Test Report No. 719165030-EEC10/01
dated 19 Jan 2010

PSB Singapore

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FORMAL REPORT ON TESTING IN ACCORDANCE WITH
FCC Parts 15B & C : 2009
OF A
WIRELESS TRANSCEIVER
[Model : SB1210]
[FCC ID : IBAAVPSB1210]

TEST FACILITY	TÜV SÜD PSB Pte Ltd, Electrical & Electronics Centre (EEC), Product Services, 1 Science Park Drive, Singapore 118221
FCC REG. NO.	99142 (3m and 10m Semi-Anechoic Chamber, Science Park) 871638 (3m Semi-Anechoic Chamber, Science Park)
IND. CANADA REG. NO.	2932I-1 (3m and 10m Semi-Anechoic Chamber, Science Park)
PREPARED FOR	Ms Sim Lee Fong Creative Technology Ltd 31 International Business Park Creative Resource Singapore 609921 Tel : +65 6895 4729 Fax : +65 6895 4110
QUOTATION NUMBER	Q09EEC02879 & 219113344
JOB NUMBER	719165030 & 719179645
TEST PERIOD	14 Dec 2009 – 23 Dec 2009

PREPARED BY	**APPROVED BY**
Quek Keng Huat	Lim Cher Hwee
Associate Engineer	Assistance Vice President

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LA-2007-0380-A
LA-2007-0380-A-1
LA-2007-0381-F
LA-2007-0382-B
LA-2007-0383-G
LA-2007-0384-G
LA-2007-0385-E
LA-2007-0386-C

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/Calibrations marked "Not SAC-SINGLAS Accredited" in this Report are not included in the SAC-SINGLAS Accreditation Schedule for our laboratory.

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TEST SUMMARY

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

Test Results Summary

Test Standard	Description	Pass / Fail
FCC Part 15: 2009		
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)(2)	Spectrum Bandwidth (6dB Bandwidth Measurement)	Pass
15.247(b)(3)	Maximum Peak Power	Pass
15.247(d)	RF Radiated Spurious Emissions	Pass
15.247(d)	Band Edge Compliance (Conducted)	Not Applicable *See Note 4
15.247(d)	Band Edge Compliance (Radiated)	Pass
15.247(e)	Peak Power Spectral Density	Pass
1.1310	Maximum Permissible Exposure	Pass

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	2.412
Channel 1	2.438
Channel 2	2.464

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

3. All test measurement procedures are according to ANSI C63.4: 2003.

4. All the measurements were done based on radiated measurements.

Modifications

No modifications were made.

PRODUCT DESCRIPTION

Description	:	The Equipment Under Test (EUT) is a **WIRELESS TRANSCEIVER.** It provides a wireless USB solution, combining X-Fi Technology with Creative's proprietary wireless implementation with all the sleek features. User will be able to do multiple audio wireless streaming simultaneously.
Manufacturer	:	Creative Technology Ltd
Model Number	:	SB1210
FCC ID	:	IBAAVPSB210
Serial Number	:	Nil
Microprocessor	:	Creative CA0189-2AG/STS Wireless Transceiver MCM80R
Operating / Transmitting Frequency	:	2.412GHz, 2.438GHz, 2.464GHz
Clock / Oscillator Frequency	:	24MHz, 24.576MHz, 22MHz
Modulation	:	DSSS
Antenna Gain	:	2.0dBi
Port / Connectors	:	1 x Headphone output 1 x Microphone input
Rated Input Power	:	5Vdc via USB port
Accessories	:	USB Docking Device Earpiece – Earphone & Microphone

SUPPORTING DESCRIPTION DESCRIPTION

Equipment Description (Including Brand Name)	Model, Serial & FCC ID Number	Cable Description (List Length, Type & Purpose)
Dell Laptop	M/N: PA19L S/N: 16575363397 FCC ID: DoC	2.00m unshielded power cable
Dell Power Adapter	M/N: PA12 S/N: CN-0F8834-48661-5CR-803K FCC ID: Nil	2.00m unshielded power cable
Dell Laptop	M/N: PP25L S/N: 32909547088 FCC ID: DoC	2.00m unshielded power cable
Dell Power Adapter	M/N: LA65NS2-00 S/N: CN-0NX061-71615-7CS-4844 FCC ID: Nil	2.00m unshielded power cable
Creative Wireless Receiver	M/N: SB1250 S/N: Nil FCC ID: IBAAVPSB1250	2.00m unshielded power cable
Creative Wireless Receiver	M/N: SB1122 S/N: Nil FCC ID: IBAAVPSB1122	2.00m unshielded power cable
Creative Remote Controller	M/N: RM-800 S/N: 313923814991 FCC ID: Nil	2.00m unshielded power cable
Creative Earphone	M/N: Nil S/N: Nil FCC ID: Nil	2.00m unshielded earphone cable
Dell Mouse	M/N: MO56UOA S/N: G0N0419Z FCC ID: DoC	1.80m standard mouse cable

EUT OPERATING CONDITIONS

FCC Part 15
1. Conducted Emissions **2. Radiated Emissions (Spurious Emissions inclusive Restricted Bands Requirement)** **3. Spectrum Bandwidth (6dB Bandwidth Measurement)** **4. Maximum Peak Power** **5. RF Radiated Spurious Emissions** **6. Band Edge Compliance (Radiated)** **7. Peak Power Spectral Density** **8. Maximum Permissible Exposure**
The EUT was exercised by operating in maximum continuous transmission in test mode, i.e transmitting at lower, middle and upper channels respectively at one time.

CONDUCTED EMISSION TEST

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 (20Hz–26.5GHz) – ESMI2	ESMI	829214/006 829550/001	27 May 2010
Schaffner LISN – LISN10 (for EUT)	NNB42	04/10055	03 Jul 2010
EMCO LISN (for supporting) – LISN6	3825/2	9309-2127	03 Jul 2010

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 9kHz. 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 (via connected host)	Temperature	23°C
Line Under Test	AC Mains	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chang Wai Kit

Frequency (MHz)	Q-P Value (dBμV)	Q-P Margin (dB)	AV Value (dBμV)	AV Margin (dB)	Line	Channel
0.18045	56.9	-7.6	41.5	-13.0	Neutral	0
0.18481	53.6	-10.7	37.2	-17.2	Live	2
0.24215	49.4	-12.6	36.5	-15.5	Neutra	1
0.24662	46.9	-15.0	32.9	-19.0	Live	1
0.30536	43.2	-16.9	31.4	-18.7	Neutral	0
0.30466	41.1	-19.0	28.2	-21.9	Live	1

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: 9kHz 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 is ±3.0dB.

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) – ESMI1	ESMI	849182/003 848926/007	24 Aug 2010
Schaffner Preamplifier (9kHz-2GHz) –PA13	CPA9231A	3422	13 Feb 2010
Schaffner Bilog Antenna – BL3 (Ref)	CBL6112B	2549	10 Dec 2010
ETS Horn Antenna	3116	0004-2474	02 Apr 2010
Teseq Preamplifier (PA17)	LNA6018	70215	18 Feb 2010
Bandstop Filter (2.4-2.5 GHz)	BRM50701	017	13 Aug 2010

RADIATED EMISSION TEST

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

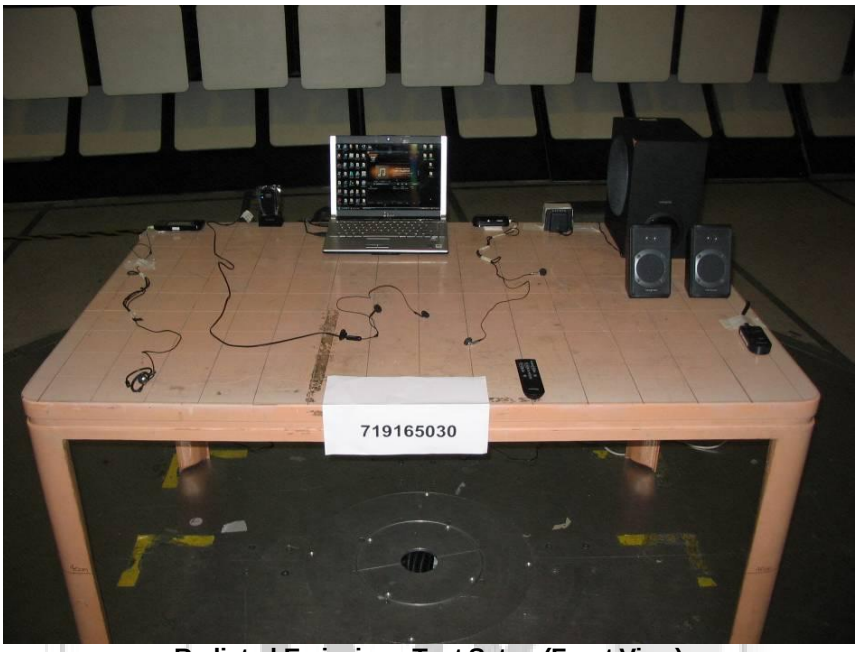
1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m X 1.0m X 0.8m high, non-metallic table.
2. The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable.
3. The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

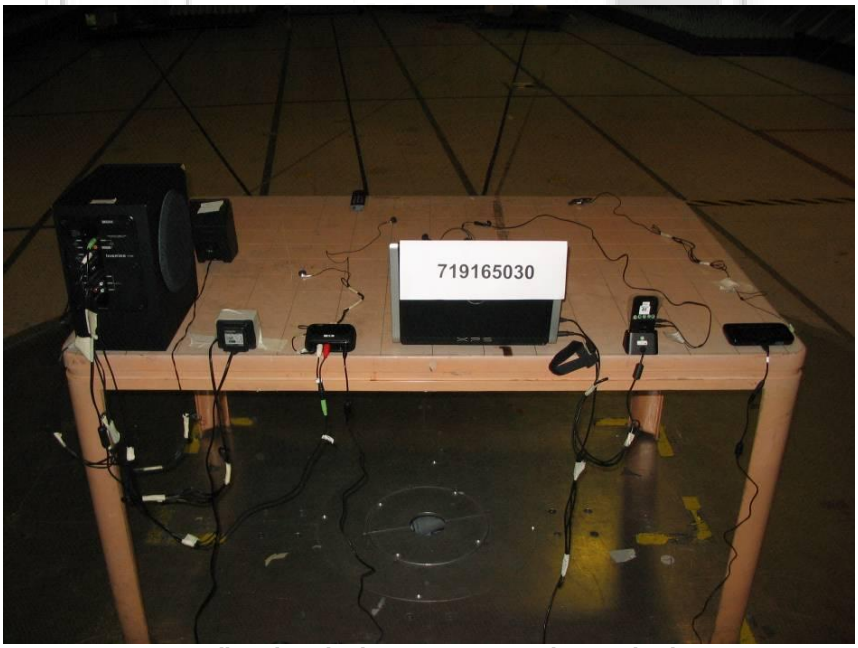
1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. A prescan was carried out to pick the worst emission frequencies from the EUT. For EUT which is a portable device, the prescan was carried out by rotating the EUT through three orthogonal axes to determine which altitude 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 1GHz, and the Horn antenna above 1GHz.

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)



Radiated Emissions Test Setup (Rear View)

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

Test Input Power	110V 60Hz (Via connected host)	Temperature	23°C
Test Distance	3m	Relative Humidity	60%
		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
30.6260	22.8	-7.2	86	100	V	1
47.0740	22.1	-7.9	222	101	V	1
62.7730	22.6	-7.4	352	212	V	1
66.4980	23.0	-7.0	65	165	V	1
98.4160	17.5	-12.5	242	126	V	1
154.1740	19.1	-10.9	303	103	V	1

Spurious Emissions above 1GHz

Frequency (GHz)	Peak Value (dBµV/m)	Peak Margin (dB)	Average Value (dBµV/m)	Average Margin (dB)	Azimuth (Degrees)	Height (cm)	Pol (H/V)	Channel
4.8033	51.7	-22.3	41.5	-12.5	24	144	H	1
5.3700	54.8	-19.2	36.5	-17.5	258	100	H	1
4.9600	53.1	-20.9	31.4	-22.6	352	200	V	1
5.1333	53.5	-20.5	27.0	-27.0	268	199	V	1
5.3600	54.7	-19.3	20.5	-33.5	351	346	V	1
4.9333	52.2	-21.8	24.6	-29.4	33	100	H	2

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. 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.
3. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
4. EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings:
   30MHz - 1GHz
   RBW: 120kHz VBW: 1MHz
   >1GHz
   RBW: 1MHz VBW: 1MHz
5. 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.
6. The channel in the table refers to the transmit channel of the EUT.
7. 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 is ±4.6dB.

SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST

FCC Part 15.247(a)(2) Spectrum Bandwidth (6dB Bandwidth Measurement) Limits

The EUT shows compliance to the requirements of this section, which states that the minimum bandwidth of the EUT employing digital modulation techniques shall be at least 500kHz.

FCC Part 15.247(a)(2) Spectrum Bandwidth (6dB Bandwidth Measurement) Test Instrumentation

Instrument	Model	S/No	Cal Due Date
R&S Test Receiver (20Hz –26.5GHz) – ESMI1	ESMI	849182/003 848926/007	24 Aug 2010
ETS Horn Antenna	3116	0004-2474	02 Apr 2010

FCC Part 15.247(a)(2) Spectrum Bandwidth (6dB 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 resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 100kHz and 300kHz.
4. All other supporting equipment were powered separately from another filtered mains.

FCC Part 15.247(a)(2) Spectrum Bandwidth (6dB 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 at Channel 0 (2.412GHz).
2. The center frequency of the spectrum analyser was set to the transmitting frequency with the frequency span wide enough to capture the 6dB 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 6dB 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 6dB 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 1 (2.438GHz) and Channel 2 (2.464GHz) respectively.

SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST

Spectrum Bandwidth (6dB Bandwidth Measurement) Test Setup

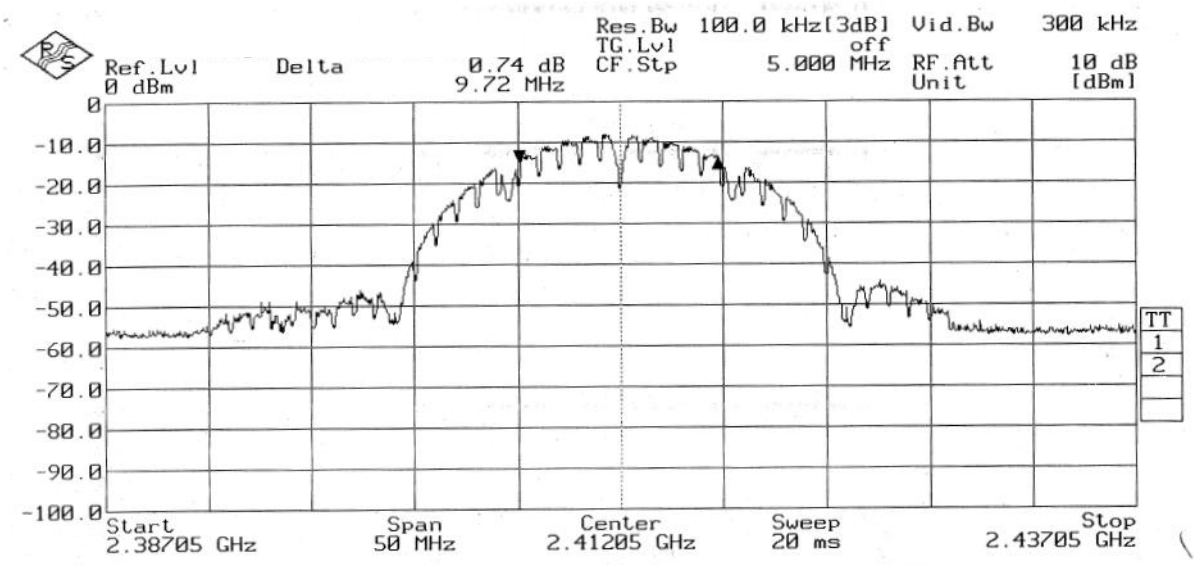
FCC Part 15.247(a)(2) Spectrum Bandwidth (6dB Bandwidth Measurement) Results

Test Input Power	110V 60Hz	Temperature	23°C
Attached Plots	1 - 3	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Dylin Lin

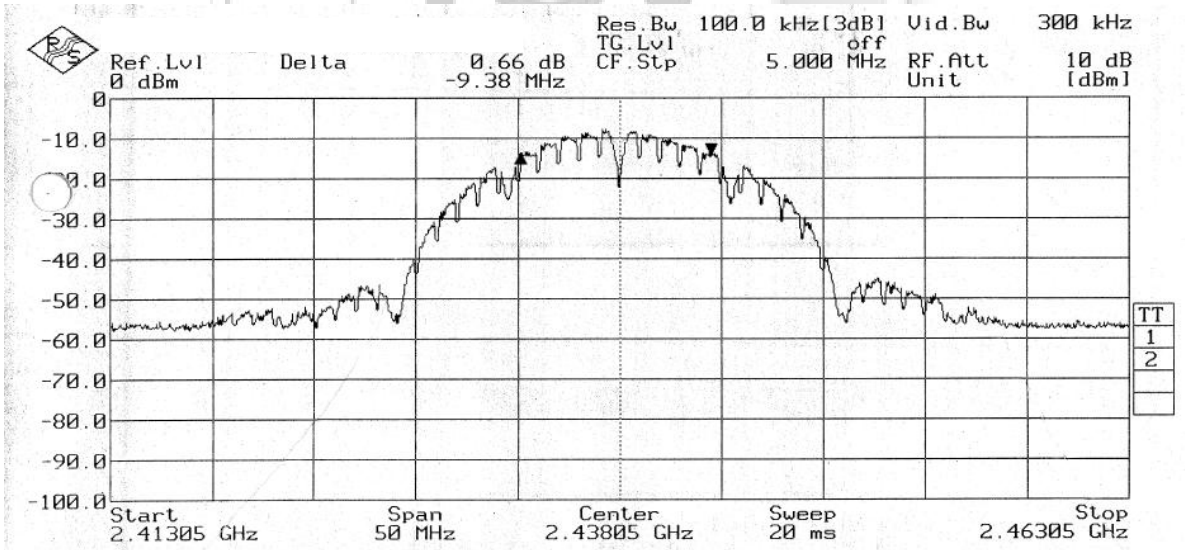
Channel	Channel Frequency (GHz)	6dB Bandwidth (MHz)
0	2.412	9.720
1	2.438	9.380
2	2.464	9.000

SPECTRUM BANDWIDTH (6dB BANDWIDTH MEASUREMENT) TEST

Spectrum Bandwidth (6dB Bandwidth Measurement) Plots

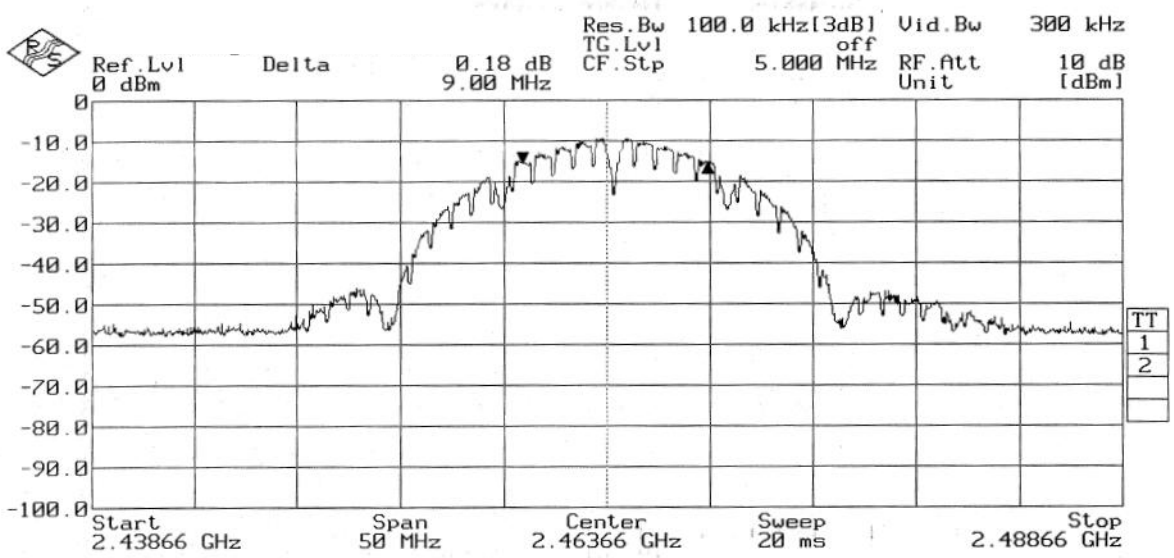


Plot 1 - Channel 0



Plot 2 - Channel 1

Spectrum Bandwidth (6dB Bandwidth Measurement) Plots



Plot 3 - Channel 2

FCC Part 15.247(b)(3) Maximum Peak Power Limits

The EUT shows compliance to the requirements of this section, which states the maximum peak power of the EUT employing digital modulation shall not exceed 1W (30dBm).

FCC Part 15.247(b)(3) Maximum Peak Power Test Instrumentation

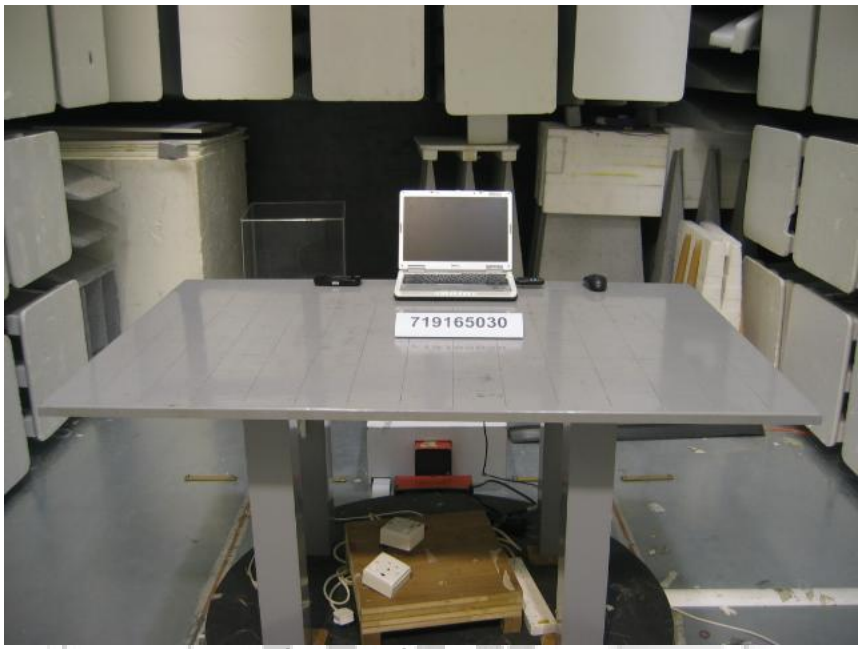
Instrument	Model	S/No	Cal Due Date
R&S Test Receiver (20Hz –26.5GHz) – ESMI1	ESMI	849182/003 848926/007	24 Aug 2010
ETS Horn Antenna	3116	0004-2474	02 Apr 2010
Teseq Preamplifier (PA17)	LNA6018	70215	18 Feb 2010

FCC Part 15.247(b)(3) 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. All other supporting equipment were powered separately from another filtered mains.

FCC Part 15.247(b)(3) 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 at Channel 0 (2.412GHz).
2. The maximum peak power of the transmitting frequency was detected and recorded.
3. The Equivalent Isotropic Radiated Power (EIRP) of the EUT was computed by adding its antenna gain to the measured maximum peak power.
4. The steps 2 to 3 were repeated with the transmitting frequency was set to Channel 1 (2.438GHz) and Channel 2 (2.464GHz) respectively.



Maximum Peak Power Test Setup

FCC Part 15.247(b)(3) Maximum Peak Power Results

Test Input Power	110V 60Hz (Via connected host)	Temperature	23°C
Antenna Gain	2.0 dBi	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chang Wai Kit

Channel	Channel Frequency (GHz)	Maximum Peak Power (W)	Maximum EIRP (W)	Limit (W)
0	2.412	0.030	0.047	1.0
1	2.438	0.030	0.047	1.0
2	2.464	0.038	0.060	1.0

Notes

1. Nil.

FCC Part 15.247(d) RF Radiated 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 Radiated Spurious Test Instrumentation

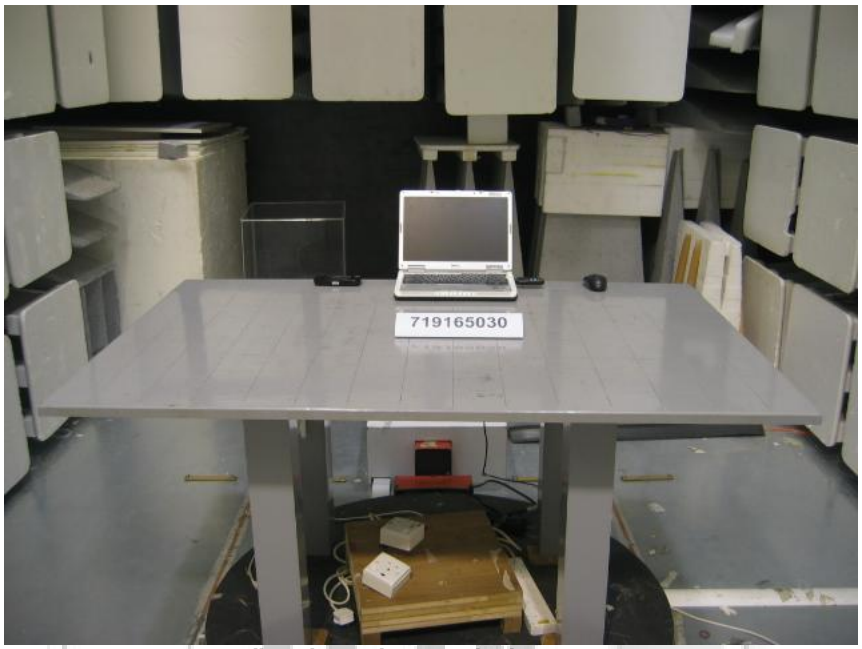
Instrument	Model	S/No	Cal Due Date
R&S Test Receiver (20Hz –26.5GHz) – ESMI1	ESMI	849182/003 848926/007	24 Aug 2010
Schaffner Preamplifier (9kHz-2GHz) –PA13	CPA9231A	3422	13 Feb 2010
Schaffner Bilog Antenna – BL3 (Ref)	CBL6112B	2549	10 Dec 2010
ETS Horn Antenna	3116	0004-2474	02 Apr 2010
Teseq Preamplifier (PA17)	LNA6018	70215	18 Feb 2010

FCC Part 15.247(d) RF Radiated 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 Radiated 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 (2.412GHz).
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 1 (2.438GHz) and Channel 2 (2.464GHz) respectively.



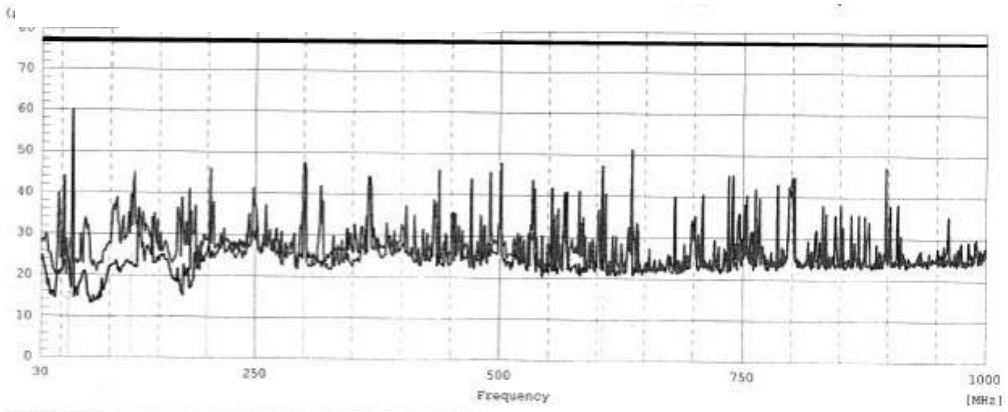
RF Radiated Spurious Emissions Test Setup

FCC Part 15.247(d) RF Radiated Spurious Emissions Results

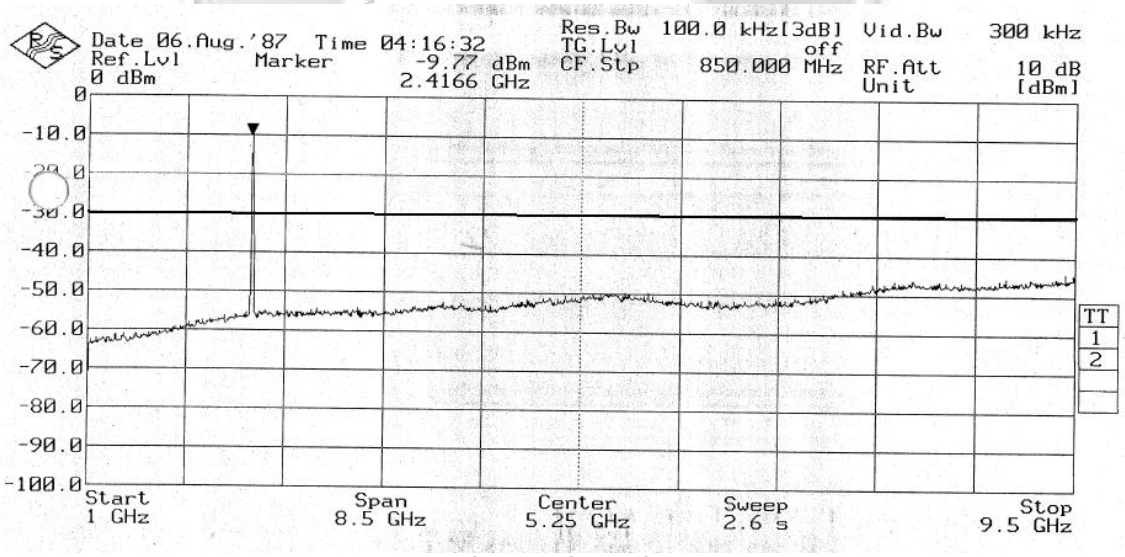
Test Input Power	110V 60Hz (Via connected host)	Temperature	23°C
Attached Plots	4 - 12	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chang Wai Kit

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

RF Radiated Spurious Emissions Plots

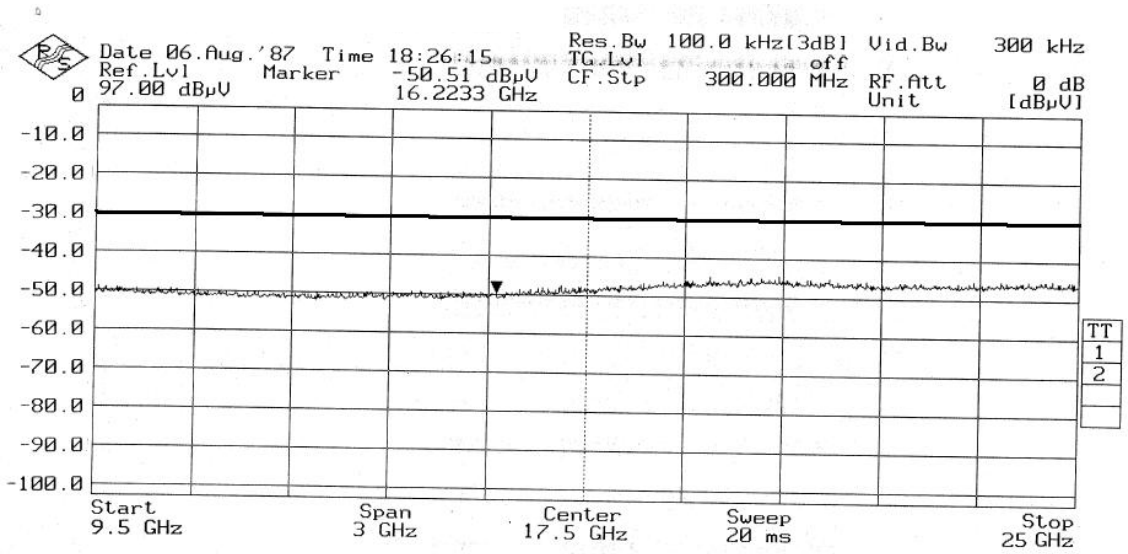


Plot 4 – Channel 0



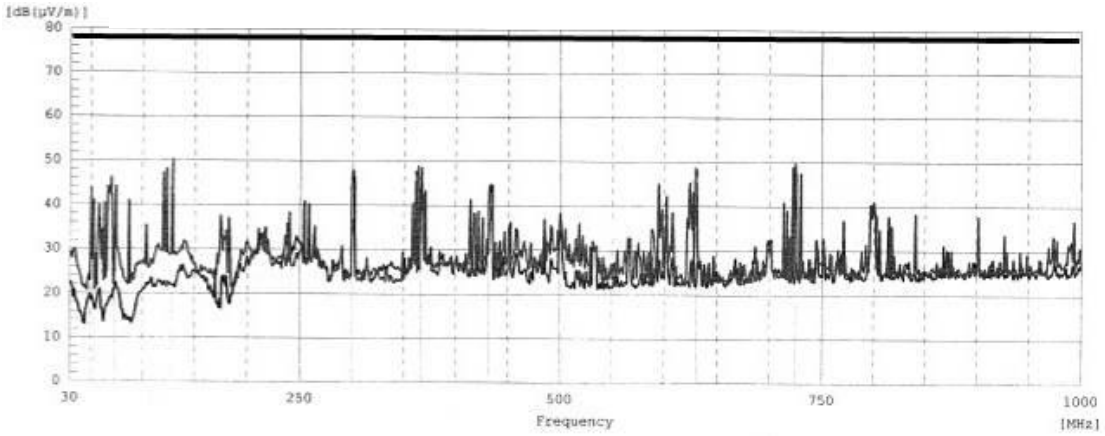
Plot 5 – Channel 0

RF Radiated Spurious Emissions Plots

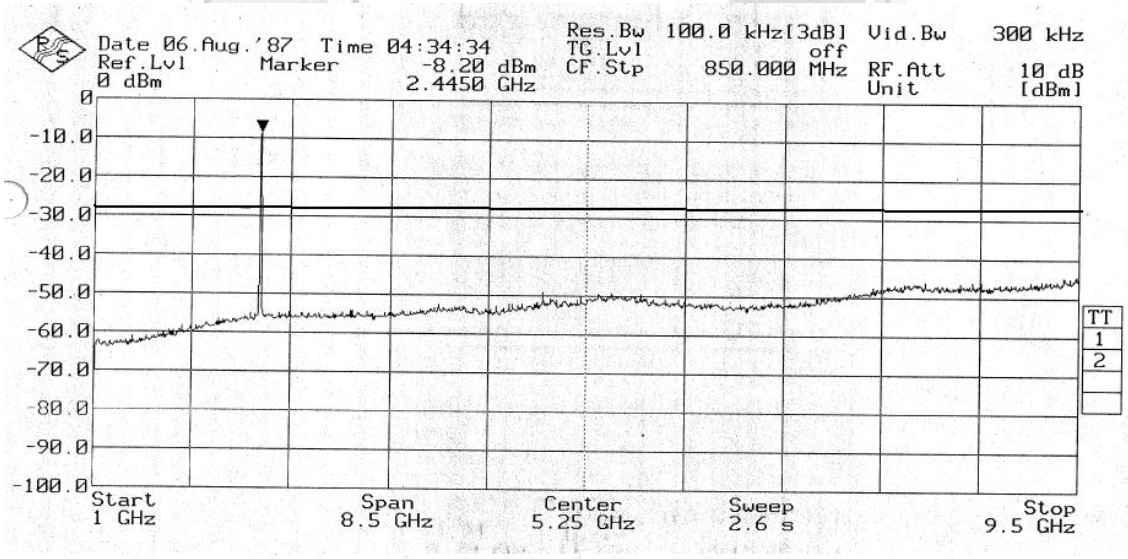


Plot 6 – Channel 0

RF Radiated Spurious Emissions Plots

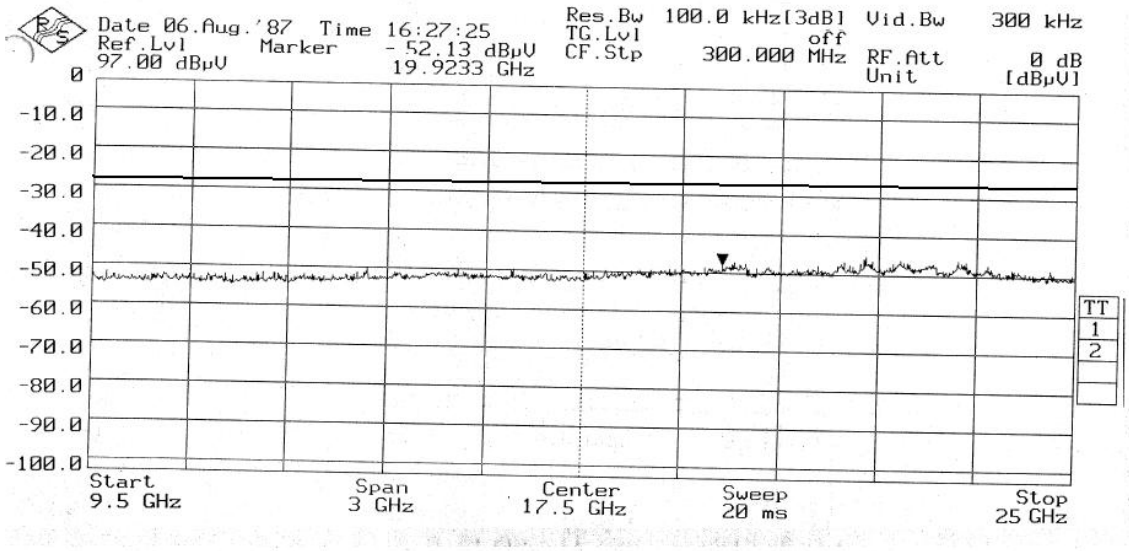


Plot 7 – Channel 1



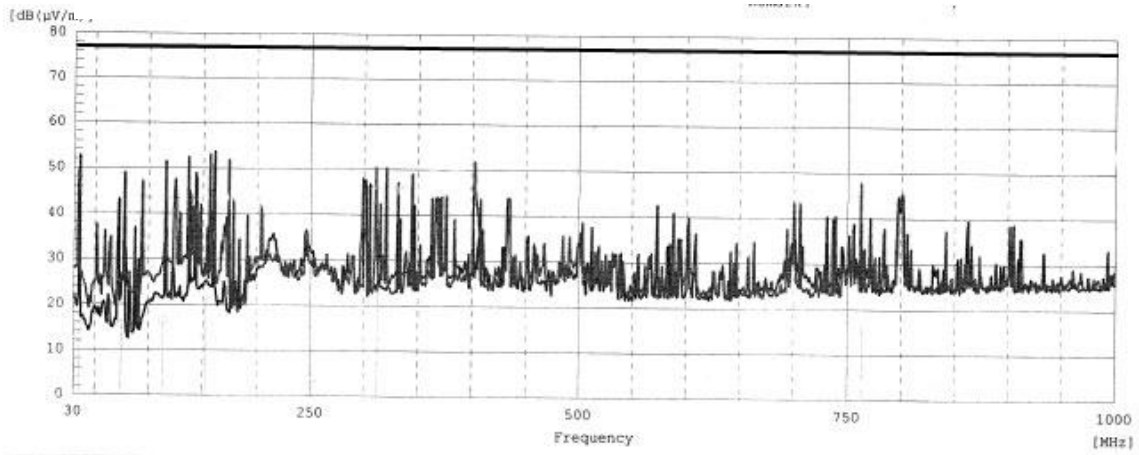
Plot 8 – Channel 1

RF Radiated Spurious Emissions Plots

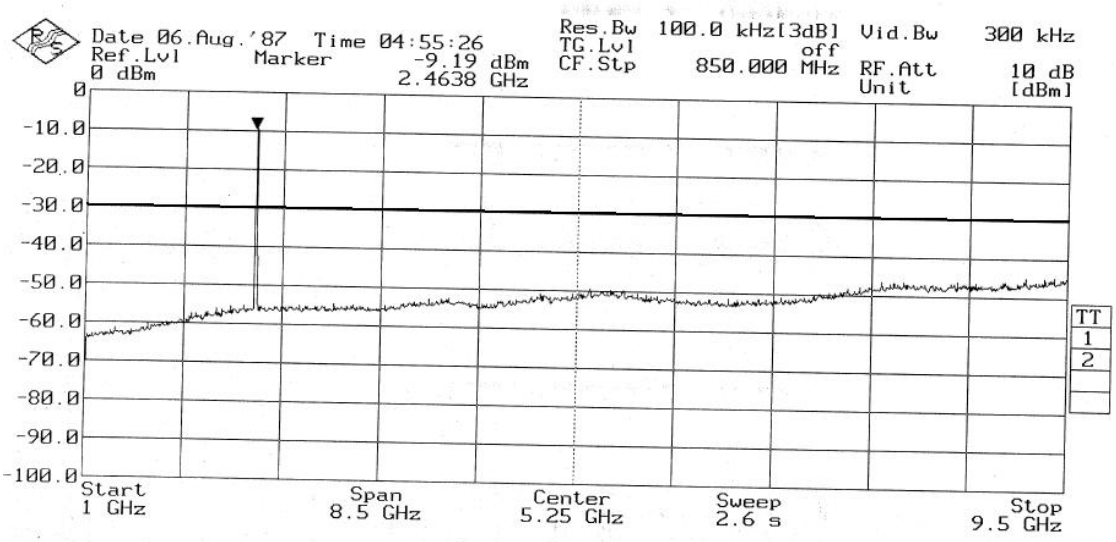


Plot 9 – Channel 1

RF Radiated Spurious Emissions Plots

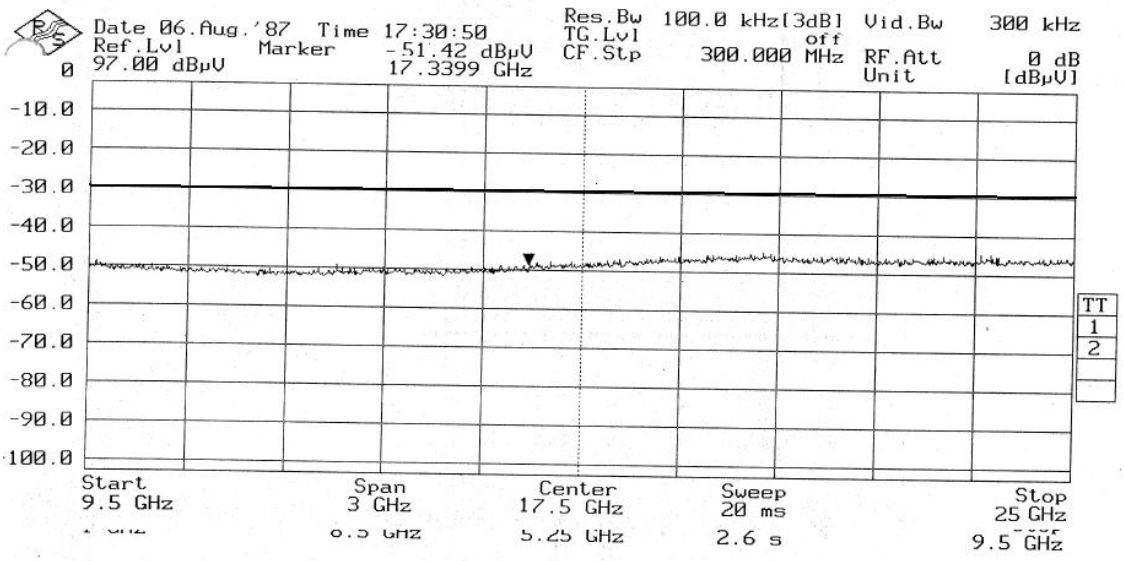


Plot 10 – Channel 2



Plot 11 – Channel 2

RF Radiated Spurious Emissions Plots



Plot 12 – Channel 2

BAND EDGE COMPLIANCE (RADIATED) TEST

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

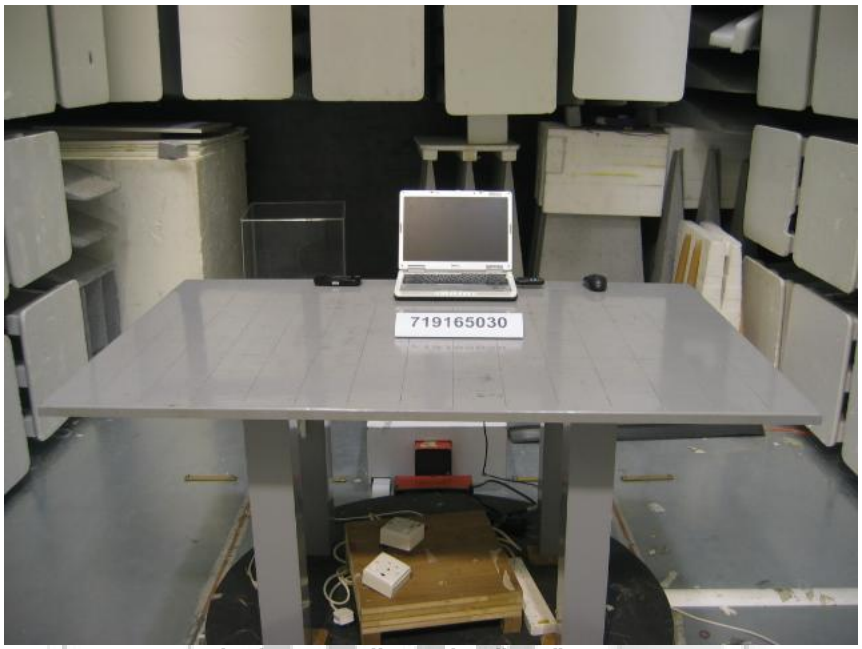
Instrument	Model	S/No	Cal Due Date
R&S Test Receiver (20Hz –26.5GHz) – ESMI1	ESMI	849182/003 848926/007	24 Aug 2010
ETS Horn Antenna	3116	0004-2474	02 Apr 2010
Teseq Preamplifier (PA17)	LNA6018	70215	18 Feb 2010

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 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.
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.



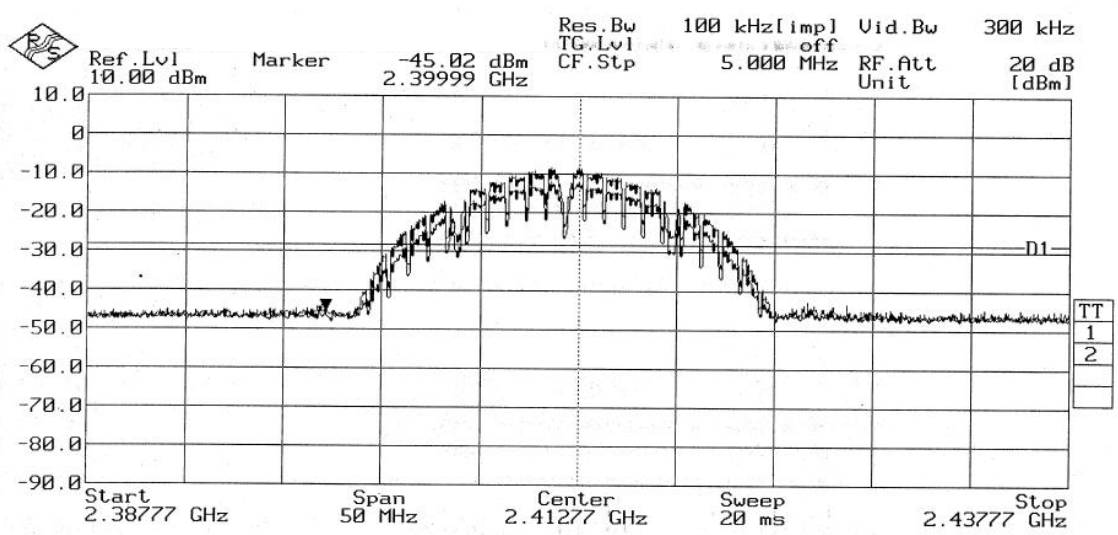
Band Edge Compliance (Radiated) Test Setup

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

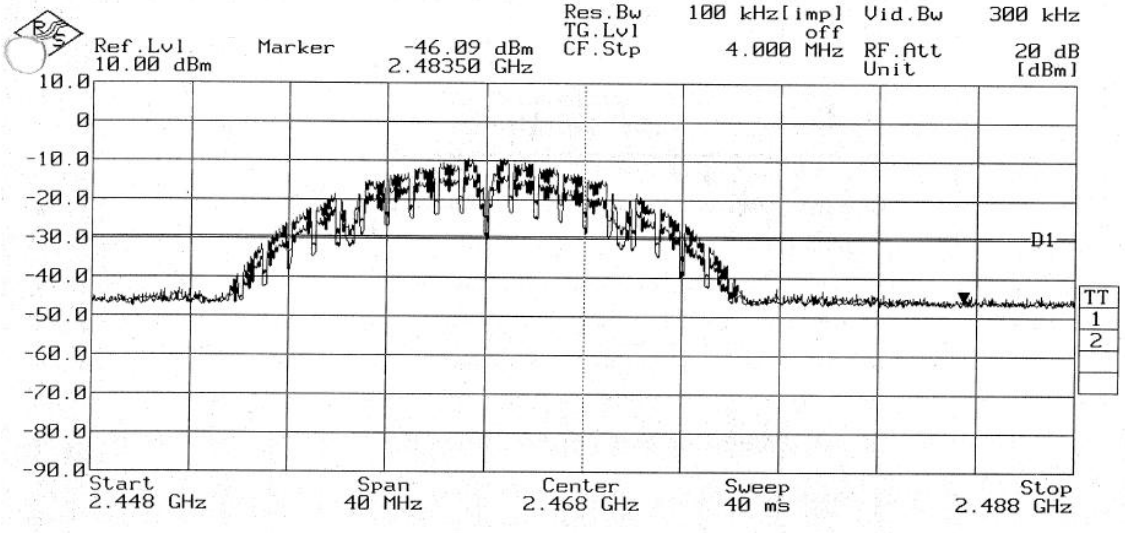
Test Input Power	110V 60Hz (Via connected host)	Temperature	23°C
Attached Plots	13 - 18	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chang Wai Kit

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

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

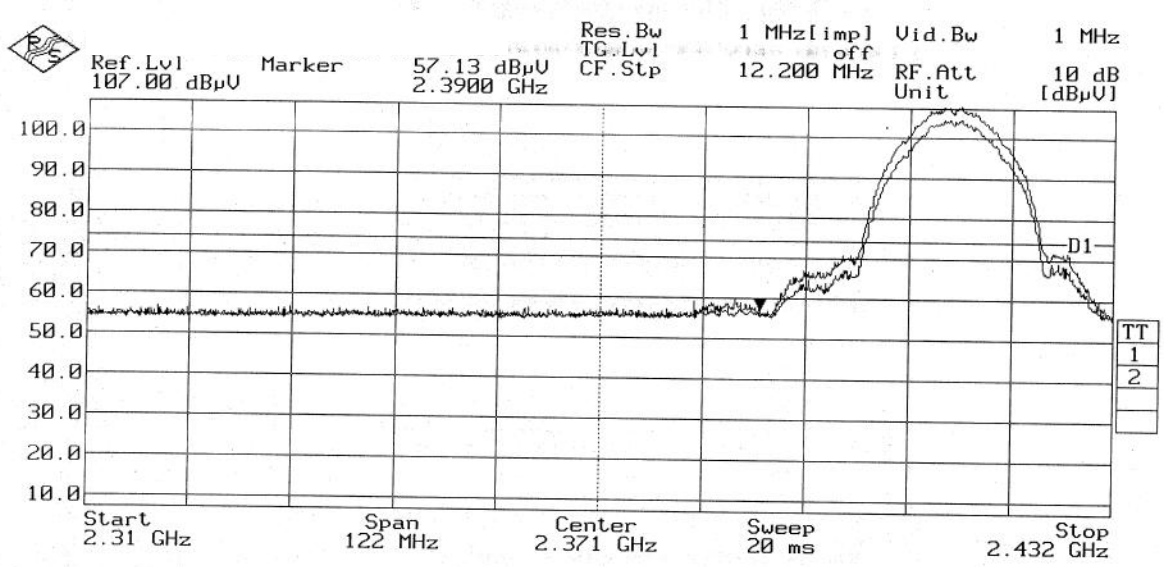


Plot 13 – Lower Band Edge at 2.4000GHz

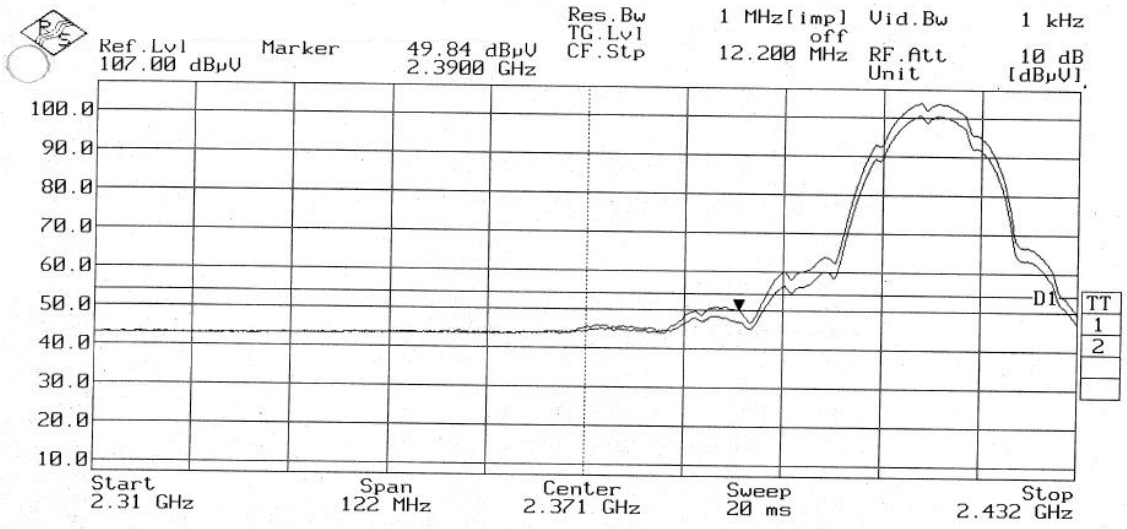


Plot 14 – Upper Band Edge at 2.4835GHz

Band Edge Compliance (Radiated) Plots (Restricted Band)

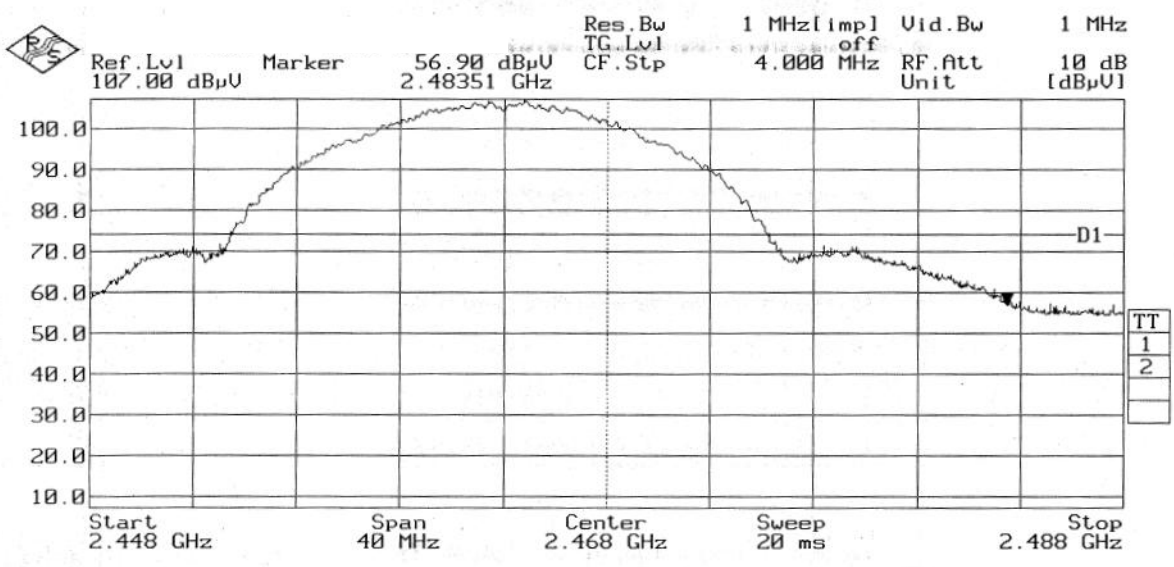


Plot 15 – Peak Plot at Lower Band Edge at 2.4000GHz

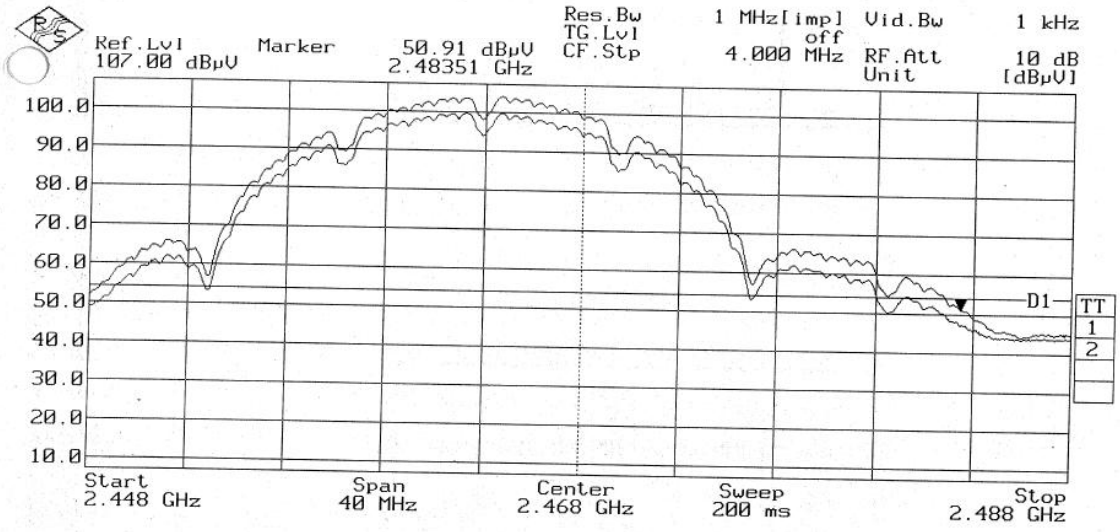


Plot 16 – Average Plot at Lower Band Edge at 2.4000GHz

Band Edge Compliance (Radiated) Plots (Restricted Band)



Plot 17 – Peak Plot at Upper Band Edge at 2.4835GHz



Plot 18 – 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

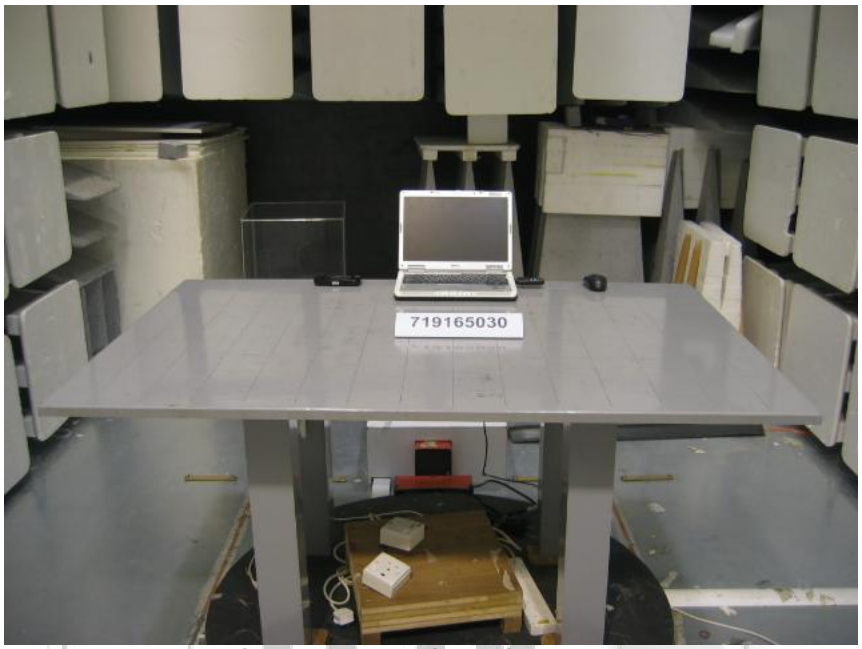
Instrument	Model	S/No	Cal Due Date
R&S Test Receiver (20Hz –26.5GHz) – ESMI1	ESMI	849182/003 848926/007	24 Aug 2010
ETS Horn Antenna	3116	0004-2474	02 Apr 2010
Teseq Preamplifier (PA17)	LNA6018	70215	18 Feb 2010

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 resolution bandwidth (RBW) and the video bandwidth (VBW) of the spectrum analyser were respectively set to 3kHz and 10kHz.
4. 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 at Channel 0 (2.412GHz).
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 1 (2.438GHz) and Channel 2 (2.464GHz) respectively.



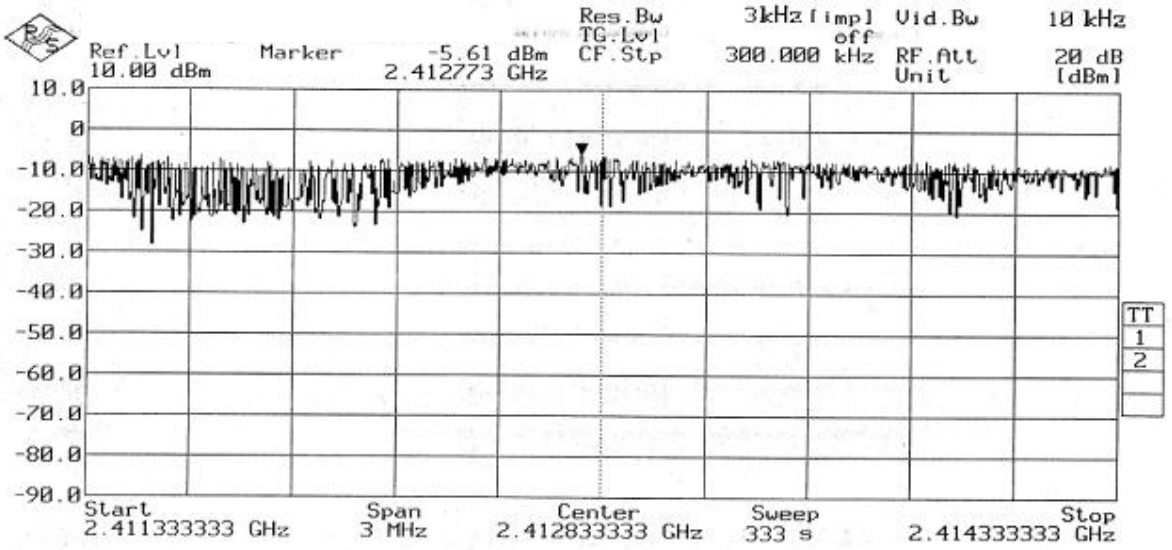
Peak Power Spectral Density Test Setup

FCC Part 15.247(e) Peak Power Spectral Density Results

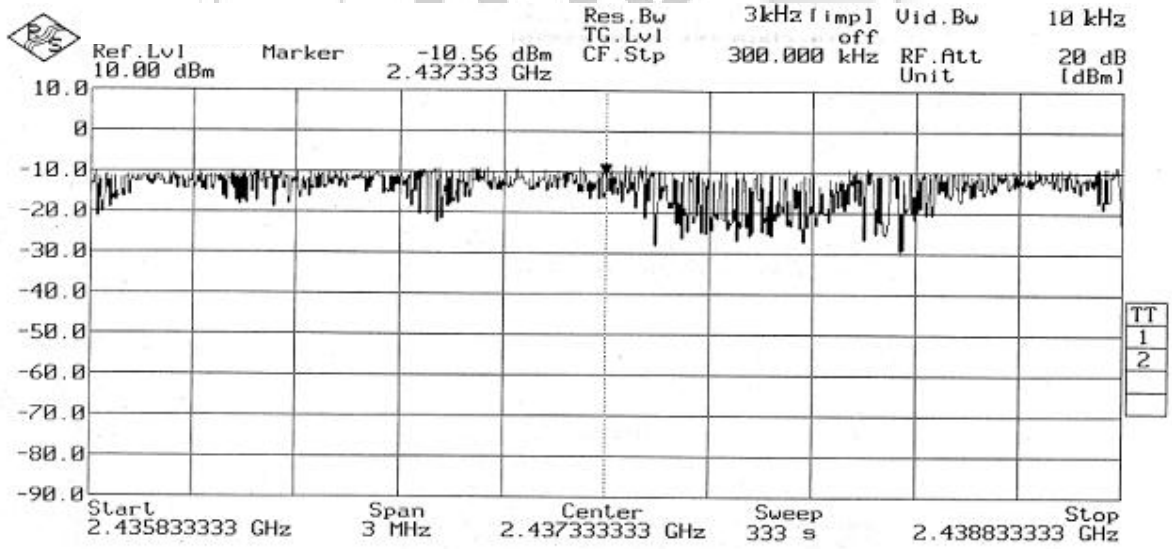
Test Input Power	110V 60Hz (Via connected host)	Temperature	23°C
Attached Plots	19 - 21	Relative Humidity	60%
		Atmospheric Pressure	1030mbar
		Tested By	Chang Wai Kit

Channel	Channel Frequency (GHz)	Peak Power Spectral Density (mW)	Limit (mW)
0	2.412	0.2748	6.3
1	2.438	0.0879	6.3
2	2.464	0.0733	6.3

Peak Power Spectral Density Plots

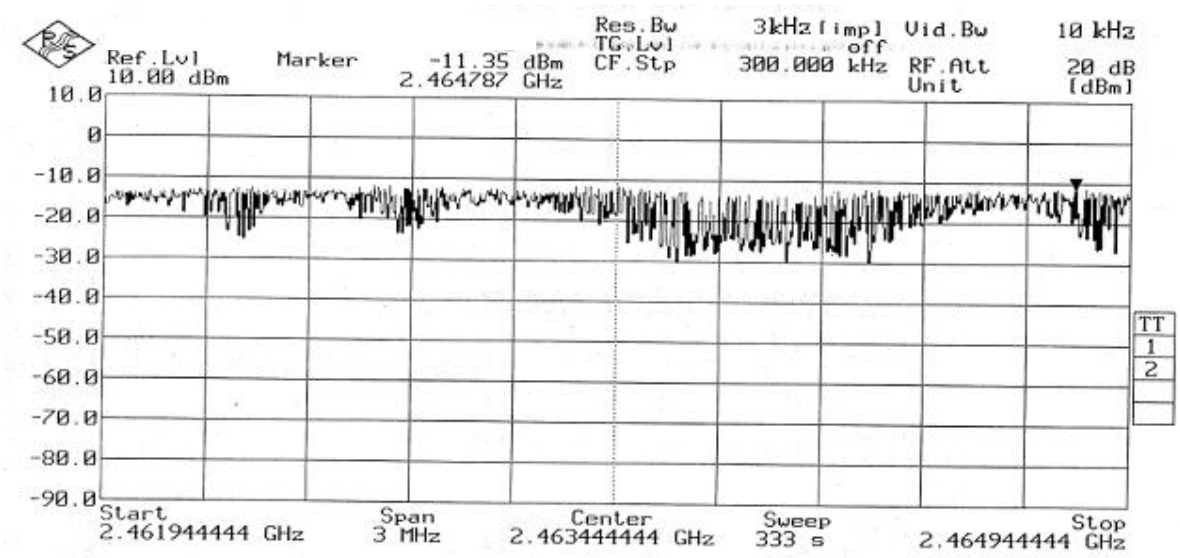


Plot 19 – Channel 0



Plot 20 – Channel 1

Peak Power Spectral Density Plots



Plot 21 – Channel 2

MAXIMUM PERMISSIBLE EXPOSURE (MPE) TEST

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 Computation

The power density at 20cm distance was computed from the following formula:

$S = (30GP) / (377d^2)$

where S = Power density in W/m^2
P = 0.038W
d = Test distance at 0.2m
G = Numerical isotropic gain, 1.6 (2.0dBi)

Substituting the relevant parameters into the formula:

$S = \sqrt{[(30GP) / 377d^2]}$
$= 0.3462 W/m^2$
$= 0.0347 mW/cm^2$

∴ The power density of the EUT at 20cm distance is $0.0347 mW/cm^2$ based on the above computation and found to be lower thant the power density limit of $1.0 mW/cm^2$.

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, this report shall contain only technical results carried out by TÜV SÜD PSB. 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 TÜV SÜD PSB approves, recommends or endorses the manufacturer, supplier or user of such product/equipment, or that TÜV SÜD PSB in any way "guarantees" the later performance of the product/equipment. Unless otherwise stated in this report, no tests were conducted to determine long term effects of using the specific product/equipment.

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

March 2010

ANNEX A

EUT PHOTOGRAPHS / DIAGRAMS

PSB Singapore

EUT PHOTOGRAPHS / DIAGRAMS ANNEX A

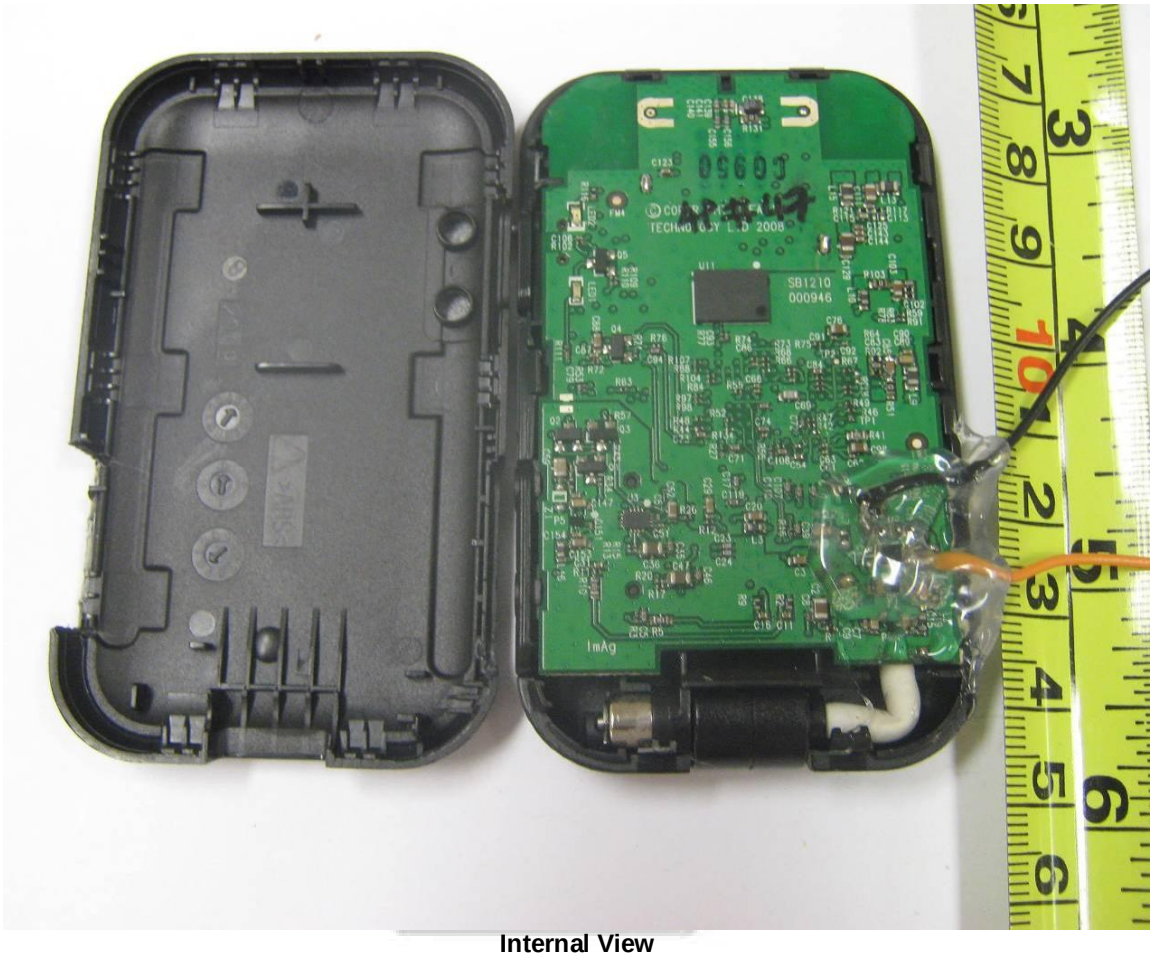
EUT PHOTOGRAPHS

Front View

Rear View

EUT PHOTOGRAPHS / DIAGRAMS — ANNEX A

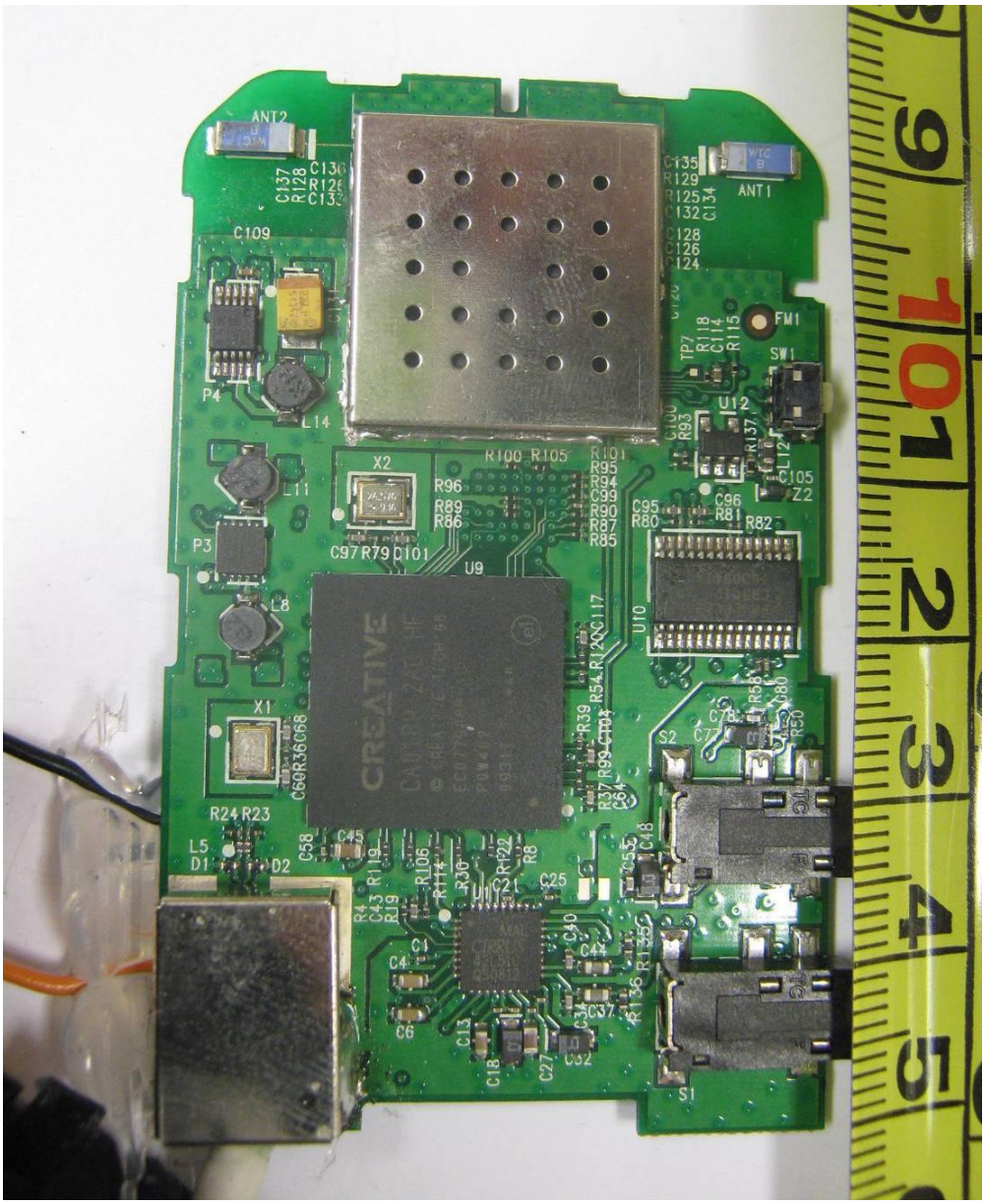
EUT PHOTOGRAPHS



Internal View

EUT PHOTOGRAPHS / DIAGRAMS — ANNEX A

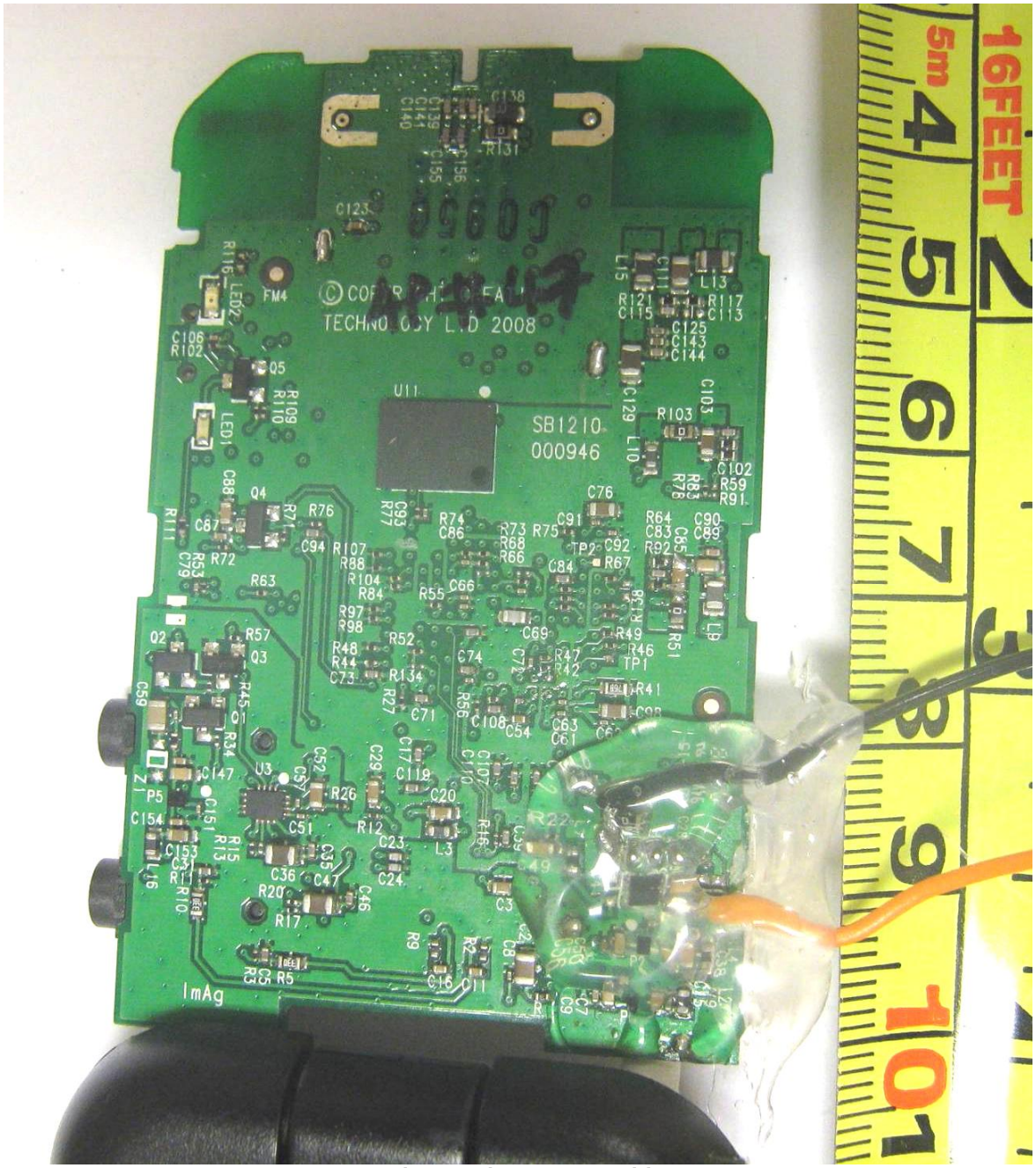
EUT PHOTOGRAPHS



Main-Board PCB Component Side

EUT PHOTOGRAPHS / DIAGRAMS — ANNEX A

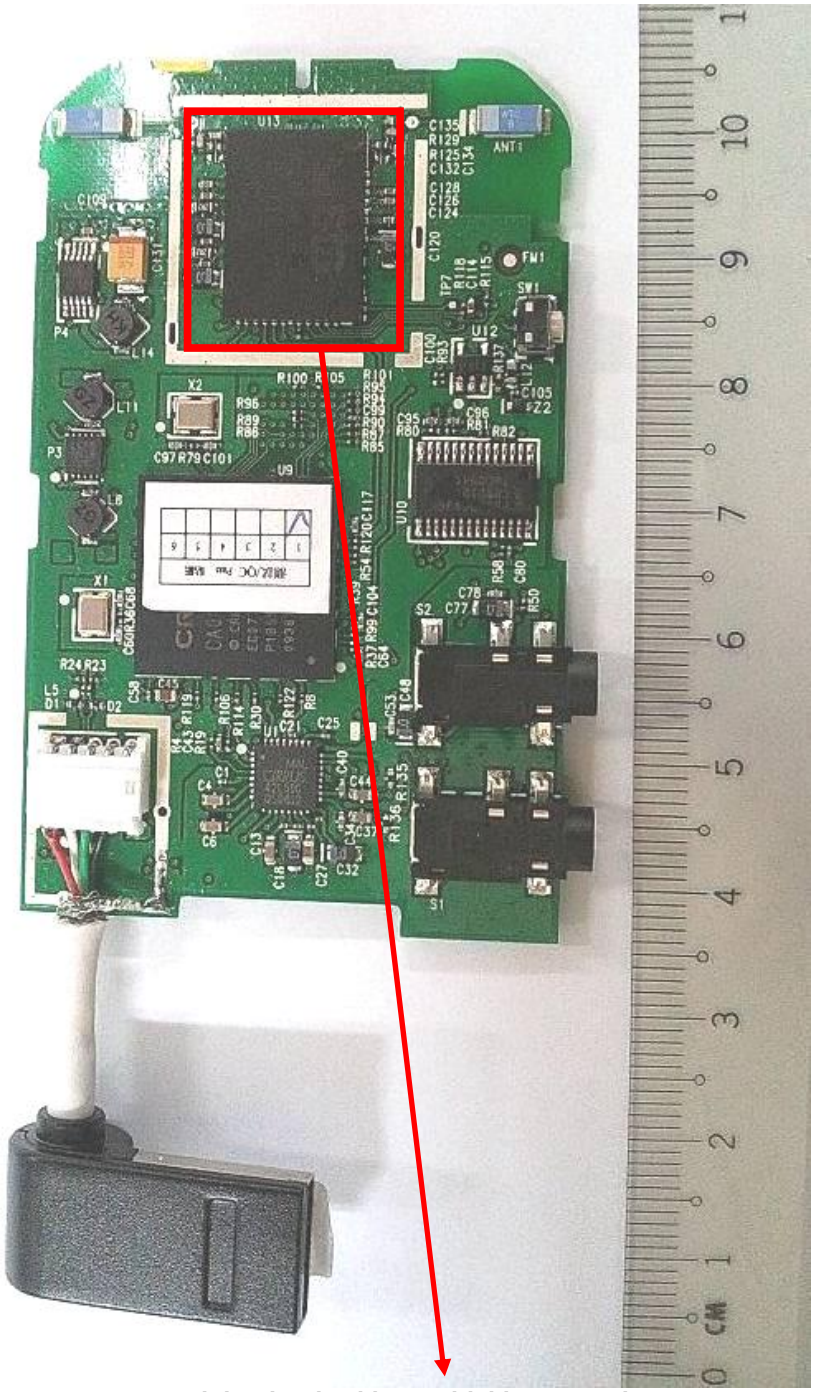
EUT PHOTOGRAPHS



Main-Board PCB Trace Side

EUT PHOTOGRAPHS / DIAGRAMS — ANNEX A

EUT PHOTOGRAPHS



RF Module Circuit with RF Shield Removed

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.

Sample Label & Physical Location of FCC Label on EUT

USER MANUAL TECHINCAL DESCRIPTION BLOCK & CIRCUIT DIAGRAM **ANNEX C**

ANNEX C

USER MANUAL TECHNICAL DESCRIPTION BLOCK & CIRCUIT DIAGRAMS

(Please refer to manufacturer for details)