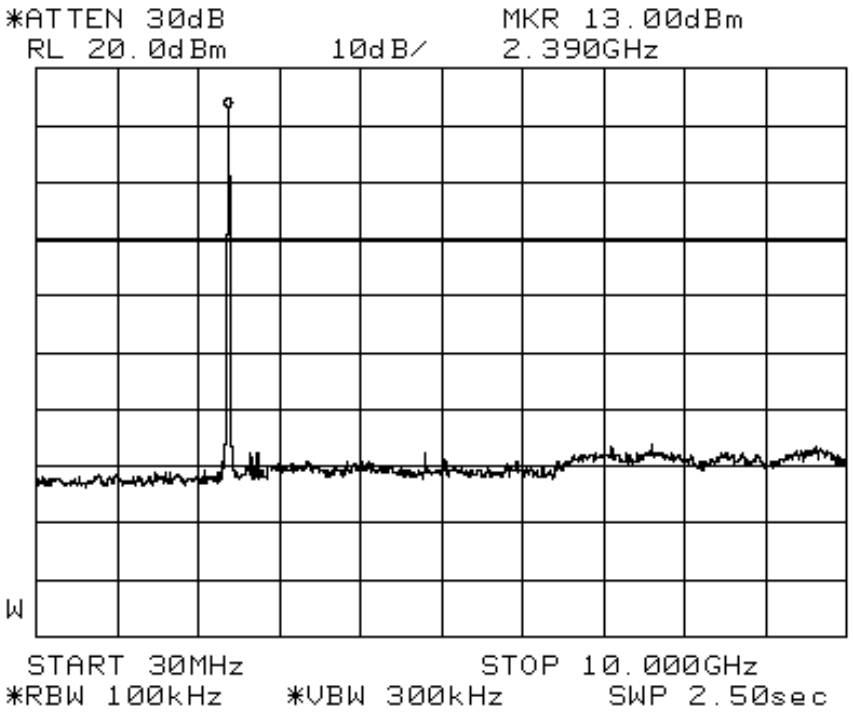
RF Conducted Spurious Emissions Test Setup

FCC Part 15.247(d) RF Conducted Spurious Emissions Results

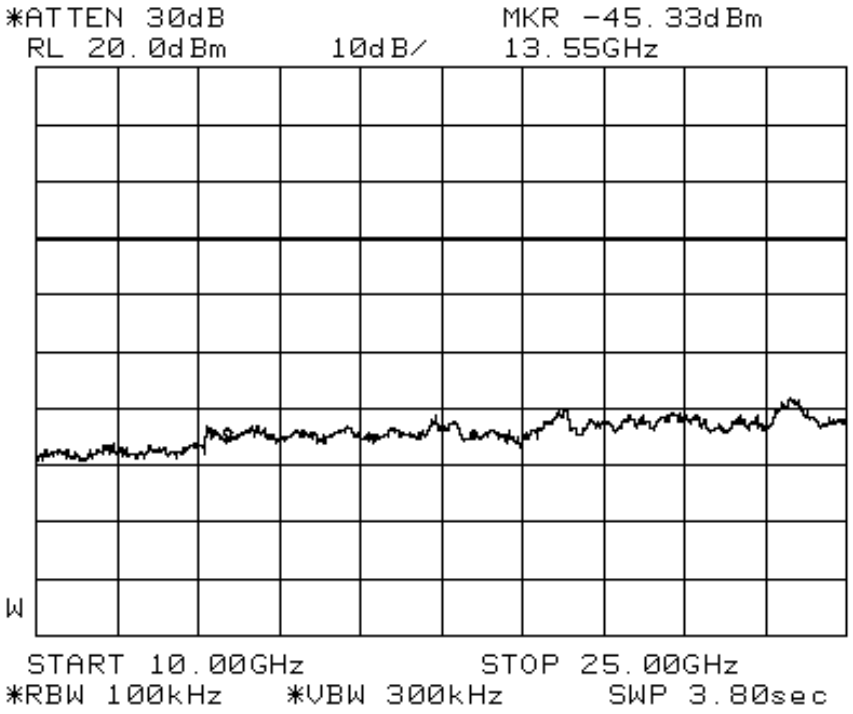
Test Input Power	110V 60Hz	Temperature	23°C
Attached Plots	13 - 18	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chang Wai Kit

All spurious signals found were below the specified limit. Please refer to the attached plots.

RF Conducted Spurious Emissions Plots

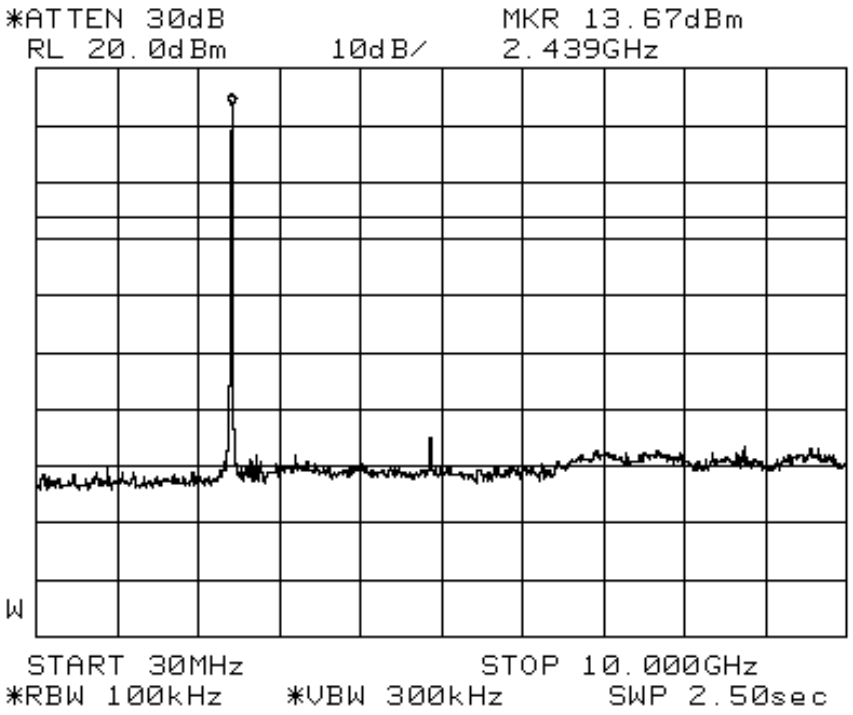


Plot 13 – Channel 0

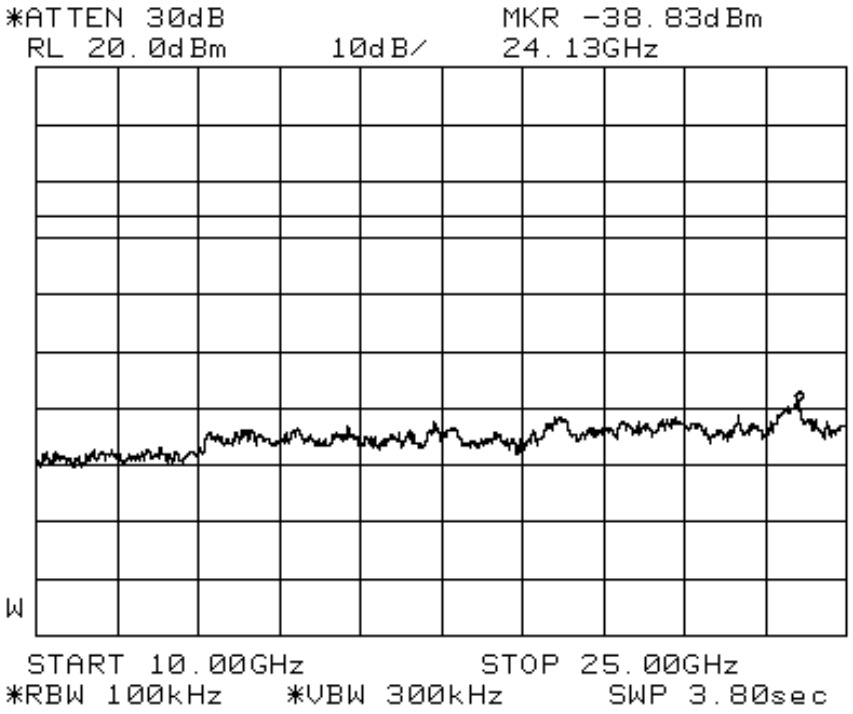


Plot 14 – Channel 0

RF Conducted Spurious Emissions Plots

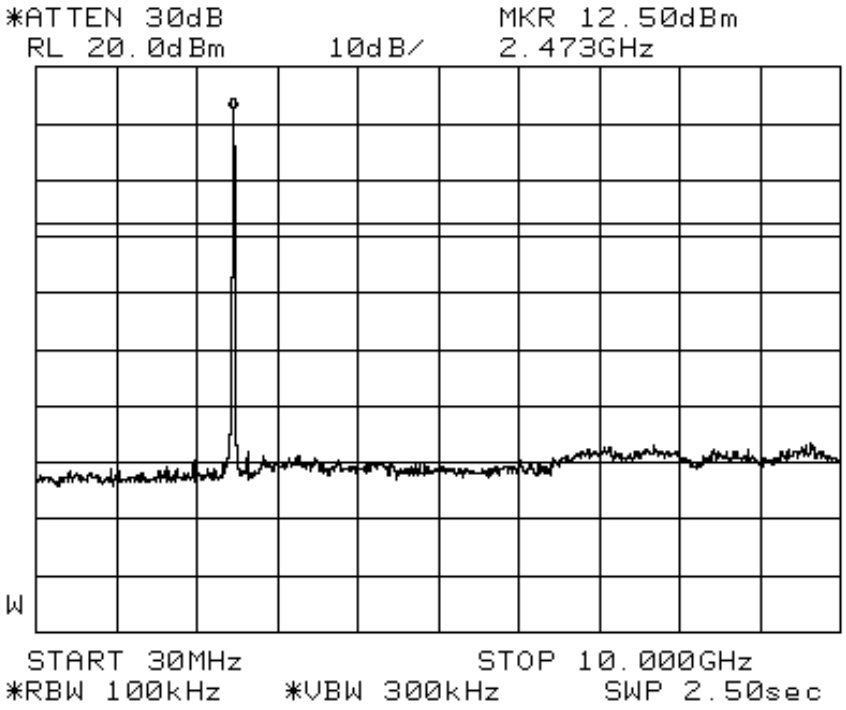


Plot 15 – Channel 18

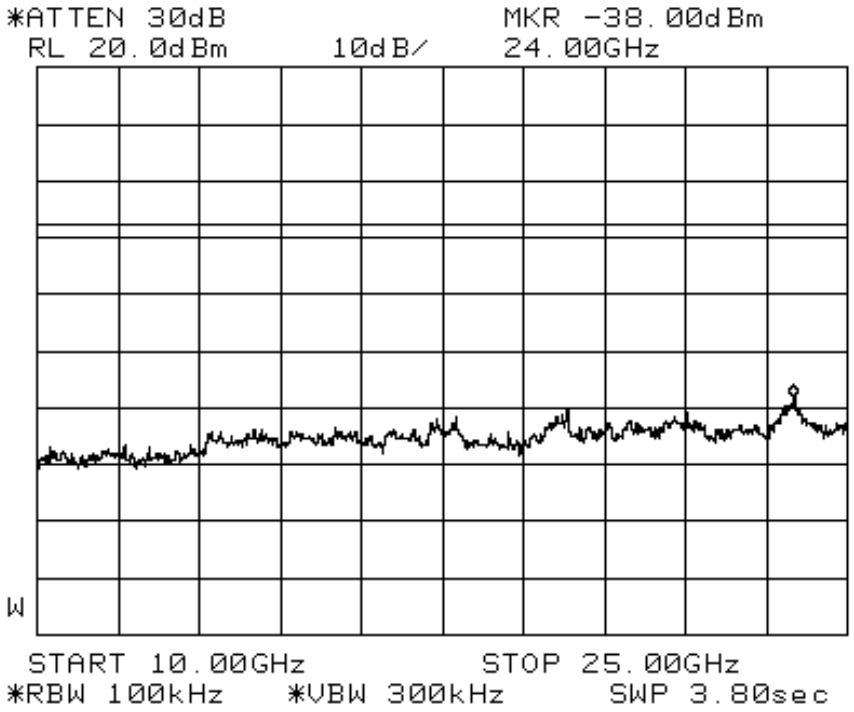


Plot 16 – Channel 18

RF Conducted Spurious Emissions Plots



Plot 17 – Channel 37



Plot 18 – Channel 37

FCC Part 15.247(d) Band Edge Compliance (Conducted) Limits

The EUT shows compliance to the requirements of this section, which states in any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator (EUT) is operating, the radio frequency power that is produced by the EUT shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of desired power.

FCC Part 15.247(d) Band Edge Compliance (Conducted) Test Instrumentation

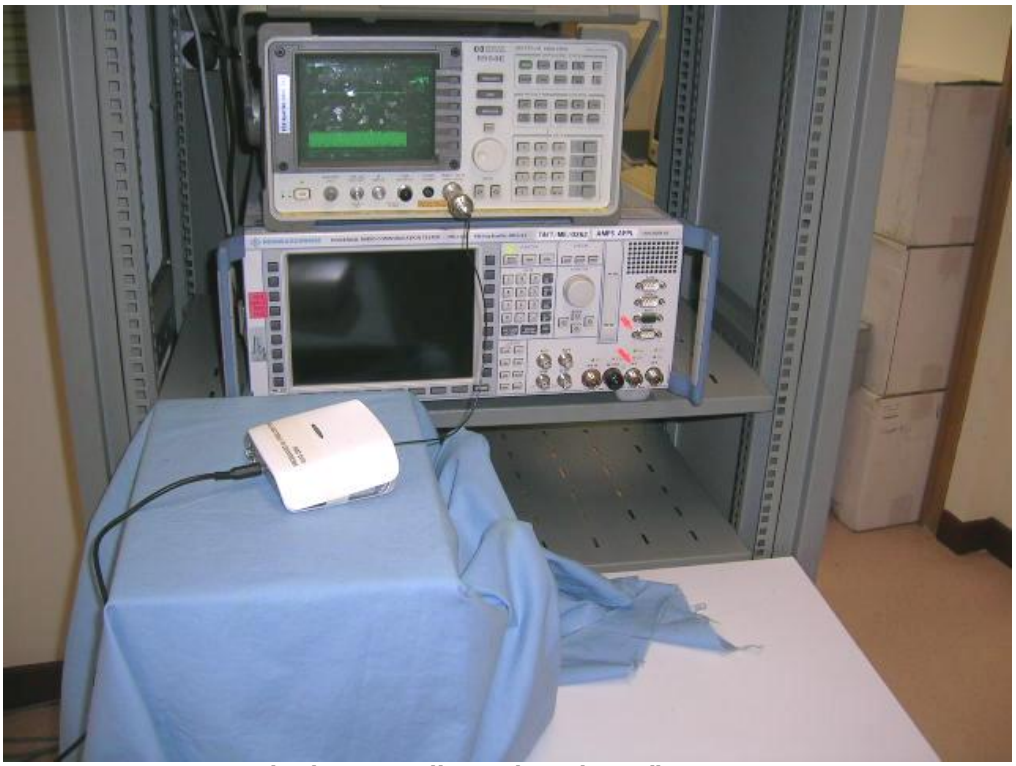
Instrument	Model	S/No	Cal Due Date
HP Spectrum Analyser – SA10	8564E	3846A01433	28 Apr 2007

FCC Part 15.247(d) Band Edge Compliance (Conducted) Test Setup

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the spectrum analyser via a low-loss coaxial cable.
4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 100kHz and 300kHz.
5. All other supporting equipment were powered separately from another filtered mains.

FCC Part 15.247(d) Band Edge Compliance (Conducted) Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode with frequency hopping sequence on.
2. The frequency span of the spectrum analyser was set to wide enough to capture the lower band edge of the transmission band, 2.400GHz and any spurious emissions at the band edge.
3. The spectrum analyser was set to max hold to capture any spurious emissions within the span. The signal capturing was continuous until no further spurious emissions were detected.
4. The steps 2 to 3 were repeated with the frequency span of the spectrum analyser was set to wide enough to capture the upper band edge frequency of the transmission band, 2.4835GHz and the any spurious emissions at the band-edge.



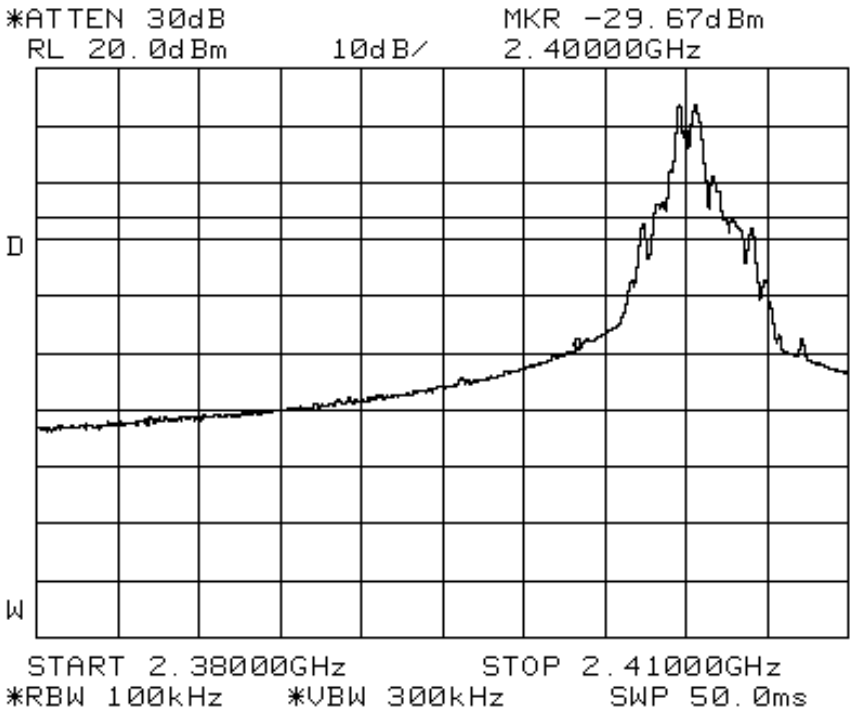
Band Edge Compliance (Conducted) Test Setup

FCC Part 15.247(d) Band Edge Compliance (Conducted) Results

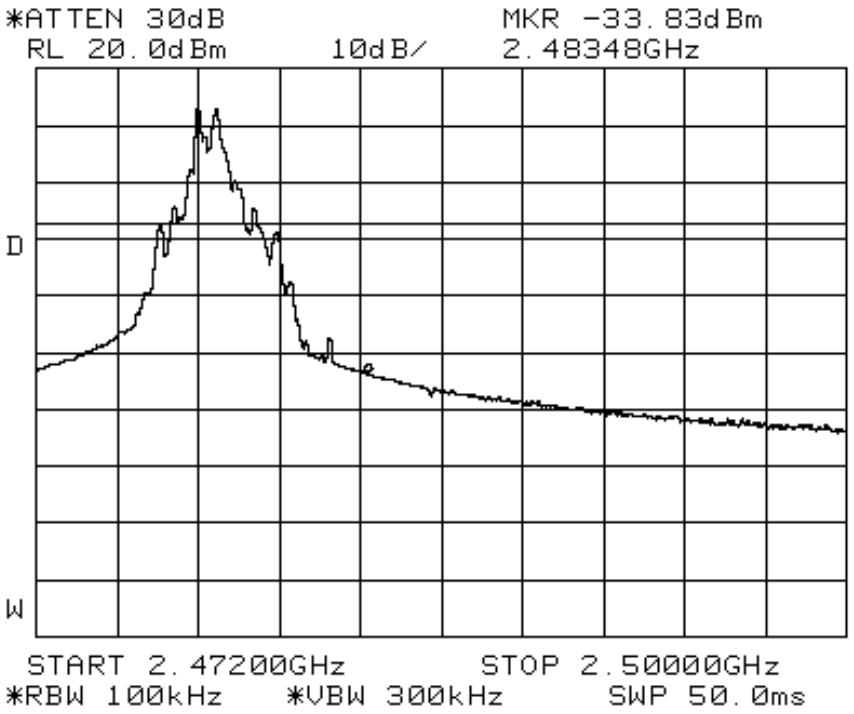
Test Input Power	110V 60Hz	Temperature	23°C
Attached Plots	19 - 20	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chang Wai Kit

No significant signal was found and they were below the specified limit.

Band Edge Compliance (Conducted) Plots



Plot 19 – Lower Band Edge at 2.4000GHz



Plot 20 – Upper Band Edge at 2.4835GHz

FCC Part 15.247(d) Band Edge Compliance (Radiated) Limits

The EUT shows compliance to the requirements of this section, which states in any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator (EUT) is operating, the radio frequency power that is produced by the EUT shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of desired power. In addition, radiated emissions which fall in the restricted bands shall comply to the radiated emission limits specified in 15.209.

FCC Part 15.247(d) Band Edge Compliance (Radiated) Test Instrumentation

Instrument	Model	S/No	Cal Due Date
R&S Test Receiver (20Hz–26.5GHz) – ESMI2 (Ref)	ESMI	829214/006 829550/001	02 May 2007
HP Preamplifier (100kHz-1.3GHz) – PA2	8447D	2944A08173	01 Apr 2007
MITEQ Preamplifier (0.1-26.5GHz) – PA11	NSP2650-N	728231	01 Apr 2007
Schaffner Bilog Antenna –BL3	CBL6112B	2549	12 May 2007
EMCO Horn Antenna – H14	3115	0003-6087	19 May 2007
Bandstop Filter (2.4-2.5 GHz)	BRM50701	017	Output Monitor

FCC Part 15.247(d) Band Edge Compliance (Radiated) Test Setup

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to following setting 100kHz and 300kHz to show compliance of spurious at band edges are at least 20dB below the carriers. For restricted band spurious at band edges, peak and average measurement plots were taken using the following setting:
   a. Peak Plot:
      RBW = VBW = 1MHz
   b. Average Plot
      RBW = 1MHz, VBW = 10Hz
4. All other supporting equipment were powered separately from another filtered mains.

FCC Part 15.247(d) Band Edge Compliance (Radiated) Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode with frequency hopping sequence on.
2. The frequency span of the spectrum analyser was set to wide enough to capture the lower band edge of the transmission band, 2.400GHz and any spurious emissions at the band edge.
3. The spectrum analyser was set to max hold to capture any spurious emissions within the span. The signal capturing was continuous until no further spurious emissions were detected.
4. The steps 2 to 3 were repeated with the frequency span of the spectrum analyser was set to wide enough to capture the upper band edge frequency of the transmission band, 2.4835GHz and the any spurious emissions at the band-edge.

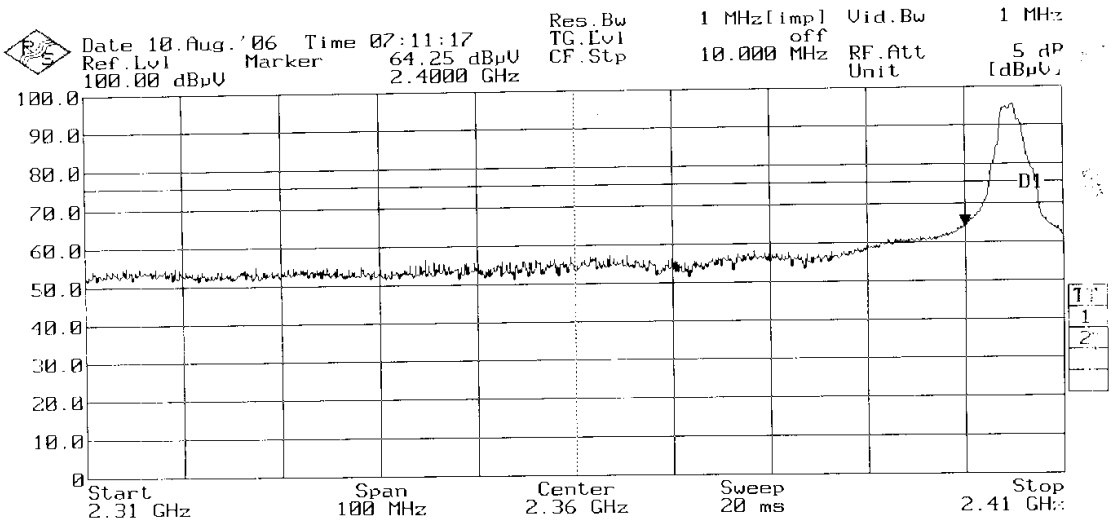
Band Edge Compliance (Radiated) Test Setup

FCC Part 15.247(d) Band Edge Compliance (Radiated) Results

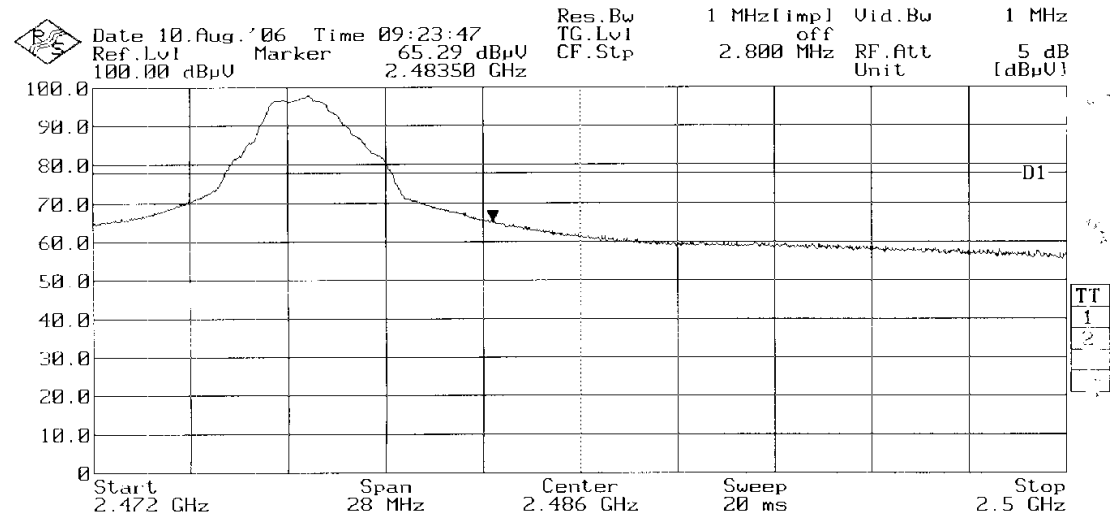
Test Input Power	110V 60Hz	Temperature	23°C
Attached Plots	21 - 26	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chang Wai Kit

No significant signal was found and they were below the specified limit.

Band Edge Compliance (Radiated) Plots (20dB Delta from Carrier at Band Edge)

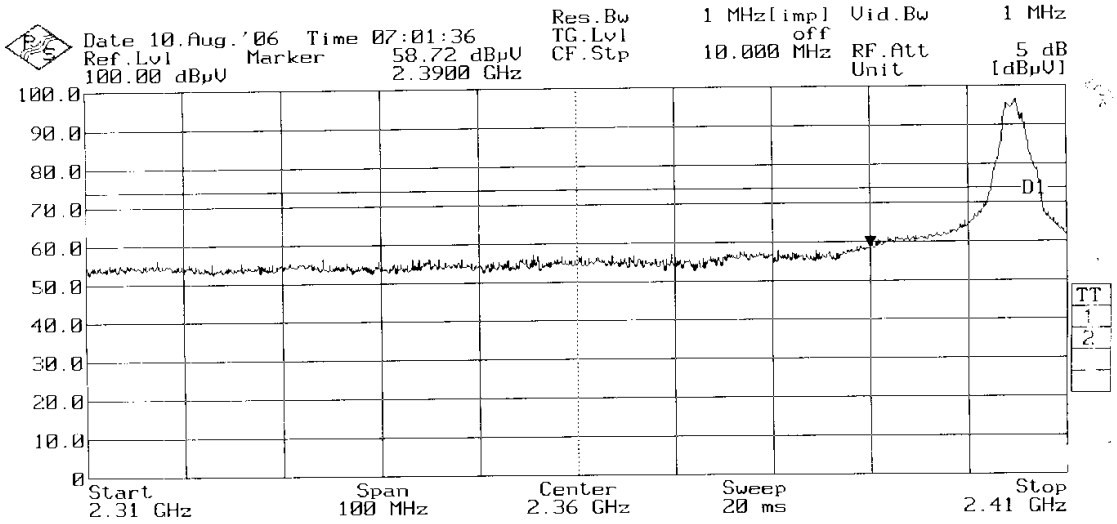


Plot 21 – Lower Band Edge at 2.4000GHz

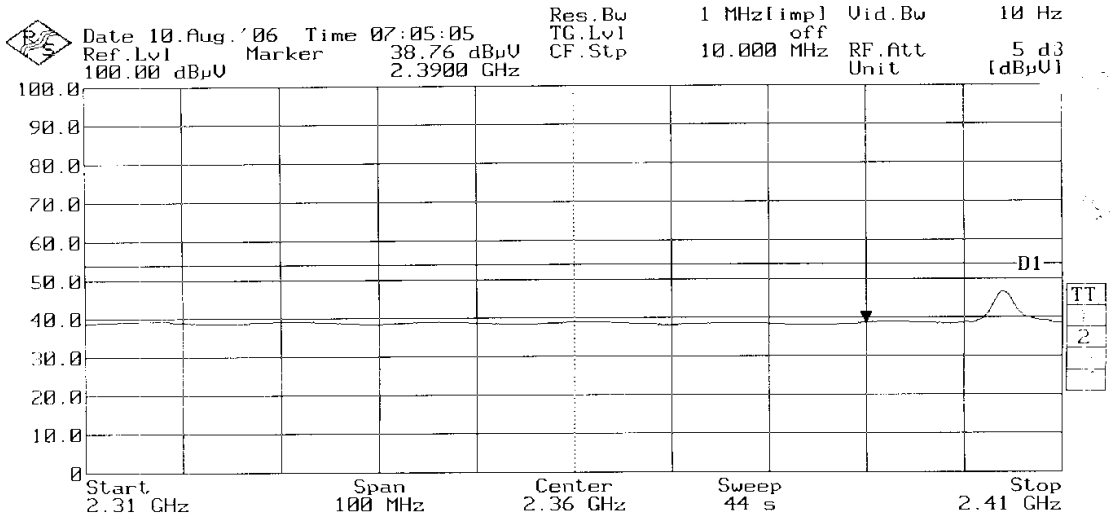


Plot 22 – Upper Band Edge at 2.4835GHz

Band Edge Compliance (Radiated) Plots (Restricted Band)

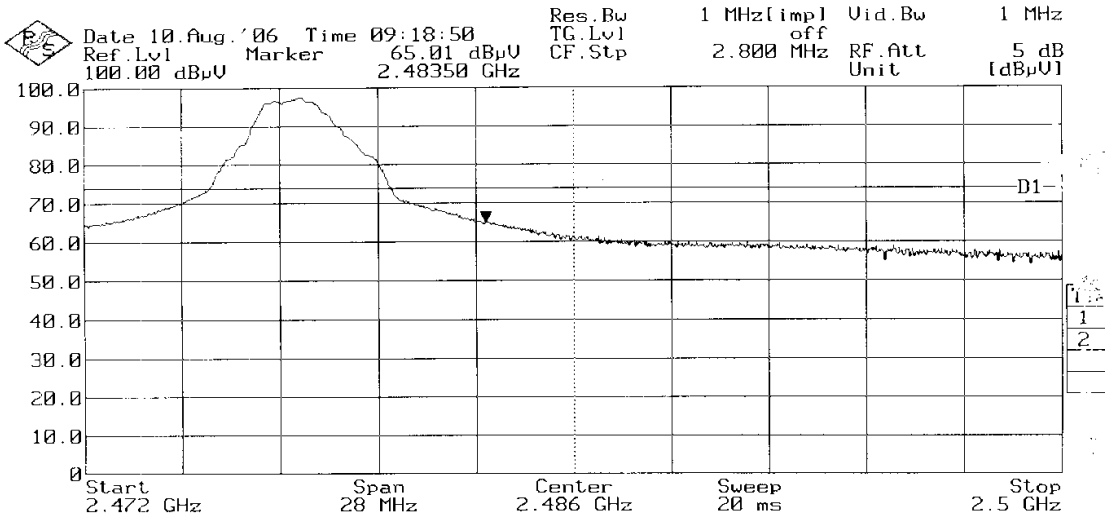


Plot 23 – Peak Plot at Lower Band Edge at 2.4000GHz

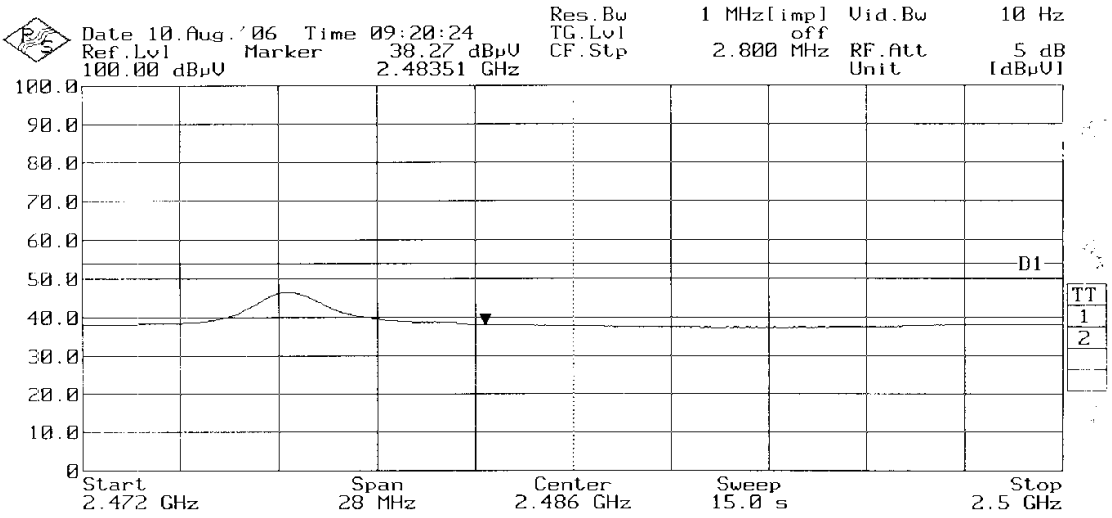


Plot 24 – Average Plot at Lower Band Edge at 2.4000GHz

Band Edge Compliance (Radiated) Plots (Restricted Band)



Plot 25 – Peak Plot at Upper Band Edge at 2.4835GHz



Plot 26 – Average Plot at Upper Band Edge at 2.4835GHz

FCC Part 15.247(e) Peak Power Spectral Density Limits

The EUT shows compliance to the requirements of this section, which states the peak power spectral density conducted from the intentional radiator (EUT) to the antenna shall not be greater than 8dBm (6.3mW) in any 3kHz band during any time interval of continuous transmission.

FCC Part 15.247(e) Peak Power Spectral Density Test Instrumentation

Instrument	Model	S/No	Cal Due Date
HP Spectrum Analyser – SA10	8564E	3846A01433	28 Apr 2007

FCC Part 15.247(e) Peak Power Spectral Density Test Setup

1. The EUT and supporting equipment were set up as shown in the setup photo.
2. The power supply for the EUT was connected to a filtered mains.
3. The RF antenna connector was connected to the spectrum via a low-loss coaxial cable.
4. The resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 3kHz and 10kHz.
5. All other supporting equipment were powered separately from another filtered mains.

FCC Part 15.247(e) Peak Power Spectral Density Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was then configured to operate in the test mode, non-hopping with transmitting frequency at Channel 0 (2.404GHz).
2. The sweep time of the spectrum analyser was set to the value of the ratio of the frequency span divided by the RBW.
3. The peak power density of the transmitting frequency was detected and recorded.
4. The step 3 was repeated with the transmitting frequency was set to Channel 18 (2.440GHz) and Channel 37 (2.478GHz) respectively.

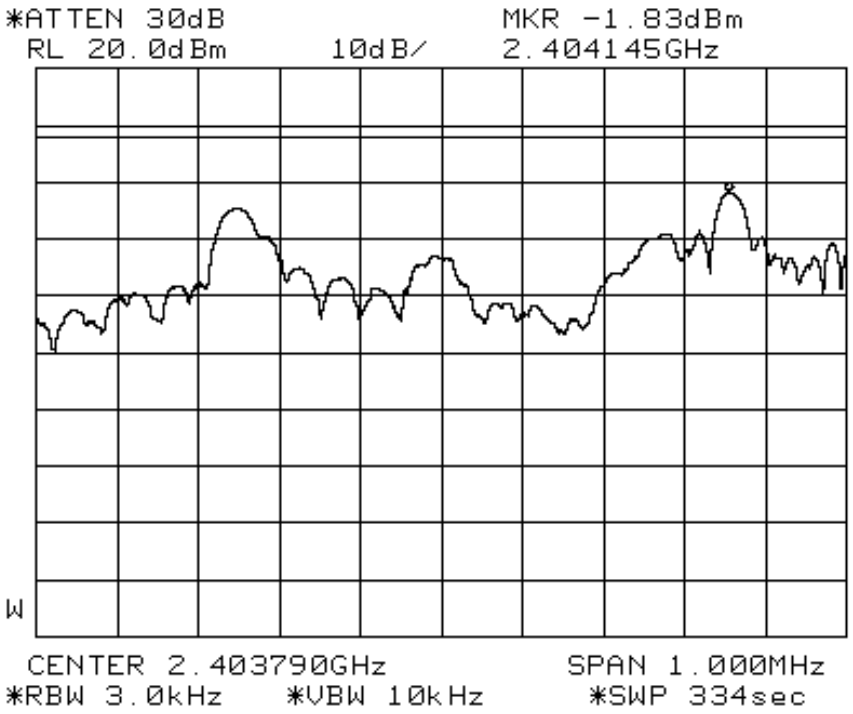
Peak Power Spectral Density Test Setup

FCC Part 15.247(e) Peak Power Spectral Density Results

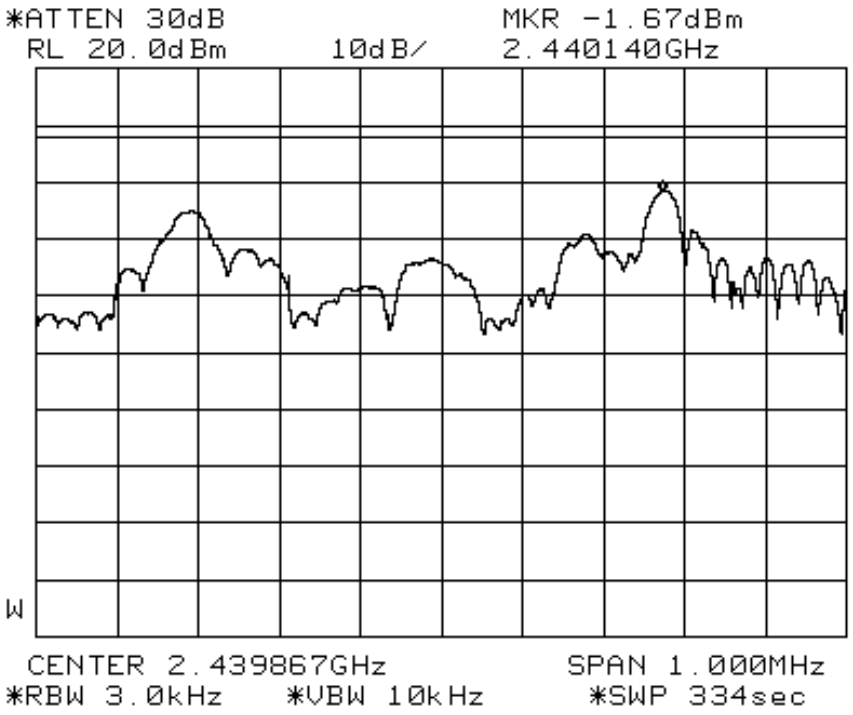
Test Input Power	110V 60Hz	Temperature	23°C
Attached Plots	27 - 29	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chang Wai Kit

Channel	Channel Frequency (GHz)	Peak Power Spectral Density (mW)	Limit (mW)
0	2.404	0.6561	6.3
18	2.440	0.6808	6.3
37	2.478	0.7638	6.3

Peak Power Spectral Density Plots

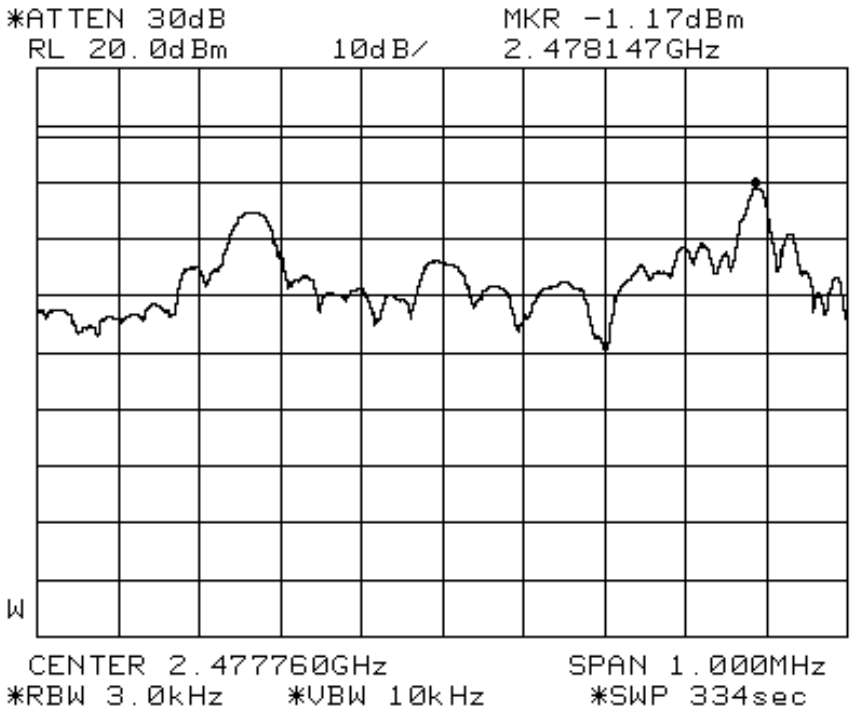


Plot 27 – Channel 0



Plot 28 – Channel 18

Peak Power Spectral Density Plots



Plot 29 – Channel 37

FCC Part 1.1310 Maximum Permissible Exposure (MPE) Limits

The EUT shows compliance to the requirements of this section, which states the MPE limits for general population / uncontrolled exposure are as shown below:

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (min)
0.3 - 1.34	614	1.63	100 Note 2	30
1.34 - 30	824 / f	2.19 / f	$180 / f^2$ Note 2	30
30 - 300	27.5	0.073	0.2	30
300 - 1500	-	-	f / 1500	30
1500 - 100000	-	-	1.0	30
Notes				
1. f = frequency in MHz				
2. Plane wave equivalent power density				

FCC Part 1.1310 Maximum Permissible Exposure (MPE) Test Instrumentation

Instrument	Model	S/No	Cal Due Date
PMM 8053 Portable Field Meter	8053	0220J10308	16 APR 2007
PMM Electric and Magnetic Field Analyzer	EHP-50A	1311L10515	16 MAR 2007

FCC Part 1.1310 Maximum Permissible Exposure (MPE) Test Setup

1. The EUT and supporting equipment were set up as shown on the setup photo.
2. The relevant field probe was positioned at least 20cm away from the EUT and supporting equipment boundary.

FCC Part 1.1310 Maximum Permissible Exposure (MPE) Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. The test was first carried out at one of the positions / sides of the EUT.
3. Power density measurement (mW/cm^2) was made using the field meter set to the required averaging time.
4. Steps 2 and 3 were repeated for the next position and its associate EUT operating mode, until all possible positions and modes were measured.

Sample Calculation Example

At 2400 MHz, limit = 1.0 mW/cm^2

Power density reading obtained directly from field meter = 0.3 mW/cm^2 averaged over the required 30 minutes.

Therefore, margin = 0.3 – 1.0 = -0.7 mW/cm^2 i.e. **0.7 mW/cm^2 below limit**

Maximum Permissible Exposure (MPE) Test Setup

FCC Part 1.1310 Maximum Permissible Exposure (MPE) Results

Test Input Power	110V 60Hz	Temperature	24°C
Test Distance	20cm	Relative Humidity	59%
EUT	Transmitter	Atmospheric Pressure	1030mbar
		Tested By	Johnsen Tia

Channel	Channel Frequency (GHz)	Power Density Value (mW/cm^2)	Margin (mW/cm^2)	Averaging Time (min)	Limit (mW/cm^2)
0	2.404	0.0009	-0.9991	30	1.0
18	2.440	0.0010	-0.9990	30	1.0
38	2.478	0.0010	-0.9990	30	1.0

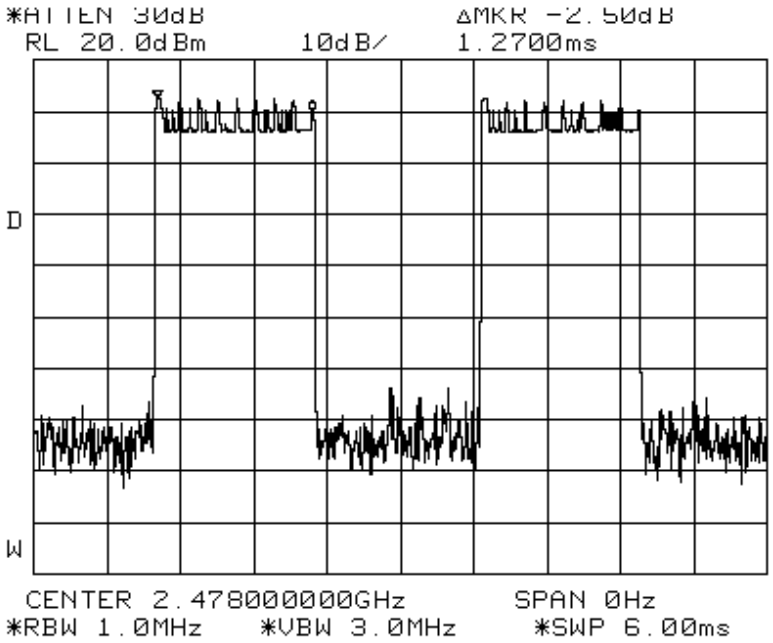
Test Input Power	110V 60Hz	Temperature	24°C
Test Distance	20cm	Relative Humidity	59%
EUT	Receiver	Atmospheric Pressure	1030mbar
		Tested By	Johnsen Tia

Channel	Channel Frequency (GHz)	Power Density Value (mW/cm^2)	Margin (mW/cm^2)	Averaging Time (min)	Limit (mW/cm^2)
0	2.404	0.0010	-0.9990	30	1.0
18	2.440	0.0010	-0.9990	30	1.0
38	2.478	0.0011	-0.9989	30	1.0

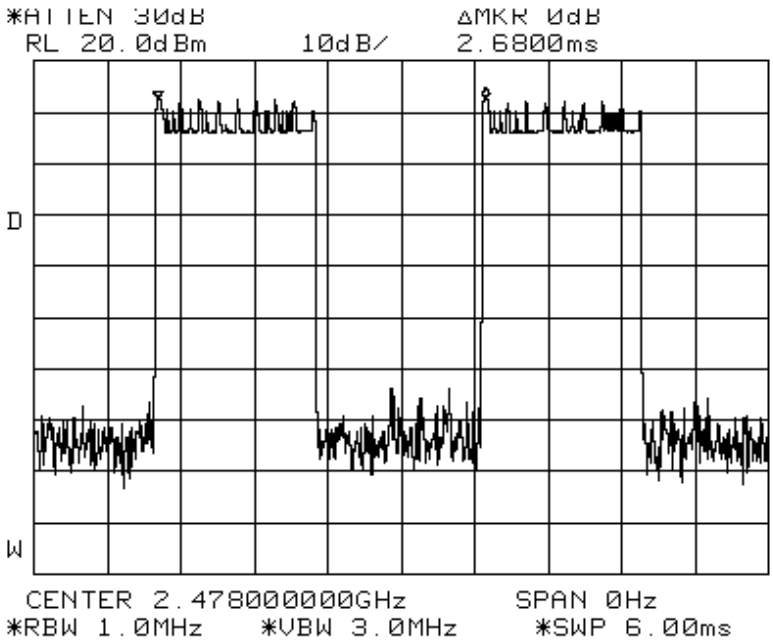
Notes

1. All possible modes of operation were investigated. Only the worst case highest radiation levels were measured. Measurements were taken at the required averaging time. All other radiation levels were relatively insignificant.
2 A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
3 Measurement Uncertainty
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2, in the range 0.1MHz – 3GHz is ±15% .

FCC Part 15.35(c) Duty Cycle Correction Factor - Transmitter



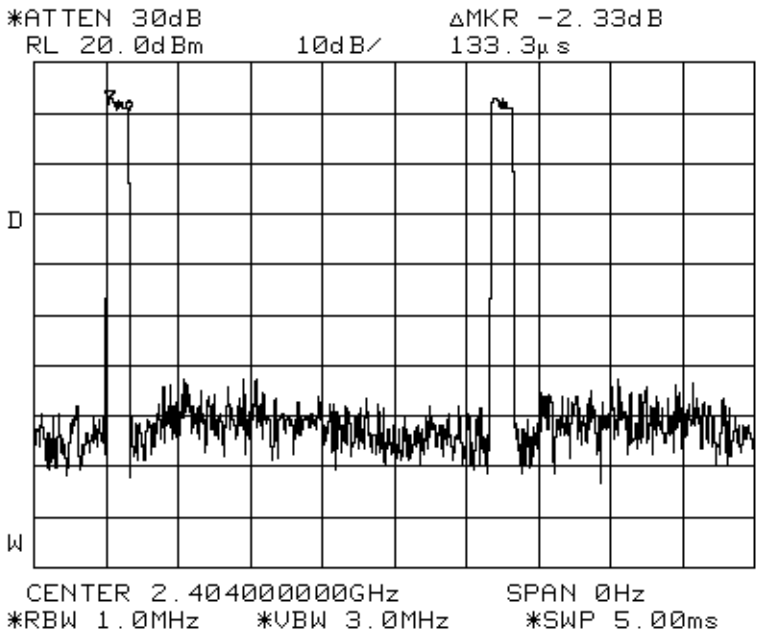
On Time



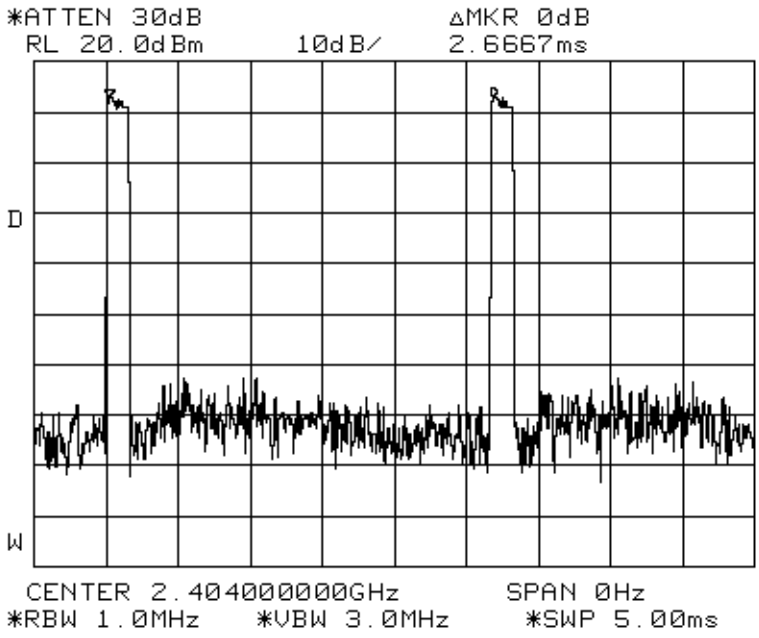
Period

Duty Cycle Factor (worst- case) = 20 log [Total On time / Period]
= 20 log [(1.27 / 2.68)]
= **-6.5dB**

FCC Part 15.35(c) Duty Cycle Correction Factor - Receiver



On Time



Period

Duty Cycle Factor (worst- case) = 20 log [Total On time / Period]
= 20 log [(0.1333 / 2.6667)]
= **-26.0dB**

This Report is issued under the following conditions:

1. Results of the testing/calibration in the form of a report will be issued immediately after the service has been completed or terminated.

2. Unless otherwise requested, a report shall contain only technical results. Analysis and interpretation of the results and professional opinion and recommendations expressed thereupon, if required, shall be clearly indicated and additional fee paid for, by the Client.

3. This report applies to the sample of the specific product/equipment given at the time of its testing/calibration. The results are not used to indicate or imply that they are applicable to other similar items. In addition, such results must not be used to indicate or imply that PSB Corporation approves, recommends or endorses the manufacturer, supplier or user of such product/equipment, or that PSB Corporation in any way "guarantees" the later performance of the product/equipment.

4. The sample/s mentioned in this report is/are submitted/supplied/manufactured by the Client. PSB Corporation therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture, consignment or any information supplied.

5. Additional copies of the report are available to the Client at an additional fee. No third party can obtain a copy of this report through PSB Corporation, unless the Client has authorised PSB Corporation in writing to do so.

6. PSB Corporation may at its sole discretion add to or amend the conditions of the report at the time of issue of the report and such report and such additions or amendments shall be binding on the Client.

7. All copyright in the report shall remain with PSB Corporation and the Client shall, upon payment of PSB Corporation's fees for the carrying out of the tests/calibrations, be granted a license to use or publish the report to the third parties subject to the terms and conditions herein, provided always that PSB Corporation may at its absolute discretion be entitled to impose such conditions on the license as it sees fit.

8. Nothing in this report shall be interpreted to mean that PSB Corporation has verified or ascertained any endorsement or marks from any other testing authority or bodies that may be found on that sample.

9. This report shall not be reproduced wholly or in parts and no reference shall be made by the Client to PSB Corporation or to the report or results furnished by PSB Corporation in any advertisements or sales promotion.

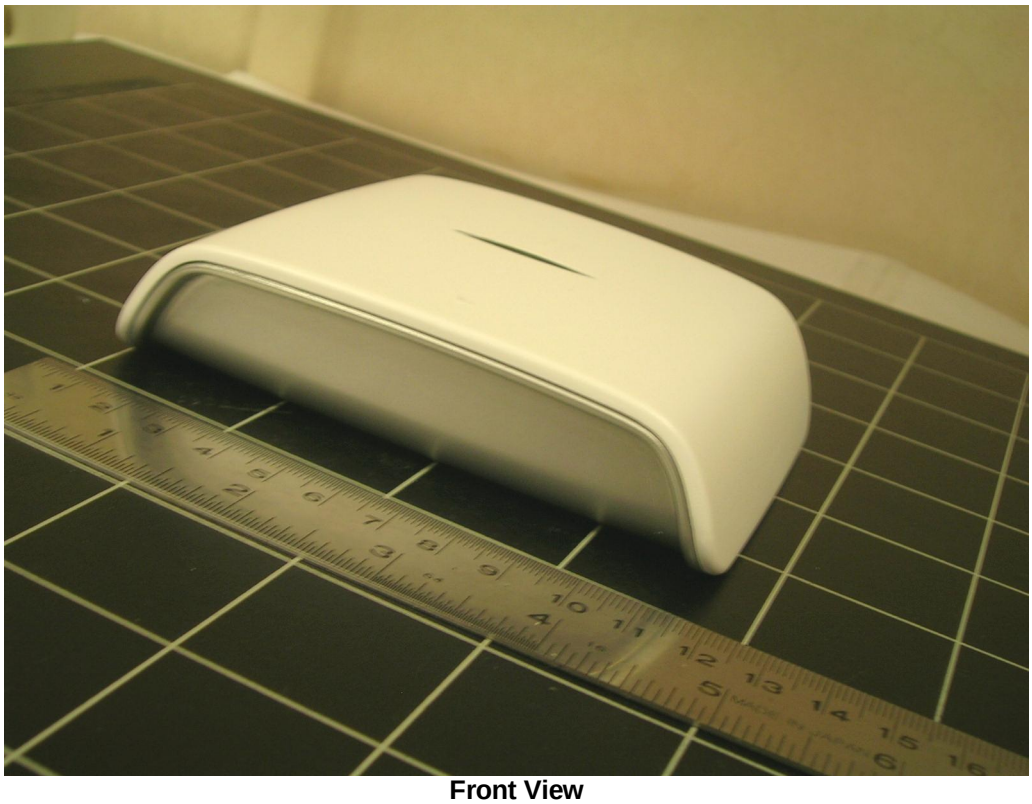
10. Unless otherwise stated, the tests are carried out in PSB Corporation Pte Ltd, No.1 Science Park Drive Singapore 118221.

June 2006

ANNEX A

EUT PHOTOGRAPHS / DIAGRAMS

EUT PHOTOGRAPHS FOR MODEL VC4030TX & VC4030RX



Front View

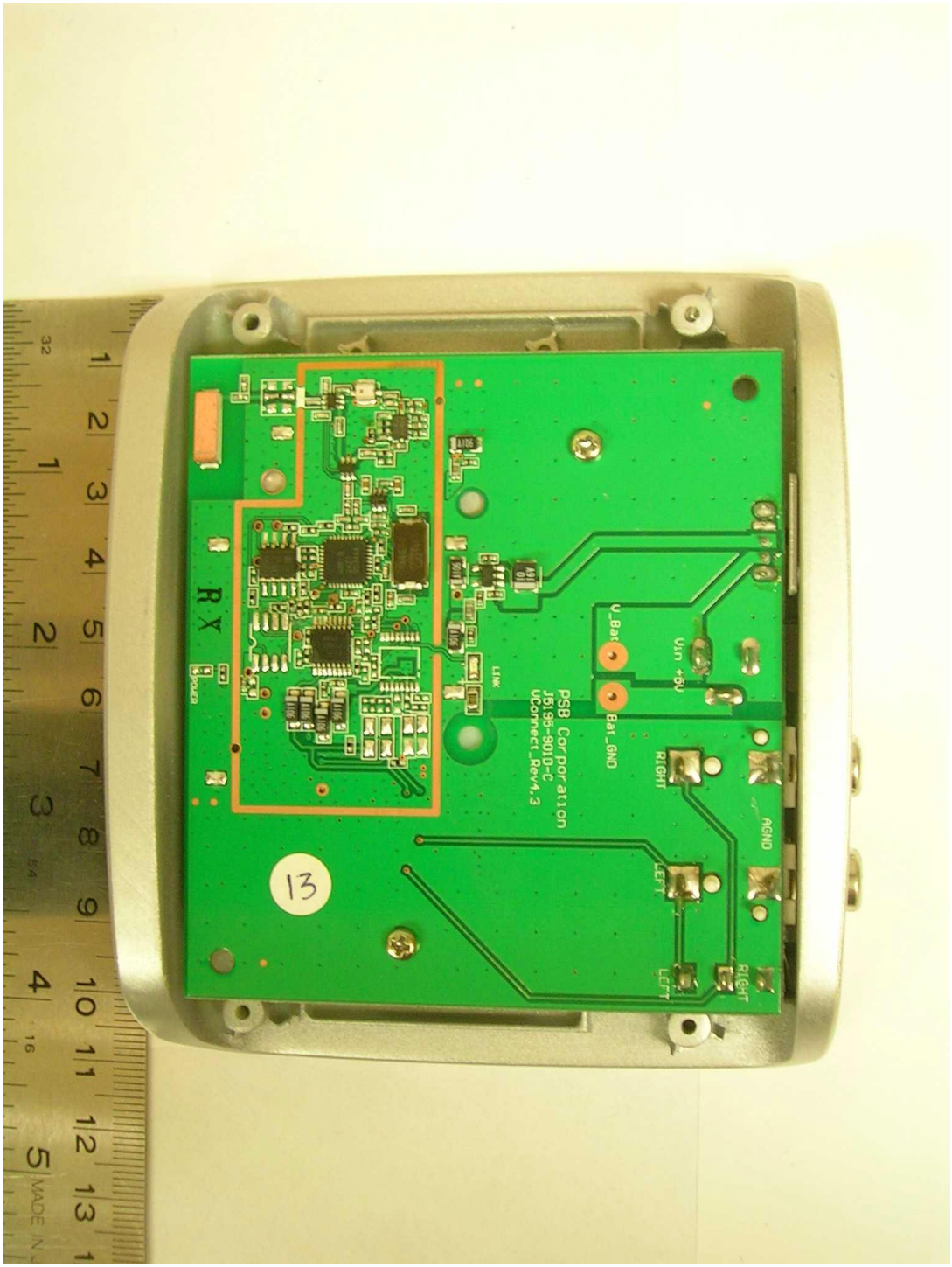
Rear View

EUT PHOTOGRAPHS FOR POWER ADAPTER MODEL D4560

EUT Power Adapter Front View

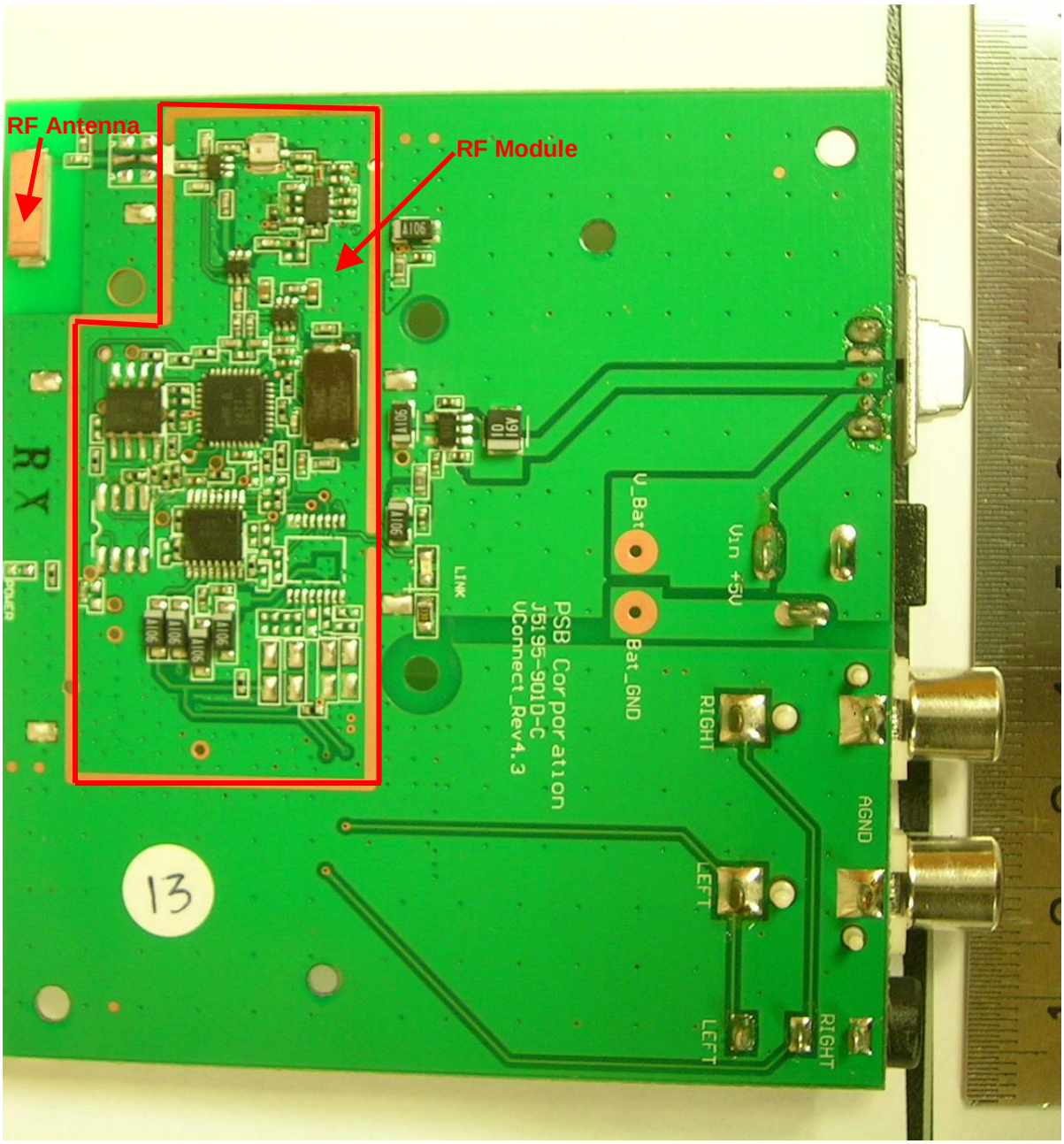
EUT Power Adapter Rear View

EUT PHOTOGRAPHS FOR MODEL VC4030RX



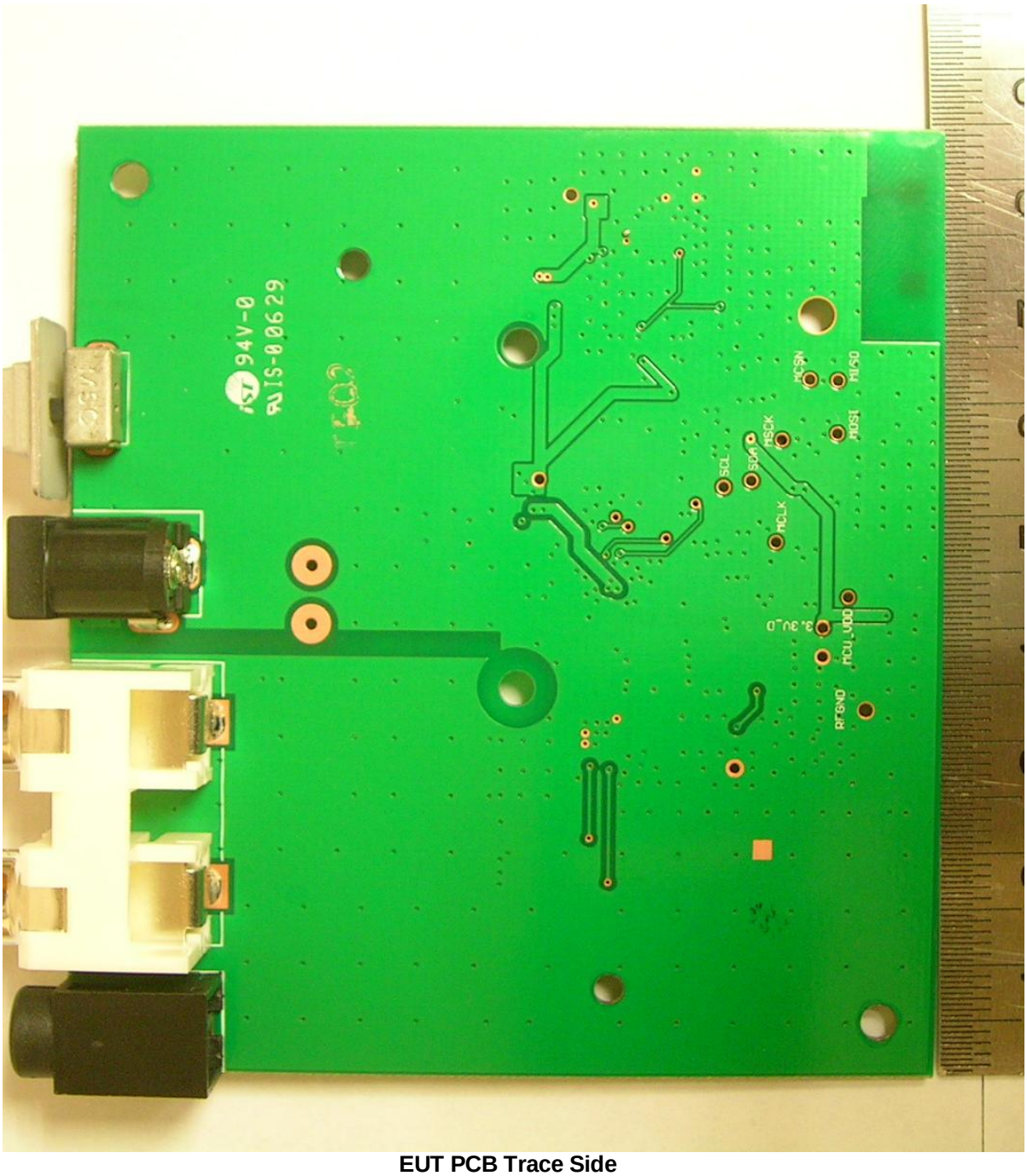
EUT Internal View

EUT PHOTOGRAPHS FOR MODEL VC4030RX



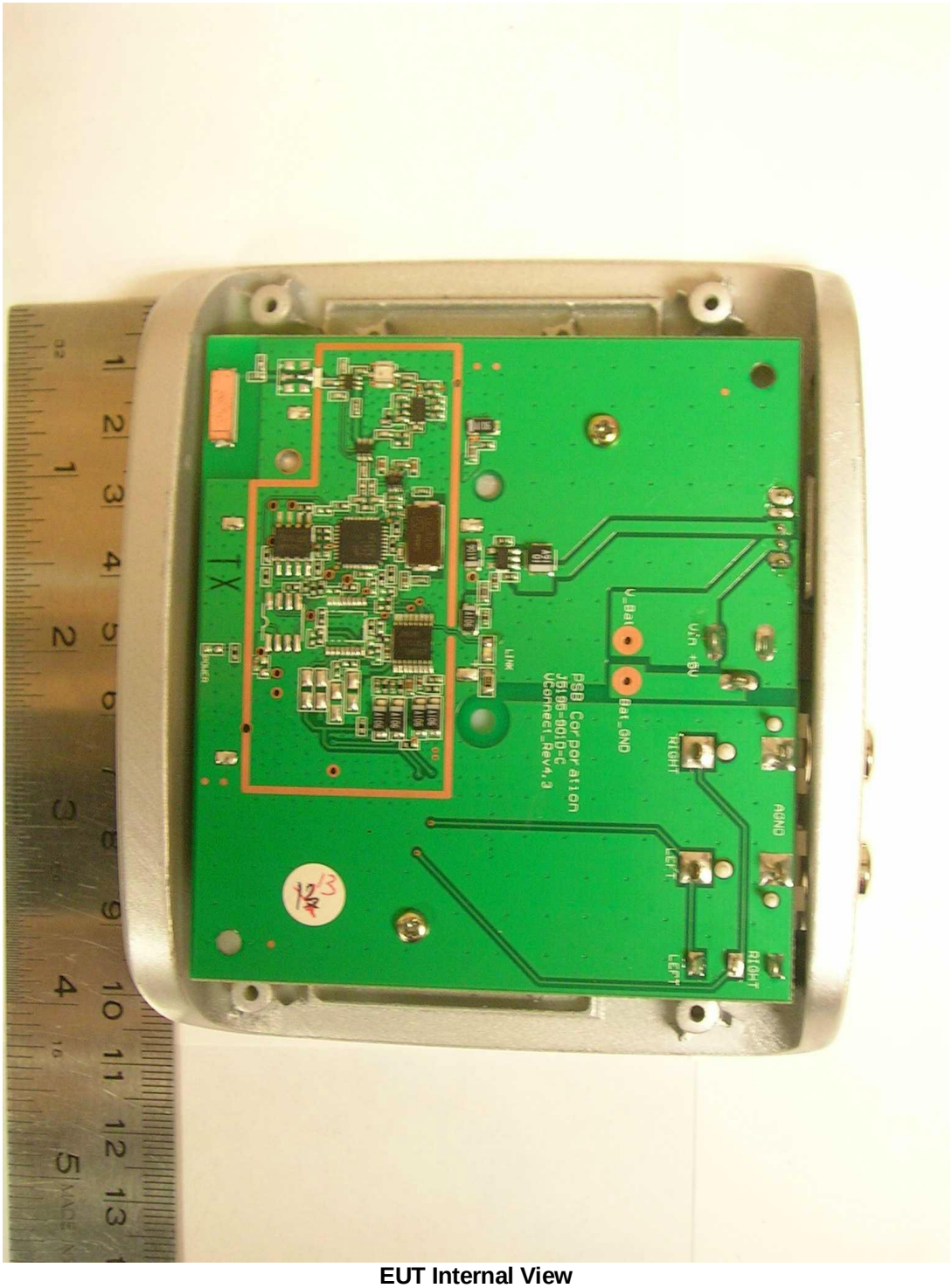
EUT PCB Component Side

EUT PHOTOGRAPHS FOR MODEL VC4030RX



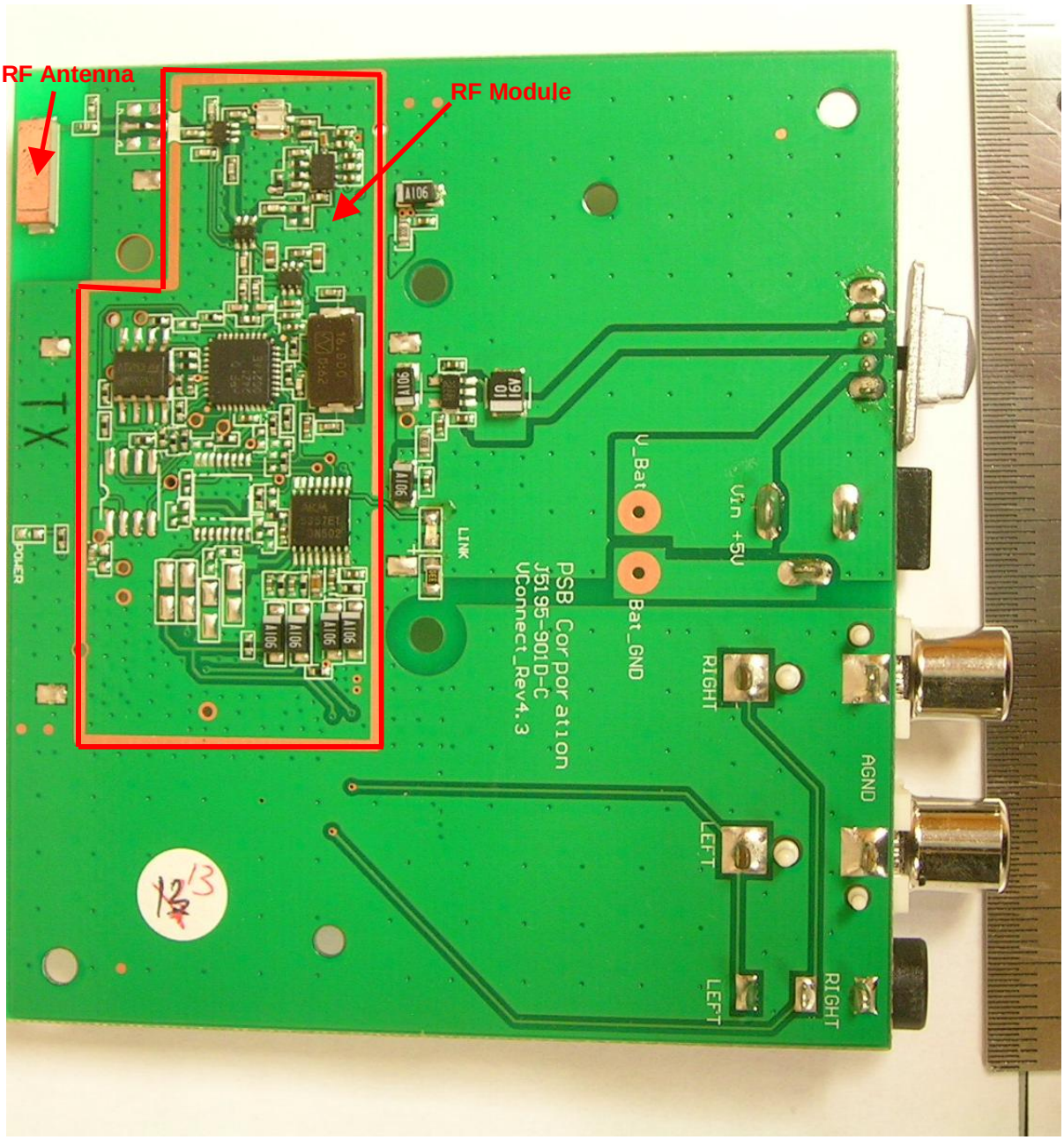
EUT PCB Trace Side

EUT PHOTOGRAPHS FOR MODEL VC4030TX



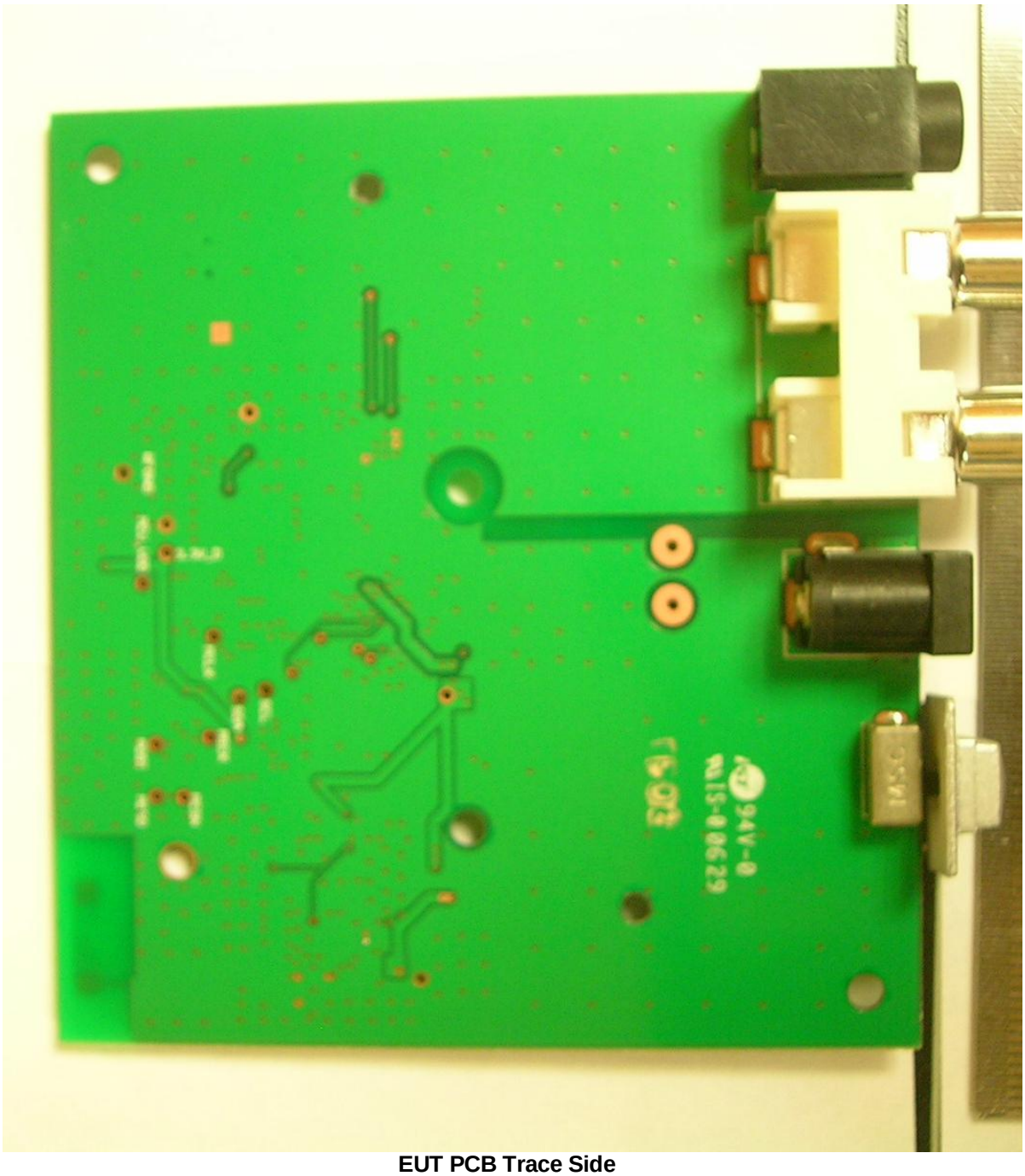
EUT Internal View

EUT PHOTOGRAPHS FOR MODEL VC4030TX



EUT PCB Component Side

EUT PHOTOGRAPHS FOR MODEL VC4030TX



EUT PCB Trace Side

ANNEX B

FCC LABEL & POSITION

FCC LABEL & POSITION ANNEX B

Labelling requirements per Section 2.925 & 15.19

The label shown will be permanently affixed at a conspicuous location on the device and be readily visible to the user at the time of purchase.

PSB Technologies Pte Ltd
SoundScape Bridge
Model No: VC4030TX
Transmitter Unit
FCC ID: UMMVC430H06M
Made in Singapore

Sample Label

Physical Location of FCC Label on EUT

Labelling requirements per Section 2.925 & 15.19

The label shown will be permanently affixed at a conspicuous location on the device and be readily visible to the user at the time of purchase.

PSB Technologies Pte Ltd
SoundScape Bridge
Model No: VC4030RX
Transmitter Unit
FCC ID: UMMVC430H06S
Made in Singapore

Sample Label

Physical Location of FCC Label on EUT

ANNEX C

USER MANUAL
TECHNICAL DESCRIPTION
BLOCK & CIRCUIT DIAGRAMS

(Please refer to manufacturer for details)