

TEST REPORT

Reference No...... : WTS14S0513856E
FCC ID : 2ACH5-PD001
Applicant..... : Poindus Systems Corp.
Address..... : 5F, No.59, Ln.77, xing-Ai Rd., NeiHu District, Taipei City 114, Taiwan
Manufacturer : Shenzhen Kente Science & Technology Co.,Ltd.
Address..... : Rm ABC ,15F ,BTower, Xuesong Building, Tairan6th Rd, Tairan
Industrial & Trading Park, Futian, Shenzhen, China
Product Name..... : Varipad
Model No..... : PD001
Standards..... : FCC CFR47 Part 22 Subpart H:2012
FCC CFR47 Part 24 Subpart E:2012
Date of Receipt sample : May 09, 2014
Date of Test : May 14~Jun.06, 2014
Date of Issue..... : Jun.23, 2014
Test Result..... : **Pass ***

***Remarks:**

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:

Waltek Services (Shenzhen) Co., Ltd.

Address: 1/F., Fukangtai Building, West Baima Road, Songgang Street, Baoan District, Shenzhen,
Guangdong, China

Testing location: The same as above

Tel :+86-755-83551033

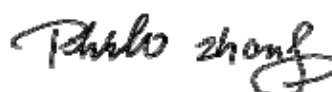
Fax:+86-755-83552400

Compiled by:

Approved by:



Zero Zhou / Project Engineer



Philo Zhong / Manager

2 Test Summary

Test Items	Test Requirement	Result
RF Output Power	2.1046 22.913 (a) 24.232 (c)	PASS
Bandwidth	2.1049 22.905 22.917 24.238	PASS
Spurious Emissions at Antenna Terminal	2.1051 22.917 (a) 24.238 (a)	PASS
Field Strength of Spurious Radiation	2.1053 22.917 (a) 24.238 (a)	PASS
Out of band emission, Band Edge	22.917 (a) 24.238 (a)	PASS
Frequency Stability	2.1055 22.355 24.235	PASS
Maximum Permissible Exposure (SAR)	1.1307 2.1093	PASS

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4 General Information

4.1 General Description of E.U.T.

Product Name	: Varipad
Model No.	: PD001
Model Difference	: N/A
GSM Band(s)	: GSM 850/900/1800/1900MHz
GPRS/EGPRS Class	: 12
WCDMA Band(s)	: FDD Band I
Wi-Fi Specification	: 802.11b/g/n HT20/n HT40
Bluetooth Version	: Bluetooth v4.0 with BLE
GPS	: Support
NFC	: N/A

4.2 Details of E.U.T.

Operation Frequency	: GSM 850: 824~849MHz PCS 1900: 1850~1910MHz WiFi: 802.11b/g/n HT20:2412-2462MHz 802.11n HT40:2422-2452MHz Bluetooth: 2402-2480MHz GPS:1.57GHz
Max. RF output power	: GSM 850: 32.64dBm PCS1900: 30.43dBm WiFi:9.8dBm Bluetooth:2.09dBm
Type of Modulation	: GSM,GPRS:GMSK EDGE: 8PSK WiFi: CCK, OFDM Bluetooth: GFSK, Pi/4 DQPSK,8DPSK
Antenna installation	: GSM/WCDMA:internal permanent antenna WiFi/Bluetooth: internal permanent antenna
Antenna Gain	: GSM 850: 0dBi PCS1900: 0dBi WiFi: 0dBi Bluetooth: 0dBi

Technical Data : (1)DC 5V, 2000mA by Adapter
 (Adapter Input: AC 100-240V, 50/60Hz, 0.5A)
 (2)DC 5V for USB charging
 (3)DC 3.7V by Battery

Adapter : SHENZHENG JUKE ELECTRONICS CO.,LTD
 M/N: JK050200-S04EUA

4.3 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

penning full test, the worst data were recorded and reported.

Support Band	Test Mode	Channel Frequency	Channel Number
GSM 850	GSM/GPRS/EDGE	824.2 MHz	128
		836.6 MHz	190
		848.8 MHz	251
PCS 1900	GSM/GPRS/EDGE	1850.2 MHz	512
		1880.0 MHz	661
		1909.8 MHz	810

Remark: All mode(s) were tested and the worst data was recorded.

4.4 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 7760A-1**

Waltek Services(Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration 7760A-1, July 12, 2012.

- **FCC – Registration No.: 880581**

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, April 29, 2014.

5 Equipment Used during Test

5.1 Equipments List

RF Conducted Test						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	EMC Analyzer	R&S	ESCI	101155	Sep.18,2013	Sep.17,2014
2	Universal Radio Communication Tester	R&S	CMU 200	112461	Apr.11,2014	Apr.10,2015
3	Humidity Chamber	GF	GTH-225-40-1P	IAA061213	May 15,2014	May 14,2015
3m Semi-anechoic Chamber for Radiated Emissions						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	EMC Analyzer	Agilent	E7405A	MY45114943	Sep.18,2013	Sep.17,2014
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Sep.18,2013	Sep.17,2014
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr.20,2013	Apr.19,2014
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.18,2013	Sep.17,2014
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr.20,2013	Apr.19,2014
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	669	Apr.20,2013	Apr.19,2014
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Apr.07,2013	Apr.06,2014
8	Coaxial Cable (above 1GHz)	Top	1000MHZ-25GHZ	EW02014-7	Apr.20,2013	Apr.19,2014
9	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Apr.20,2013	Apr.19,2014
10	Universal Radio Communication Tester	R&S	CMU 200	112461	Apr.11,2014	Apr.10,2015
11	Signal Generator	R&S	SMR20	100046	Apr.11,2014	Apr.10,2015

5.2 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-6}$
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (Bilog antenna 30M~1000MHz)
	± 5.47 dB (Horn antenna 1000M~25000MHz)
Conducted Spurious Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)

5.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

6 RF OUTPUT POWER

Test Requirement:	FCC Part 2.1046,22.913 (a),24.232 (c)
Test Method:	ANSI C63.4:2003, TIA/EIA-603-D:2010
Test Mode:	Transmitting

6.1 EUT Operation

Operating Environment :

Temperature:	22.5 °C
Humidity:	52.1 % RH
Atmospheric Pressure:	101.2kPa

6.2 Test Procedure

Conducted method:

The RF output of the transmitter was connected to the wireless test set and the spectrum analyzer through sufficient attenuation.



Radiated method:

1. The setup of EUT is according with per TIA/EIA Standard 603D:2010 and ANSI C63.4-2003 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

6.3 Test Result

Conducted Power

Cellular Band (Part 22H)

Test Mode	Channel	Frequency (MHz)	Peak Output Power(dBm)	Limit (dBm)
GSM 850	128	824.2	32.64	38.45
	190	836.6	32.54	38.45
	251	848.8	32.51	38.45

Test Mode	Channel	Frequency (MHz)	Peak Output Power(dBm)				Limit(dBm)
			Slot 1	Slot 2	Slot 3	Slot 4	
GPRS	128	824.2	32.63	31.69	29.88	28.98	38.45
	190	836.6	32.52	31.6	29.8	28.9	38.45
	251	848.8	32.49	31.59	29.82	28.93	38.45

Test Mode	Channel	Frequency (MHz)	Peak Output Power(dBm)				Limit(dBm)
			Slot 1	Slot 2	Slot 3	Slot 4	
EDGE	128	824.2	27.21	25.94	23.74	22.33	38.45
	190	836.6	27.08	25.85	23.62	22.21	38.45
	251	848.8	26.99	25.7	23.44	22.05	38.45

Cellular Band (Part 24E)

Test Mode	Channel	Frequency (MHz)	Peak Output Power(dBm)	Limit (dBm)
PCS 1900	512	1850.2	30.2	33
	661	1880.0	30.43	33
	810	1909.8	30.37	33

Test Mode	Channel	Frequency (MHz)	Peak Output Power(dBm)				Limit(dBm)
			Slot 1	Slot 2	Slot 3	Slot 4	
GPRS	512	1850.2	30.2	29.2	27.38	26.52	33
	661	1880.0	30.41	29.44	27.64	26.76	33
	810	1909.8	30.33	29.38	27.56	26.74	33

Test Mode	Channel	Frequency (MHz)	Peak Output Power(dBm)				Limit(dBm)
			Slot 1	Slot 2	Slot 3	Slot 4	
EDGE	512	1850.2	26.66	25.34	22.78	21.44	33
	661	1880.0	26.36	24.96	22.41	21.07	33
	810	1909.8	26.06	24.66	22.1	20.71	33

Radiated Power(Measured at max. conducted power channel)

ERP and EIRP

Cellular Band (Part 22H)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	FCC Part 22H/24E	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
GSM 850 Channel190										
824.2	99.00	303	1.5	H	31.90	0.20	0.00	31.70	38.45	-6.75
824.2	95.26	346	1.8	V	27.92	0.20	0.00	27.72	38.45	-10.73
GPRS Channel190										
824.2	98.32	195	1.9	V	31.22	0.27	0.00	30.95	38.45	-7.50
824.2	94.18	250	1.4	H	26.84	0.35	0.00	26.49	38.45	-11.96
EDGE Channel190										
824.2	91.35	230	1.1	V	24.25	0.27	0.00	23.98	38.45	-14.47
824.2	86.17	276	1.2	H	18.83	0.35	0.00	18.48	38.45	-19.97

Cellular Band (Part 24E)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	FCC Part 22H/24E	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
PCS 1900 Channel512										
1880.0	95.12	92	1.1	H	19.93	0.31	10.40	30.02	33	-2.98
1880.0	88.36	152	1.4	V	13.87	0.31	10.40	23.96	33	-9.04
GPRS Channel512										
1880.0	94.27	130	2.0	H	19.08	0.31	10.40	29.17	33	-3.83
1880.0	87.89	254	1.0	V	13.40	0.31	10.40	23.49	33	-9.51
EDGE Channel512										
1880.0	87.26	150	1.7	H	12.07	0.31	10.40	22.16	33	-10.84
1880.0	81.12	307	1.8	V	6.63	0.31	10.40	16.72	33	-16.28

7 BANDWIDTH

Test Requirement:	FCC Part 2.1049,22.917,22.905,24.238
Test Method:	ANSI C63.4:2003, TIA/EIA-603-D:2010
Test Mode:	Transmitting

7.1 EUT Operation

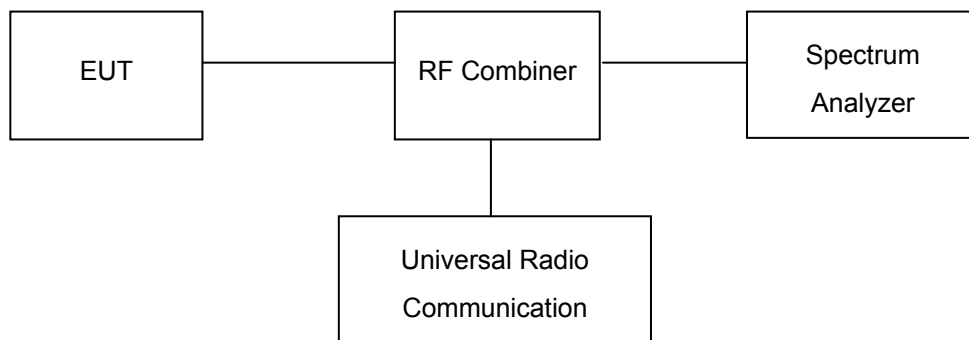
Operating Environment :

Temperature:	22.5 °C
Humidity:	52.3% RH
Atmospheric Pressure:	101.2kPa

7.2 Test Procedure

The RF output of the transmitter was connected to the wireless test set and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 3 kHz (Cellular /PCS) and the 26 dB & 99%bandwidth was recorded.



7.3 Test Result

Cellular Band (Part 22H)

Test Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth(kHz)	26 dB Emission Bandwidth(kHz)
GSM 850	190	836.6	245.509	319.400
GPRS	190	836.6	243.513	315.400
EDGE	190	836.6	247.505	315.400

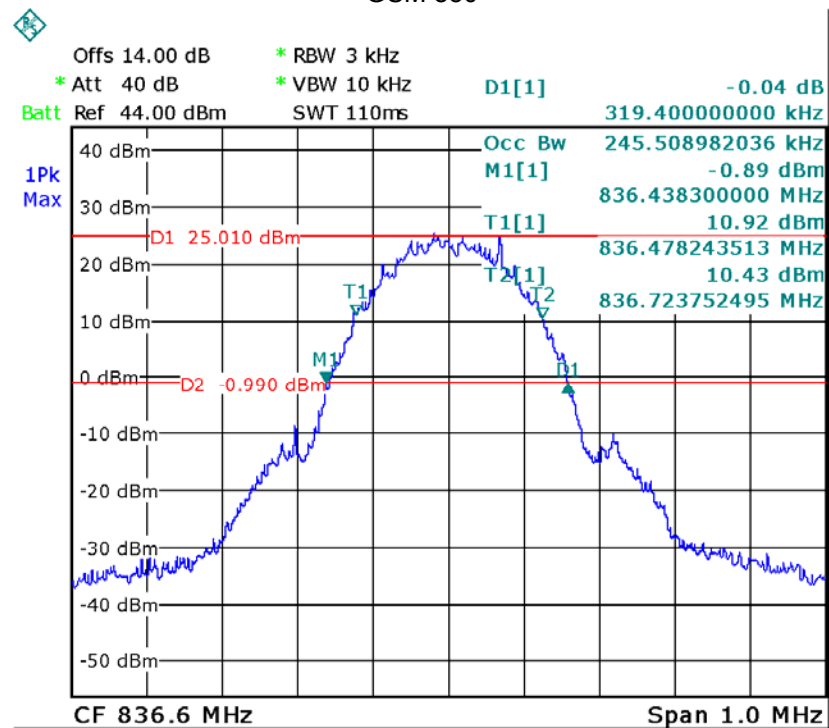
Cellular Band (Part 24E)

Test Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth(kHz)	26 dB Emission Bandwidth(kHz)
PCS 1900	661	1880.0	245.509	315.400
GPRS	661	1880.0	243.513	313.400
EDGE	661	1880.0	249.501	317.400

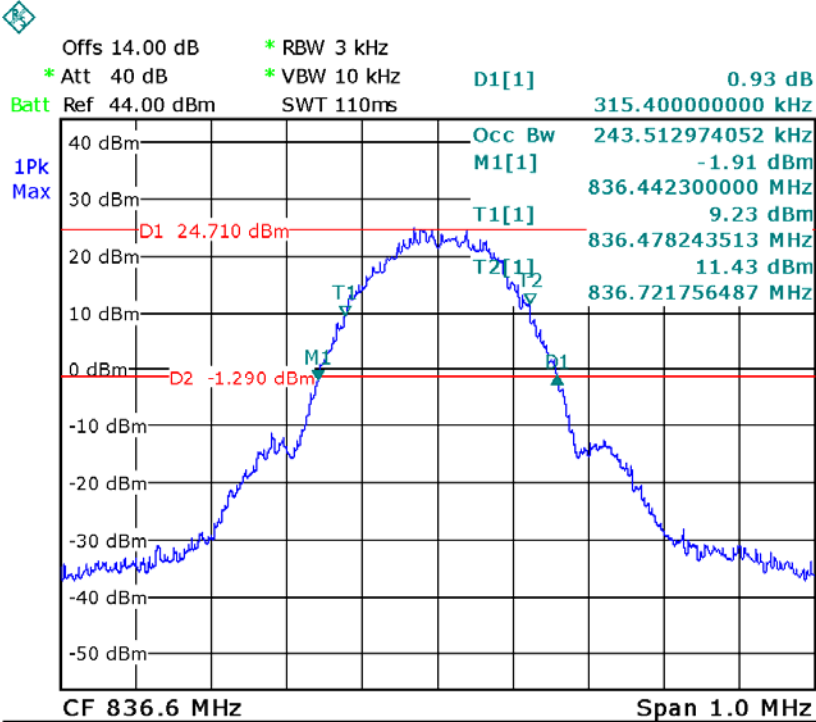
Test Plots

Cellular Band (Part 22H)

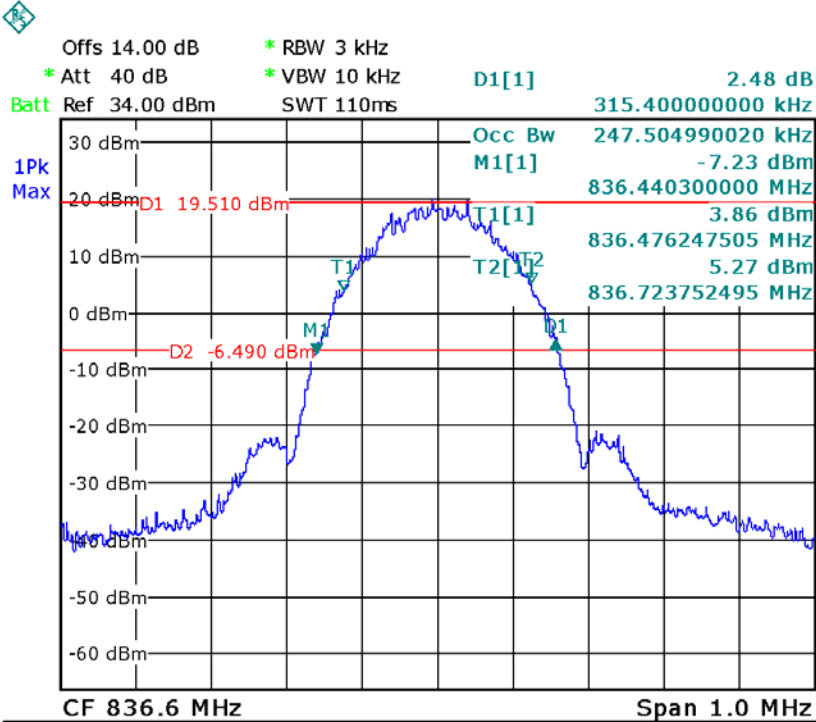
GSM 850



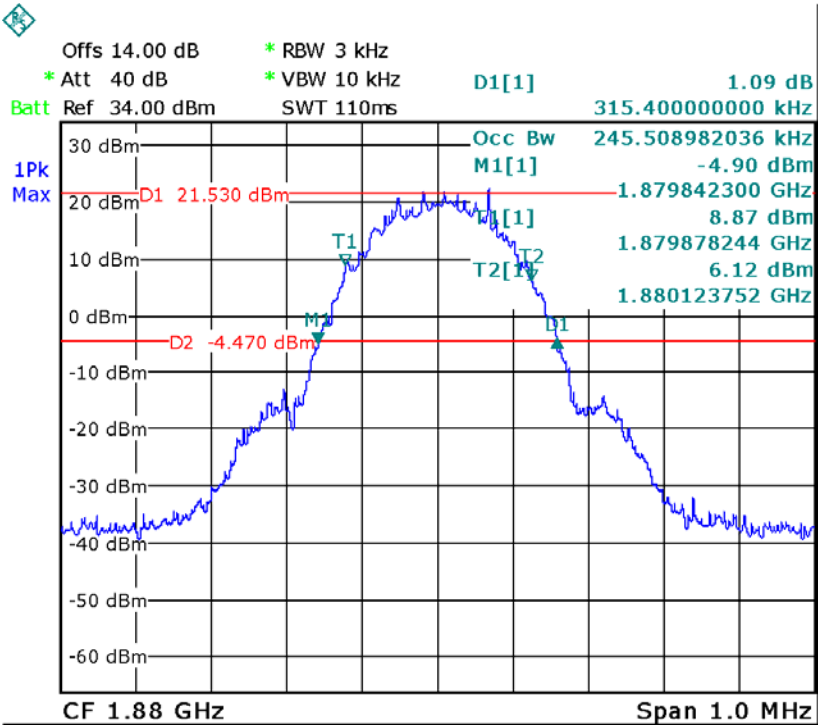
GPRS



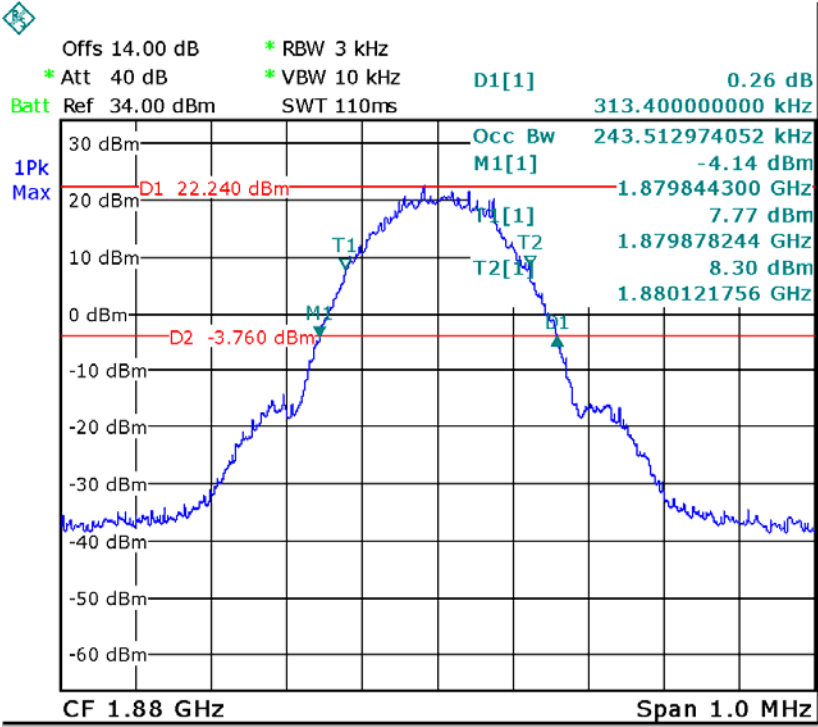
EDGE

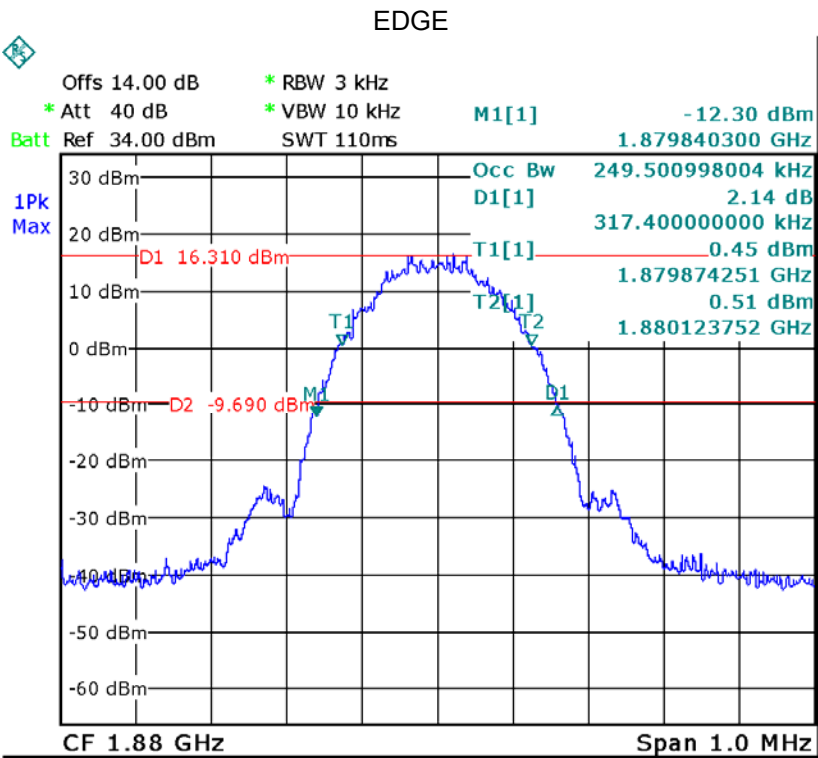


Cellular Band (Part 24E)
PCS 1900



GPRS





8 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Test Requirement:	FCC Part 2.1051,22.917(a),24.238(a)
Test Method:	ANSI C63.4:2003, TIA/EIA-603-D:2010
Test Mode:	Transmitting

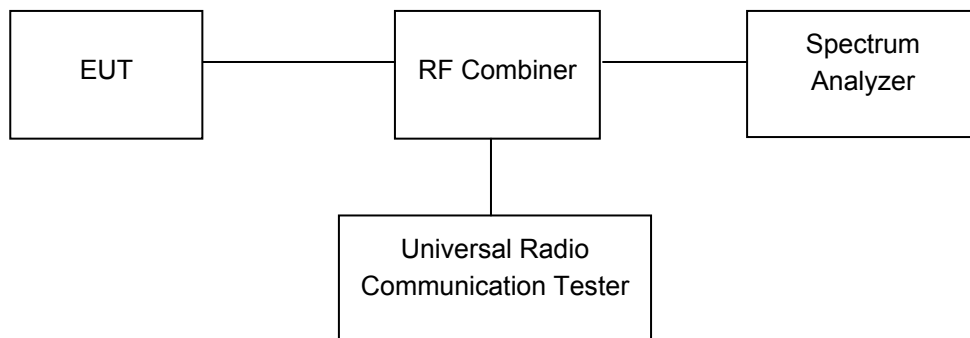
8.1 EUT Operation

Operating Environment :

Temperature:	23.5 °C
Humidity:	52.1 % RH
Atmospheric Pressure:	101.3kPa

8.2 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonics.



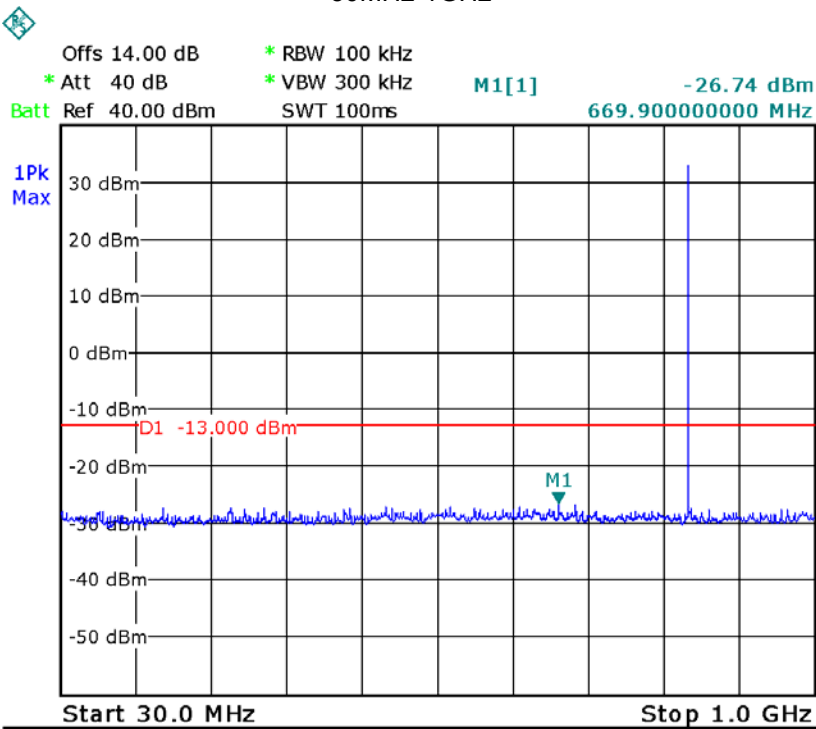
8.3 Test Result

Remark: only the worst data were recorded.

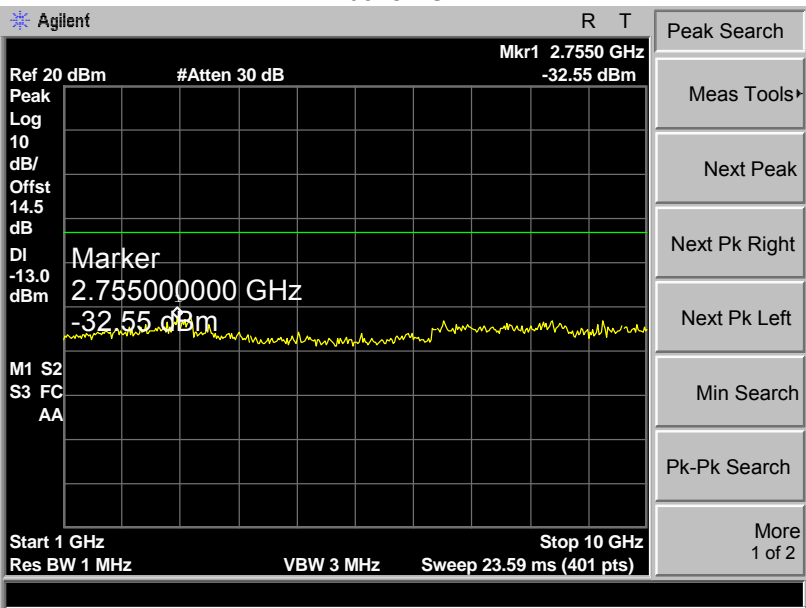
Cellular Band (Part 22H)

GSM 850

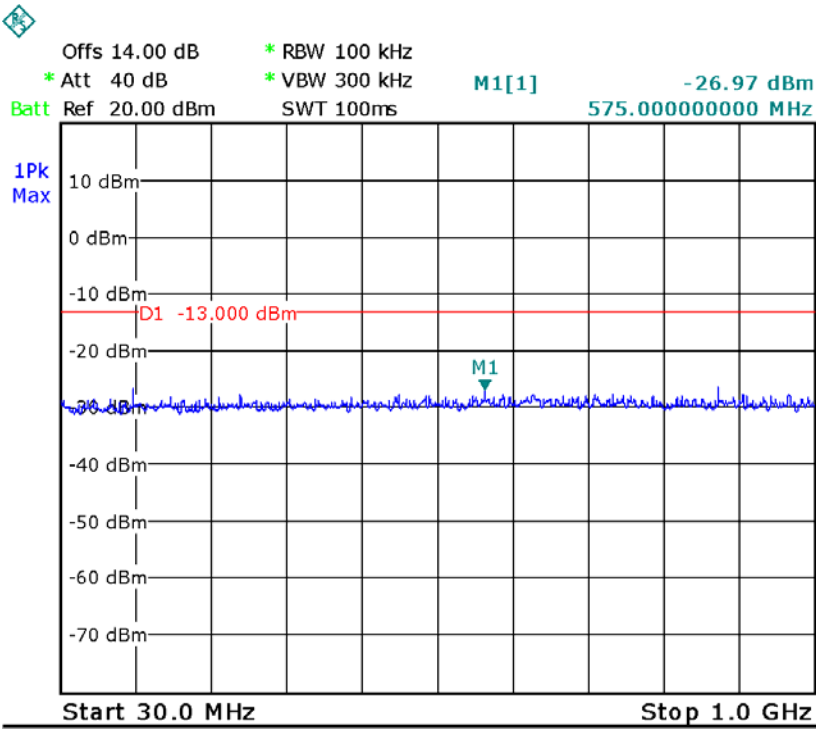
30MHz-1GHz



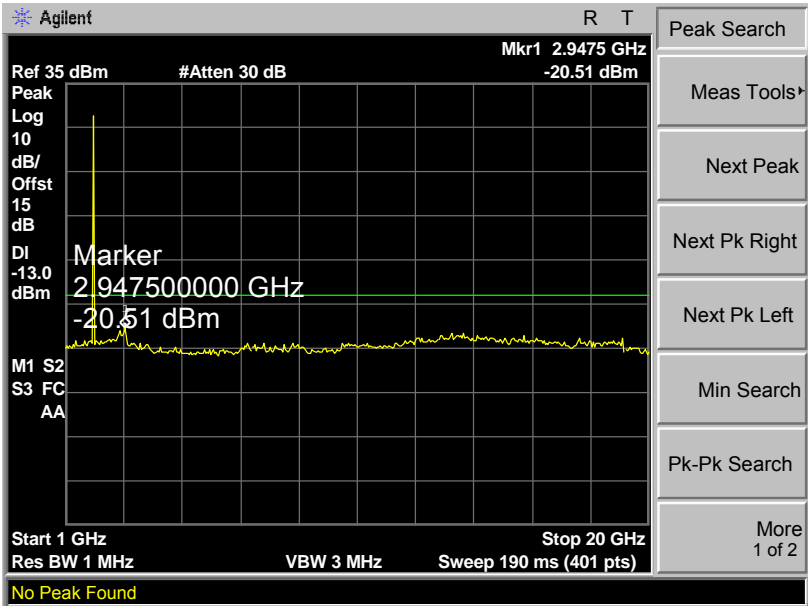
Above 1GHz



Cellular Band (Part 24E)
PCS 1900
30MHz-1GHz



Above 1GHz



9 SPURIOUS RADIATED EMISSIONS

Test Requirement:	FCC Part 2.1053,22.917,24.238.
Test Method:	ANSI C63.4:2003, TIA/EIA-603-D:2010
Test Mode:	Transmitting

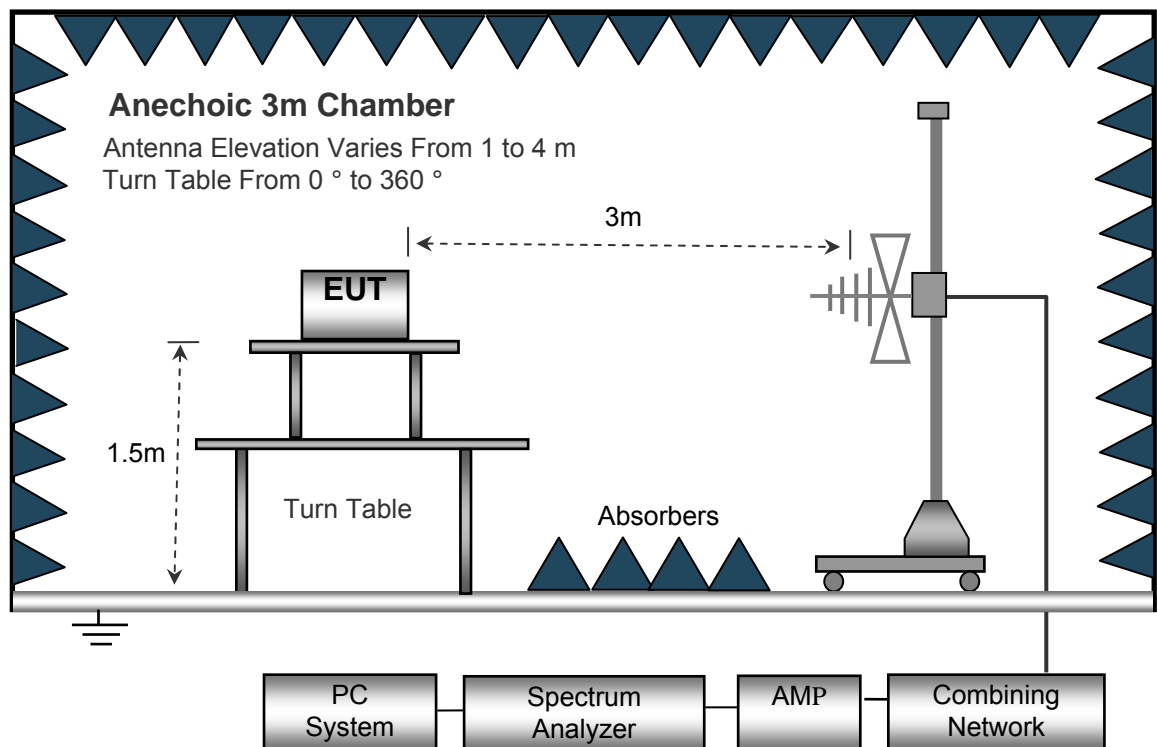
9.1 EUT Operation

Operating Environment :

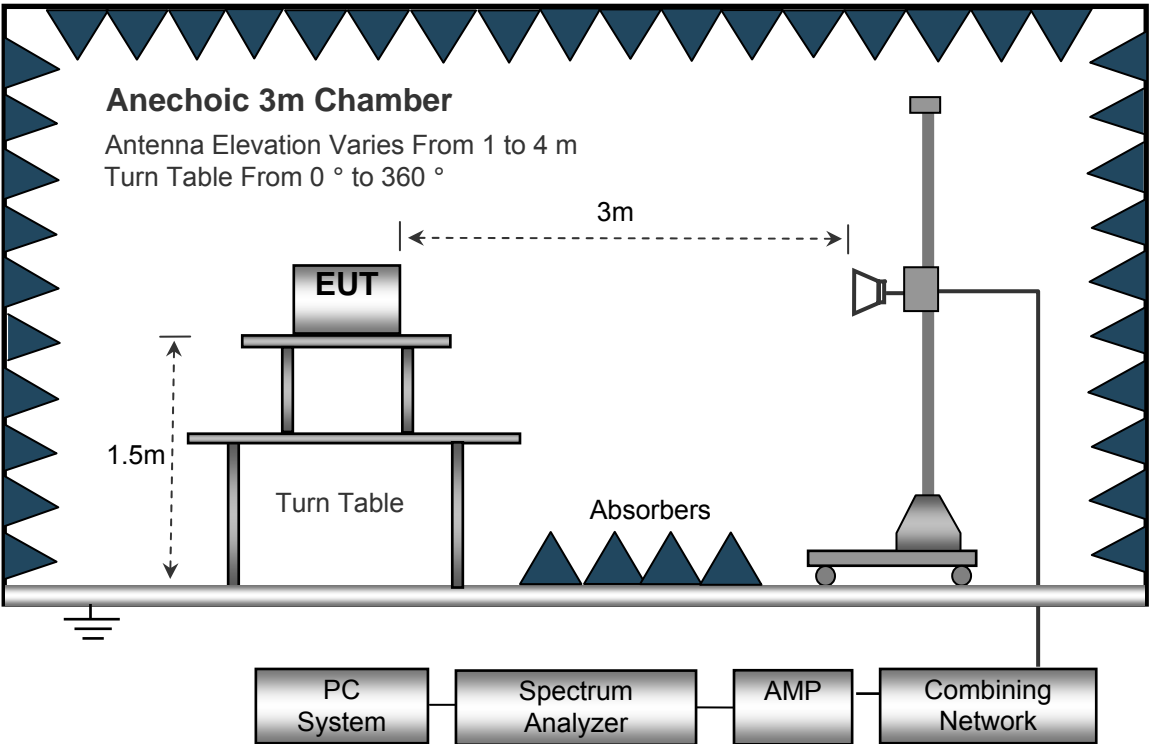
Temperature:	23.5 °C
Humidity:	52.1 % RH
Atmospheric Pressure:	101.2kPa

9.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4: 2003.
The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



9.3 Spectrum Analyzer Setup

30MHz ~ 1GHz

- Sweep Speed Auto
- Detector PK
- Resolution Bandwidth..... 100kHz
- Video Bandwidth..... 300kHz

Above 1GHz

- Sweep Speed Auto
- Detector PK
- Resolution Bandwidth..... 1MHz
- Video Bandwidth..... 3MHz
- Detector Ave.
- Resolution Bandwidth..... 1MHz
- Video Bandwidth..... 10Hz

9.4 Test Procedure

1. The EUT is placed on a turntable, which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from 30MHz up to the tenth harmonic of the highest fundamental frequency.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.
7. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = $10 \lg (\text{TXpwr in Watts}/0.001)$ – the absolute level
Spurious attenuation limit in dB = $43 + 10 \lg (\text{power out in Watts})$
8. Repeat above procedures until the measurements for all frequencies are completed.

9.5 Summary of Test Results

Remark: Test performed from 30MHz to 10th harmonics with low/middle/high channels, only the worst data were recorded.

Cellular Band (Part 22H)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Result	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
GSM 850 Channel190										
356.3	32.21	173	1.7	H	-70.29	0.20	0.00	-70.49	-13	-57.49
356.3	30.33	43	1.1	V	-71.87	0.20	0.00	-72.07	-13	-59.07
1648.4	45.12	312	1.4	H	-69.63	0.30	9.40	-60.53	-13	-47.53
1648.4	44.39	236	1.0	V	-70.14	0.30	9.40	-61.04	-13	-48.04
2472.6	41.06	263	2.0	H	-73.64	0.43	10.60	-63.47	-13	-50.47
2472.6	40.68	224	1.4	V	-70.39	0.43	10.60	-60.22	-13	-47.22

Cellular Band (Part 24E)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Result	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
PCS 1900 Channel512										
356.3	32.68	155	1.5	H	-69.82	0.20	0.00	-70.02	-13	-57.02
356.3	30.89	118	1.2	V	-71.31	0.20	0.00	-71.51	-13	-58.51
3760.0	44.22	136	1.5	H	-66.90	2.42	12.60	-56.72	-13	-43.72
3760.0	43.81	310	1.0	V	-65.79	2.42	12.60	-55.61	-13	-42.61
5640.0	40.36	342	1.7	H	-68.76	2.87	12.90	-58.73	-13	-45.73
5640.0	39.18	135	2.0	V	-69.48	2.87	12.90	-59.45	-13	-46.45

Note:

1) Absolute Level = SG Level - Cable loss + Antenna Gain

2) Margin = Limit- Absolute Level

10 Band Edge Measurement

Test Requirement:	FCC Part 2.1051,22.917(a),24.238(a)
Test Method:	ANSI C63.4:2003, TIA/EIA-603-D:2010
Test Mode:	Transmitting

10.1 EUT Operation

Operating Environment :

Temperature:	23.5 °C
Humidity:	52.3 % RH
Atmospheric Pressure:	101.3kPa

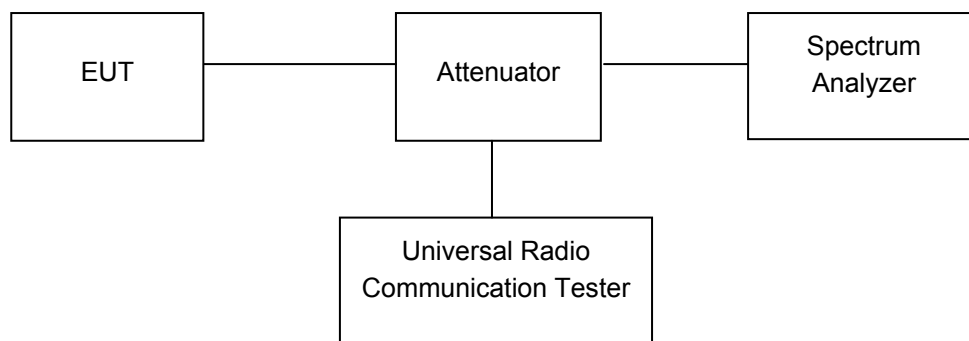
10.2 Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

According to FCC Part 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to FCC Part 24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

The center of the spectrum analyzer was set to block edge frequency



10.3 Test Result

Cellular Band (Part 22H)

Test Mode	Frequency(MHz)	Emission(dBm)	Limit(dBm)
GSM 850	823.998	-14.21	-13
	849.022	-13.94	-13

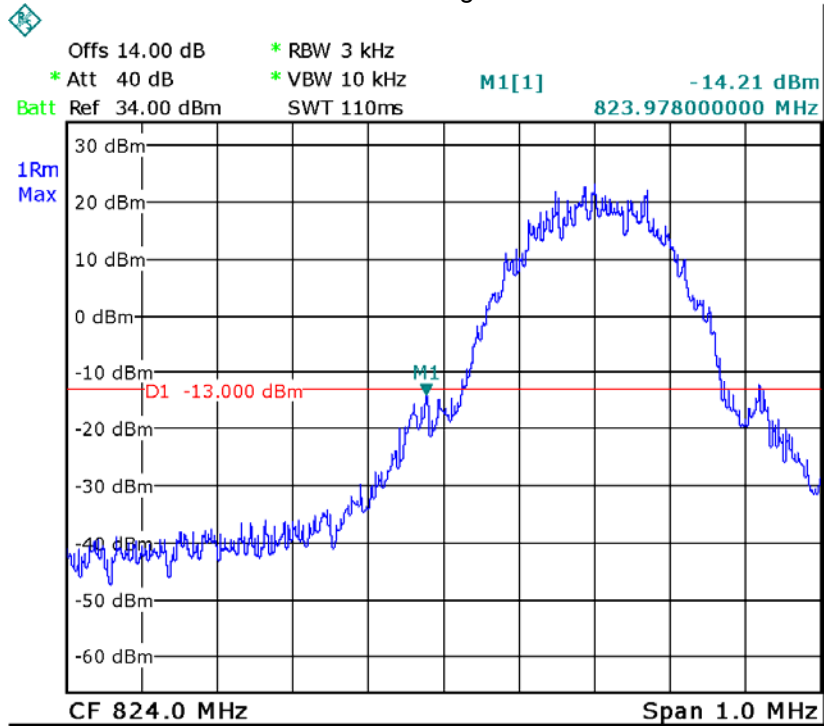
Cellular Band (Part 24E)

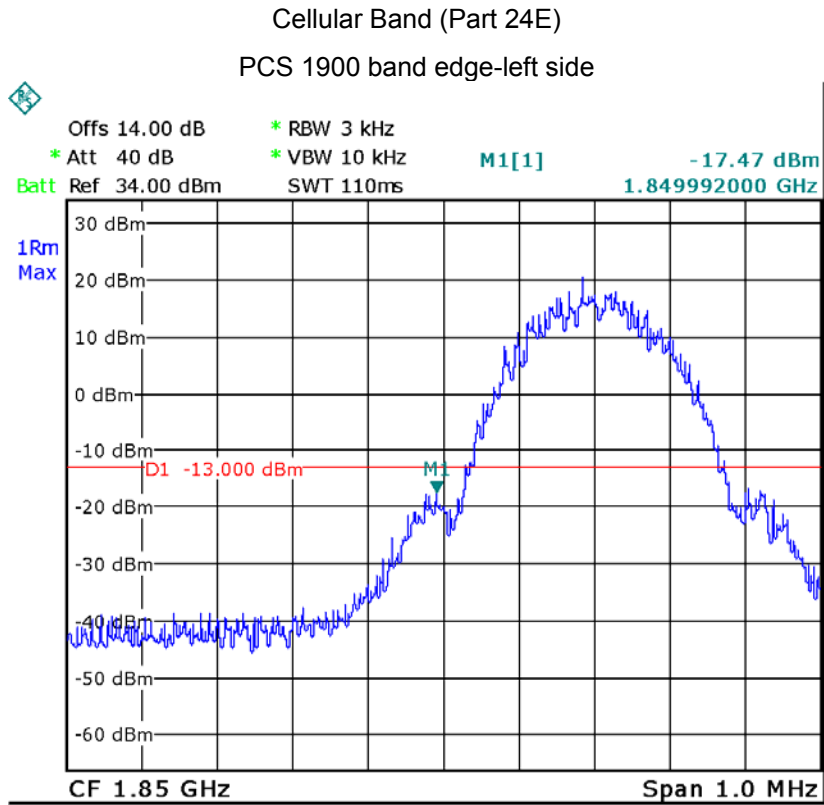
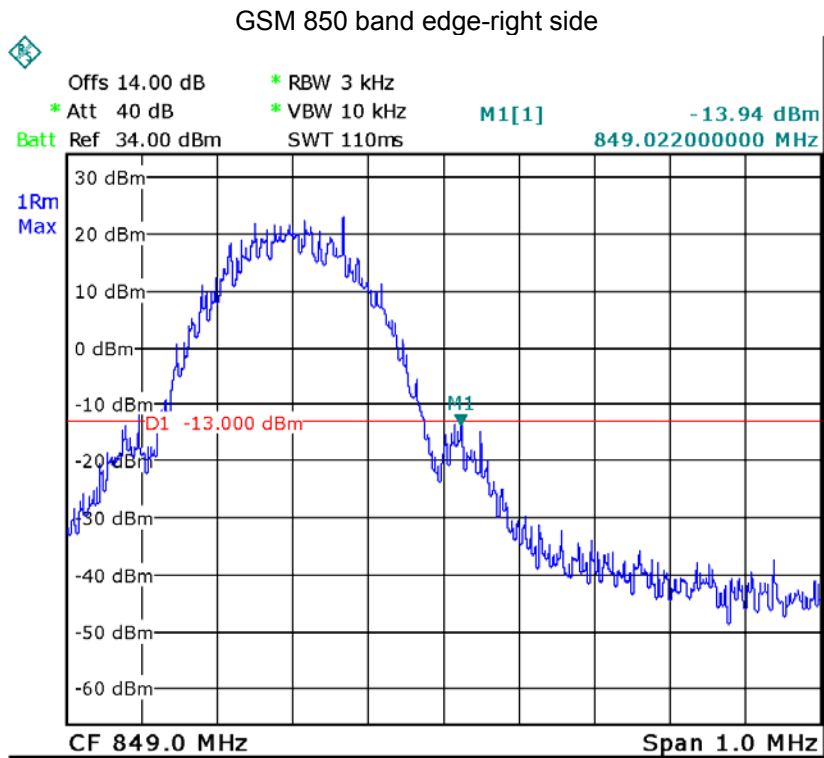
Test Mode	Frequency(MHz)	Emission(dBm)	Limit(dBm)
PCS 1900	1849.998	-17.47	-13
	1910.018	-16.39	-13

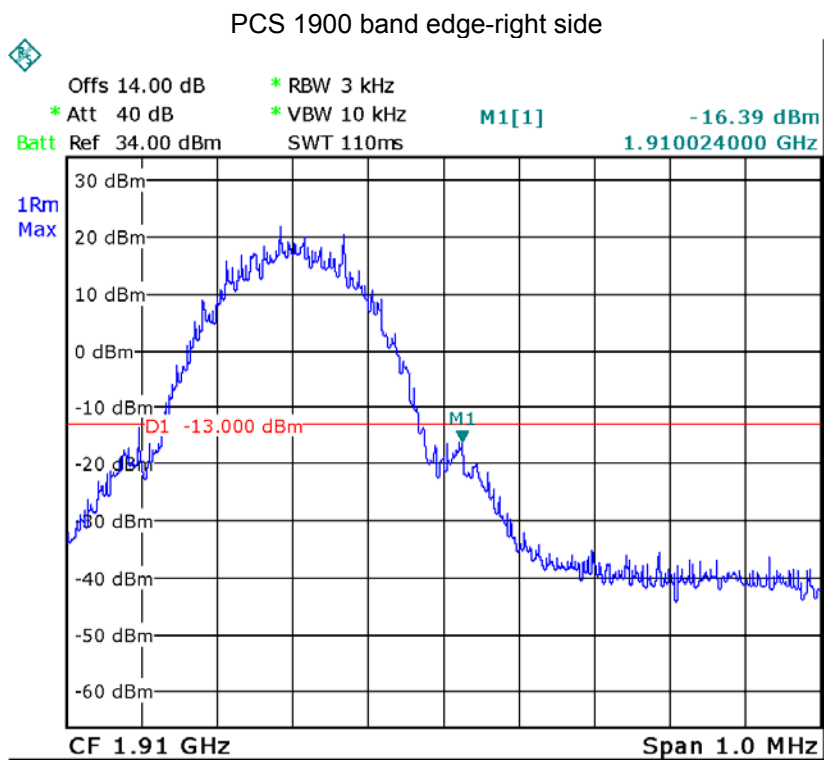
Test plots

Cellular Band (Part 22H)

GSM 850 band edge-left side







11 FREQUENCY STABILITY

Test Requirement:	FCC Part 2.1055,22.355,24.235
Test Method:	ANSI C63.4:2003, TIA/EIA-603-D:2010
Test Mode:	Transmitting

11.1 EUT Operation

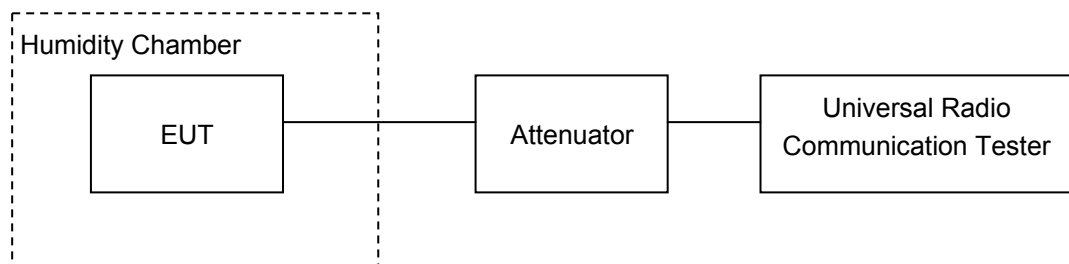
Operating Environment :	
Temperature:	22.9 °C
Humidity:	52.0 % RH
Atmospheric Pressure:	101.3kPa

11.2 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



11.3 Test Result

Cellular Band (Part 22H)

GSM 850 Test Frequency:836.6MHz				
Temperature ()	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	6	0.00717	2.5
40		10	0.01195	2.5
30		8	0.00956	2.5
20		11	0.01315	2.5
10		5	0.00598	2.5
0		7	0.00837	2.5
-10		6	0.00717	2.5
-20		4	0.00478	2.5
-30		3	0.00359	2.5
20	3.3	7	0.00837	2.5
20	4.2	8	0.00956	2.5

PCS Band (Part 24E)

PCS 1900 Test Frequency:1880.0MHz				
Temperature ()	Power Supply (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	29	0.01543	2.5
40		25	0.01330	2.5
30		22	0.01170	2.5
20		22	0.01170	2.5
10		21	0.01117	2.5
0		18	0.00957	2.5
-10		20	0.01064	2.5
-20		21	0.01117	2.5
-30		17	0.00904	2.5
20	3.3	31	0.01649	2.5
20	4.2	25	0.01330	2.5

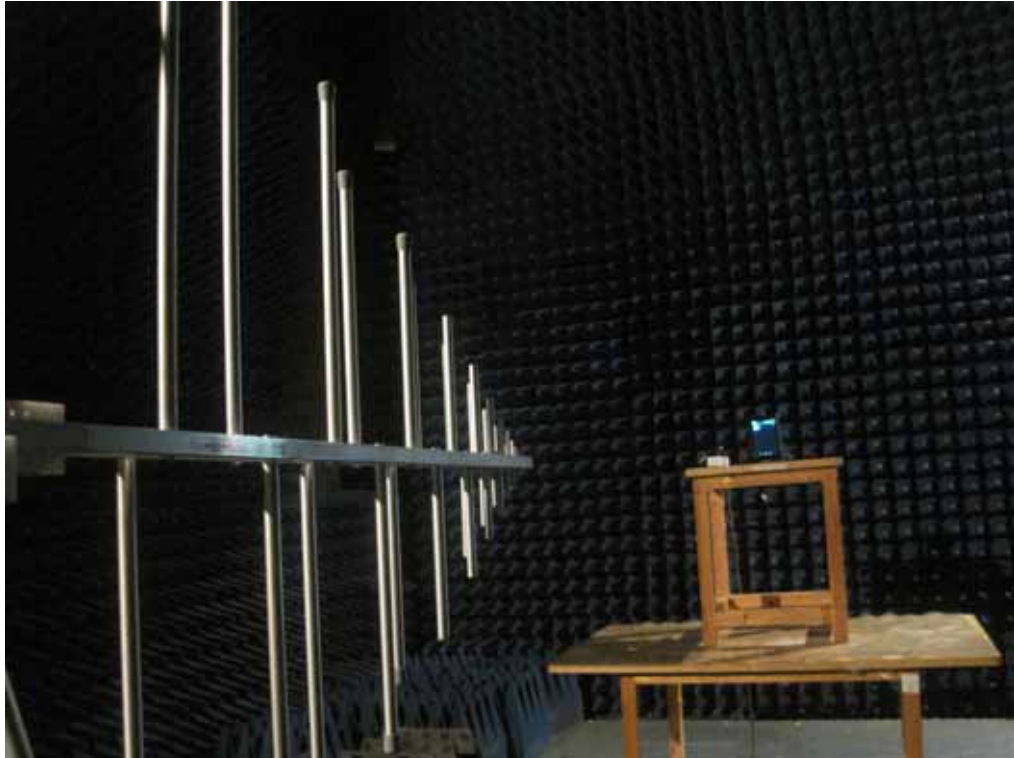
12 RF Exposure

Remark: refer to SAR test report: STR14058278H.

13 Photographs – Model PD001 Test Setup

13.1 Photograph – Radiation Spurious Emission Test Setup

30MHz-1GHz



Above 1GHz



13.2 Photograph –Humidity Chamber Test Setup



14 Photographs - Constructional Details

14.1 Model PD001 External View













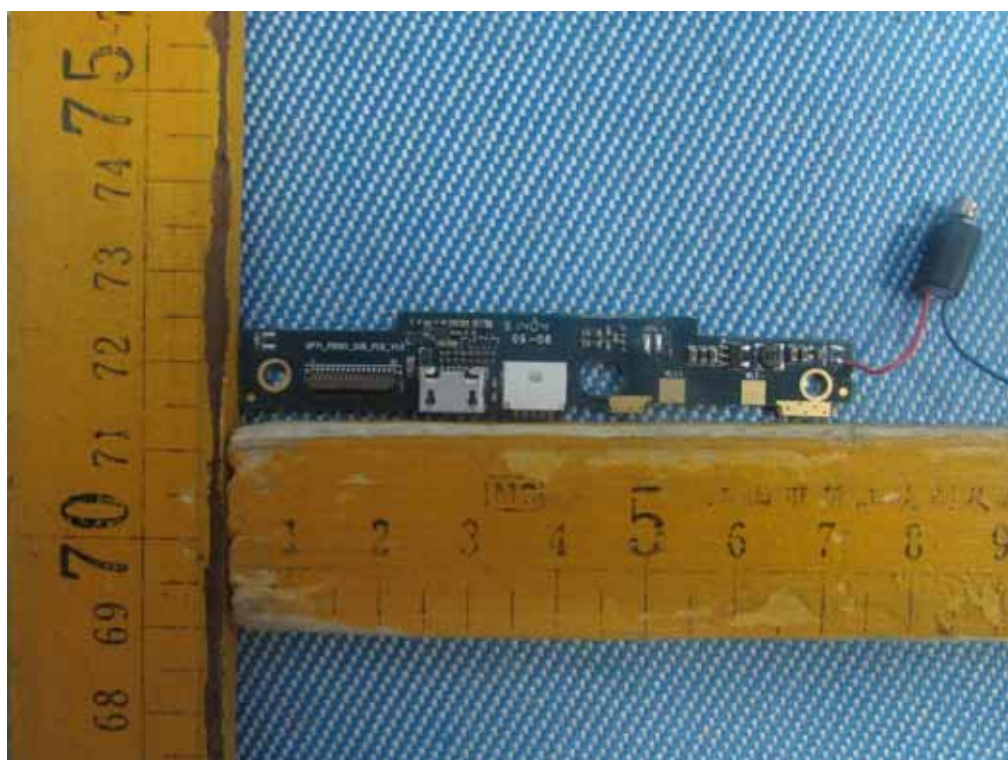
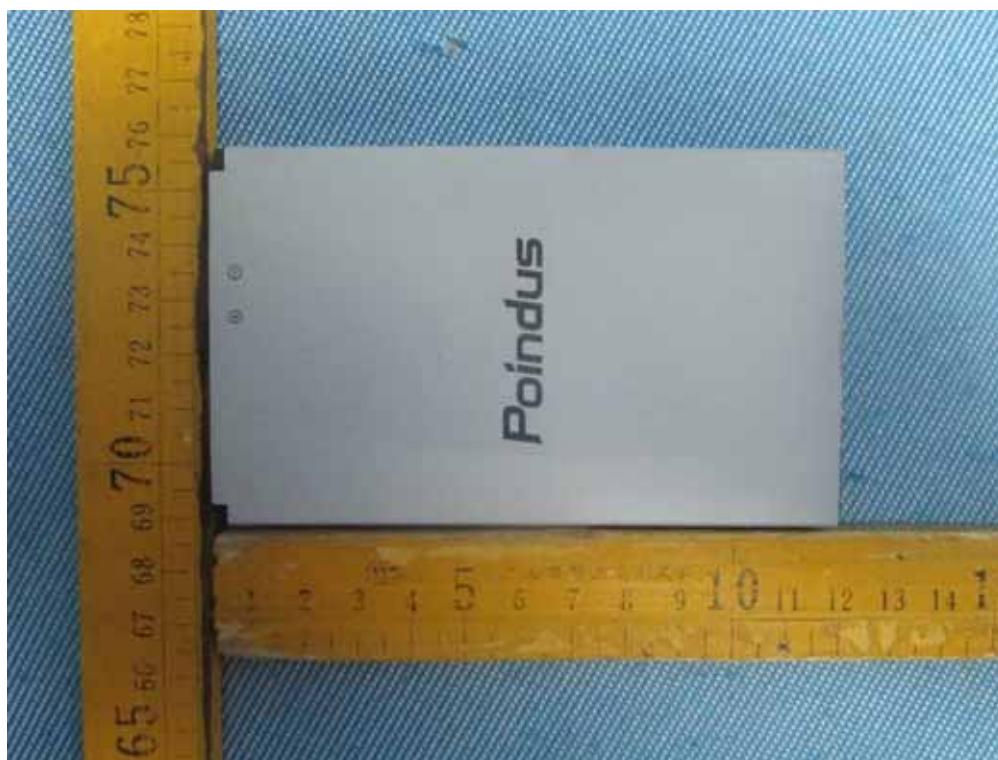


14.2 Model PD001 Internal View

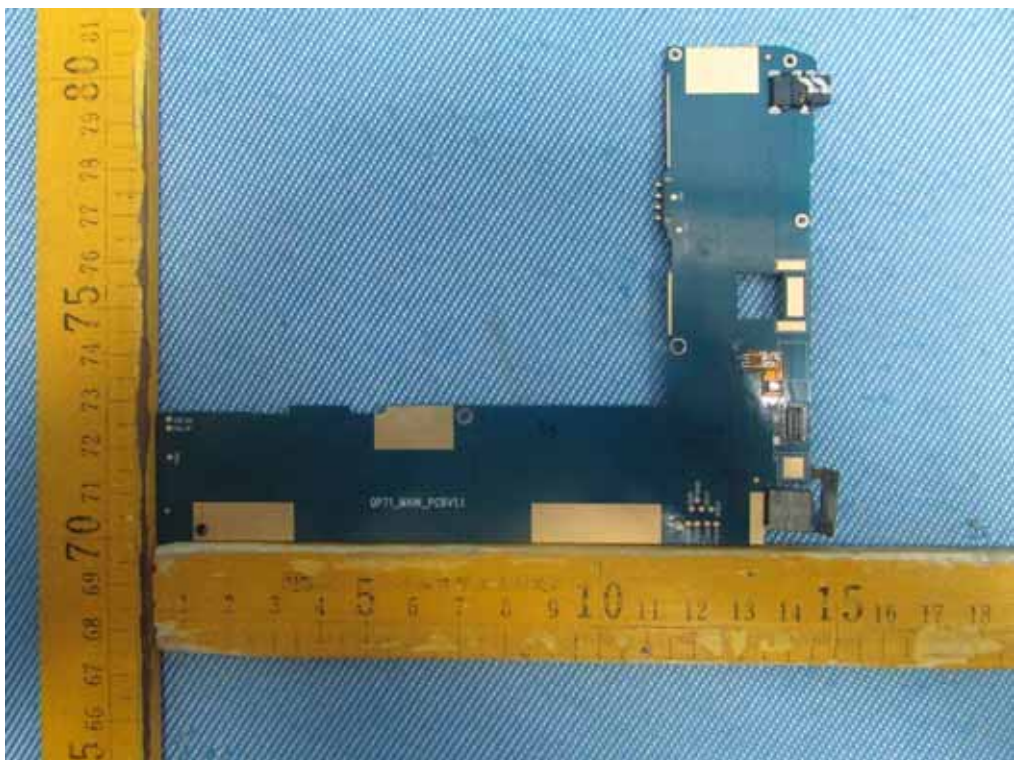
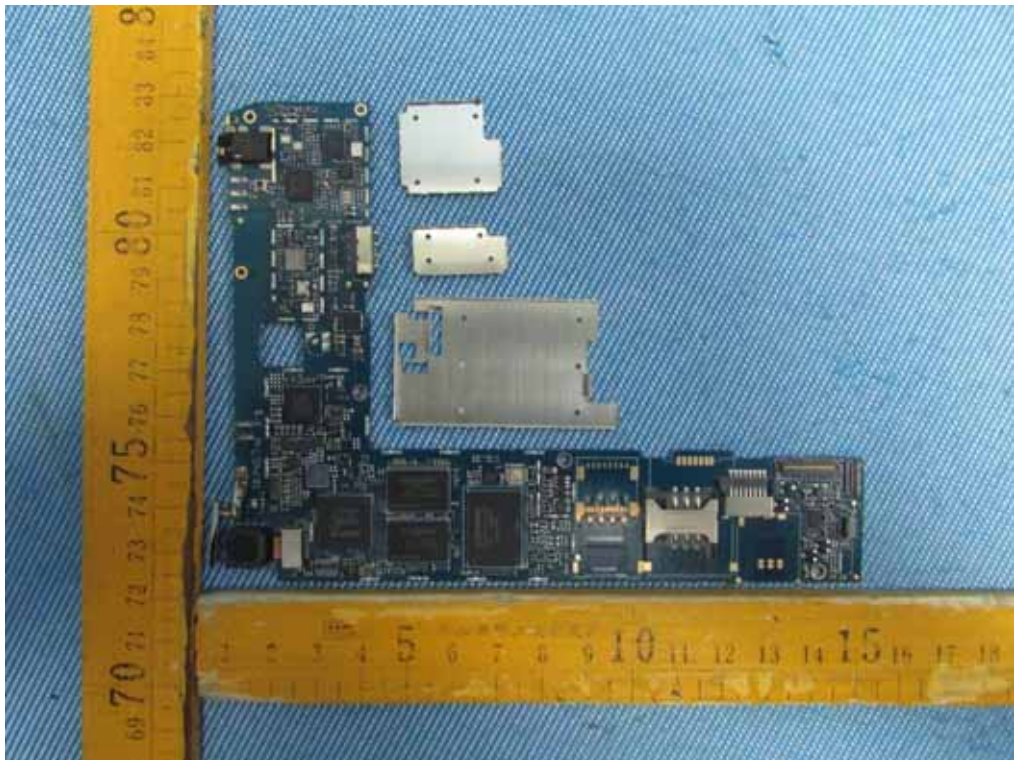












===== End of Report =====