TEST REPORT

1. Applicant

Name	: Uriver Inc
Address	: 3rd., Fl., Bogwang Bldg, Gaepo-dong, 1238-7 Gangnam-gu, Seoul, Korea

2. Products

Name	: Tri-Band GSM Mobile Phone with Bluetooth
Model/Type	: UR801, ST-1
Manufacturer	: Uriver Inc

3. Test Standard	: FCC CFR 47 Part 15, Subpart C section 15.247
4. Test Method	: ANSI C63.4-2003
5. Test Result	: Positive
6. Date of Application	: May 29, 2008
7. Date of Issue	: June 09, 2008

Tested by

Sung-kyu Cho

Telecommunication Team Engineer

Approved by

S. J. Kim

Seok-Jin Kim

Telecommunication Team Manager

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1. GENERAL INFORMATIONS

1.1. Applicant (Client)

Name	Uriver Inc
Address	3rd., Fl., Bogwang Bldg, Gaepo-dong, 1238-7 Gangnam-gu, Seoul, Korea
Contact Person	TSJEONG
Telephone No.	+82-2-3497-8432
Facsimile No.	+82-2-579-6624
E-mail address	tsjeong@uriver.co.kr
Manufacturer Name	Uriver Inc
Manufacturer Address	3rd., Fl., Bogwang Bldg, Gaepo-dong, 1238-7 Gangnam-gu, Seoul, Korea

1.2. Equipment (EUT)

Type of equipment	Tri-Band GSM/GPRS Mobile Phone with Bluetooth
Model Name	UR801, ST-1
FCC ID	UDTUR80
Frequency Band	2402 ~ 2480 MHz
Method / System	Frequency Hopping Spread Spectrum
Max RF Output Power	-0.6 dBm
Type of Modulation	FHSS / FSK
Number of Channels	79 channels
Antenna Gain	Max 2.9 dBi
Function Type	Transceiver
FCC Classification	FCC Part 15 Spread Spectrum Transmitter (DSS)

1.3. Testing Laboratory

Testing Place	Korea Testing Labortory (KTL) 1271-12, Sa-Dong Sangnok-Gu, Ansan-si Gyunggi-Do , Korea
FCC registration number	408324
Industry Canada filing number	6298
Test Engineer	Sung-kyu Cho
Telephone number	+82 31 5000 132
Facsimile number	+82 31 5000 159
E-mail address	skcho@ktl.re.kr
Other Comments	-

2. SUMMARY OF TEST RESULTS

Testing performed for : Uriver Inc.

Equipment Under Test : Tri-Band GSM Mobile Phone with Bluetooth

Receipt of Test Sample : , 2008.05. 28

Test Start Date : , 2008. 05. 29

Test End Date : ,2008. 06. 09

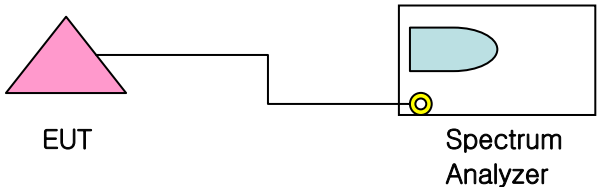
The following table represents the list of measurements required under the FCC CFR47 Part 15.207, 15.247, and 15.209

FCC Rules	Test Requirements	Result	Comments
15.247(a)(1)	20dB Bandwidth	Pass	See Data sheets
15.247(b)(1)	Maximum Peak Power	Pass	See Data sheets
15.247(d)	100 KHz Bandwidth of Frequency Band Edges	Pass	See Data sheets
15.247(a)(1)	Hopping channel separation	Pass	See Data sheets
15.247(b)(iii)	Number of hopping channels	Pass	See Data sheets
15.247(a)(1)(iii)	Dwell time	Pass	See Data sheets
15.247(d)	Conducted Spurious Emission	Pass	See Data sheets
15.209	Radiated Spurious Emissions	Pass	See Data sheets
15.207	AC line Conducted Emissions	Pass	See Data sheets

3. Measurement & Results

3.1. 20 dB Bandwidth

3.1.1. Test Setup Layout

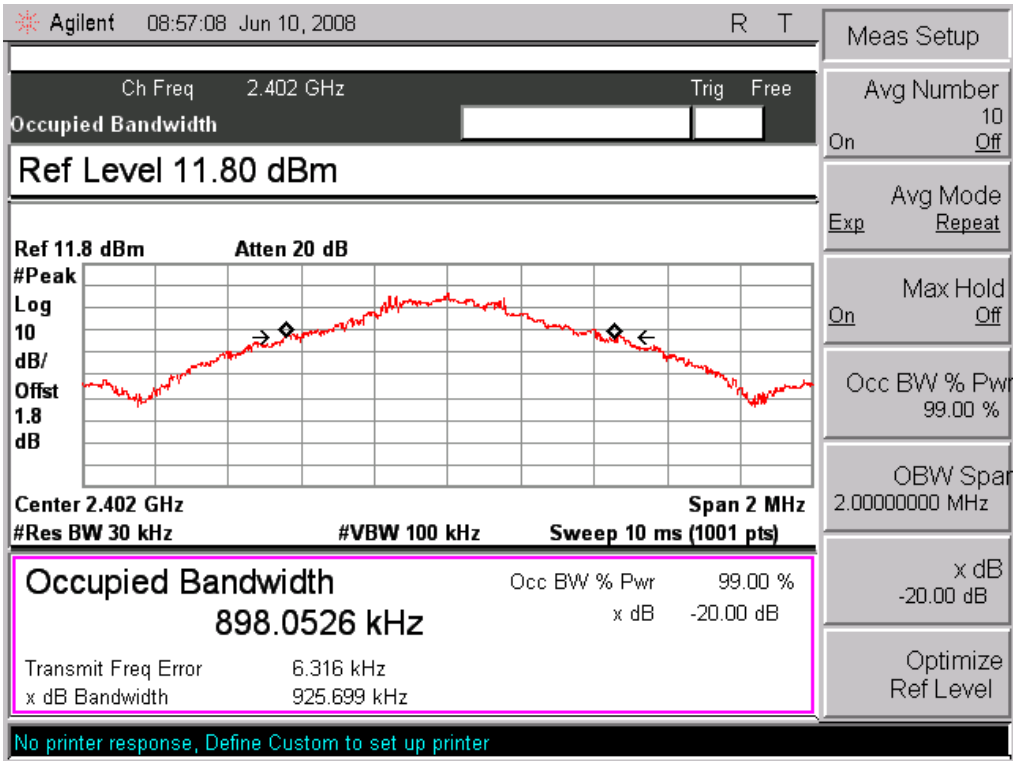


3.1.2. Test Condition

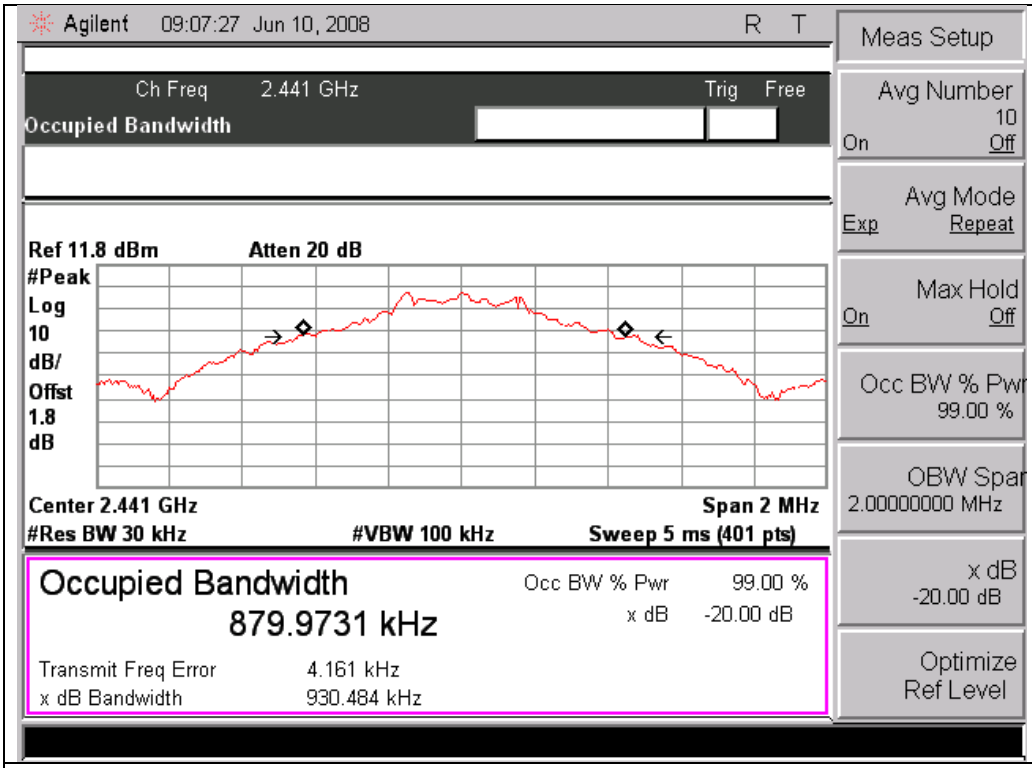
- Set RBW of Spectrum analyzer to 30 kHz
- The 20dB bandwidth is defined as the frequency range where the power is higher than the peak power minus 20dB . Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater

3.1.3. Test result

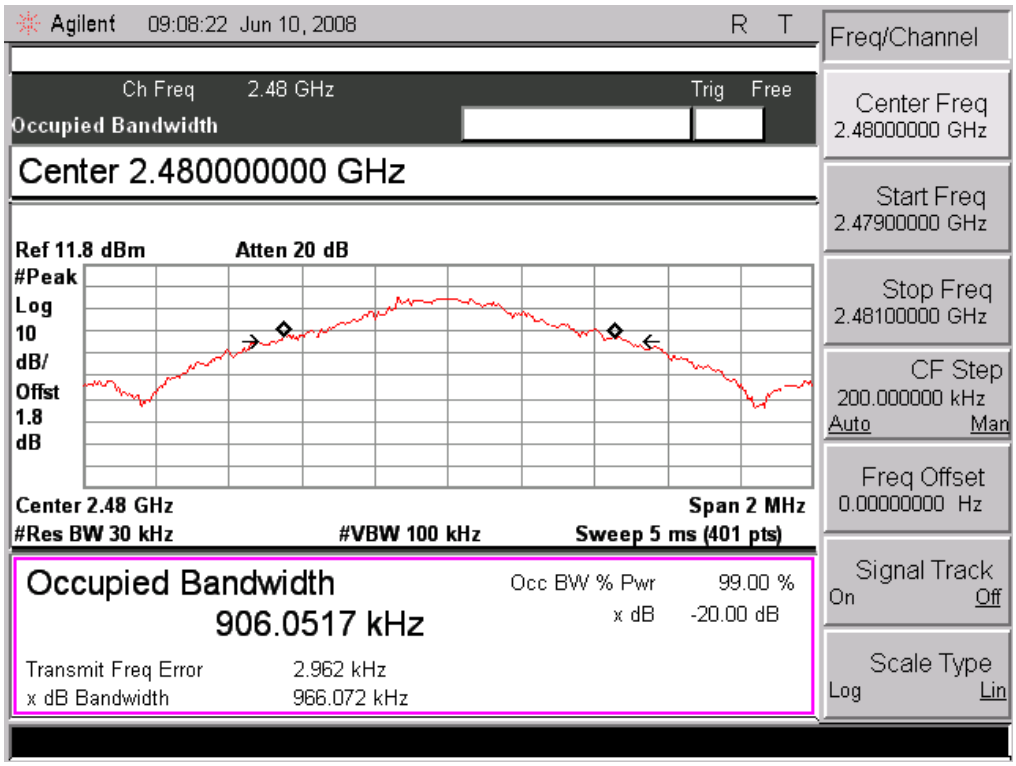
Channels	Frequency (MHz)	Result (kHz)	Verdict
0	2402	925.69	Pass
39	2441	930.48	Pass
78	2480	966.07	Pass



- Frequency 2402 CH 0 –



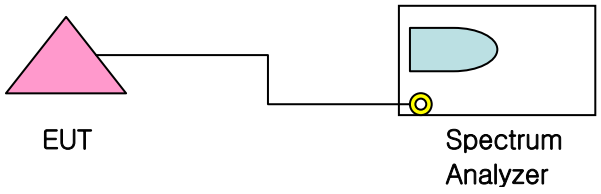
- Frequency 2441 CH 39 -



- Frequency 2480 CH 78 -

3.2. Maximum Peak Power

3.2.1. Test Setup Layout

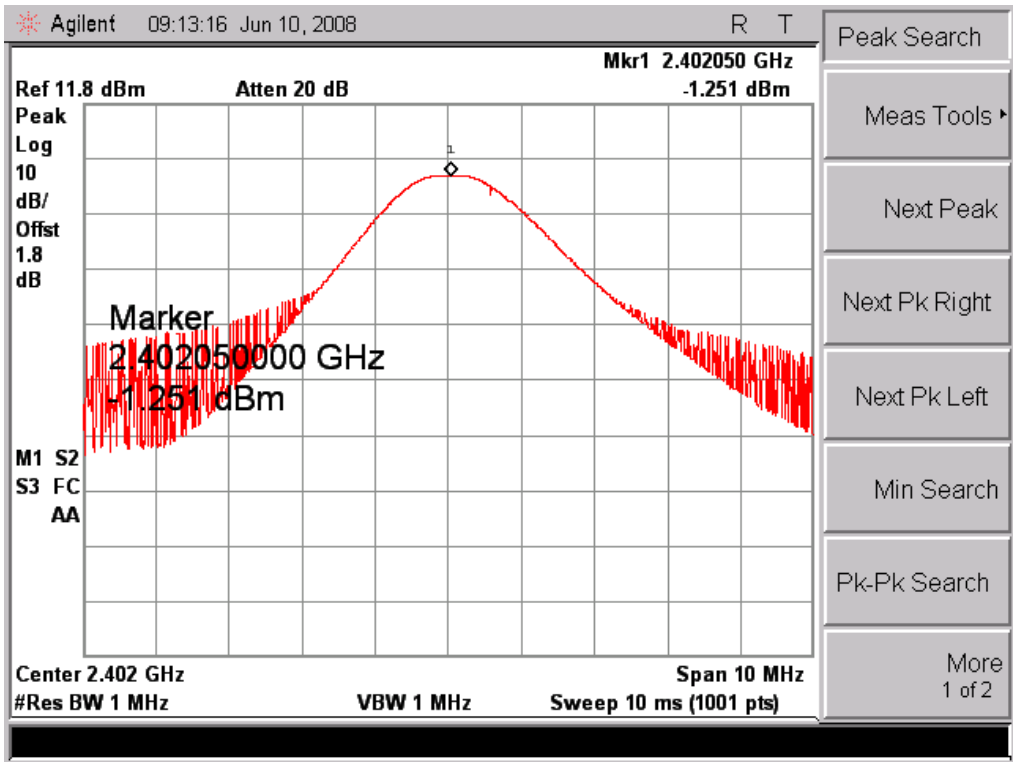


3.2.2. Test Condition

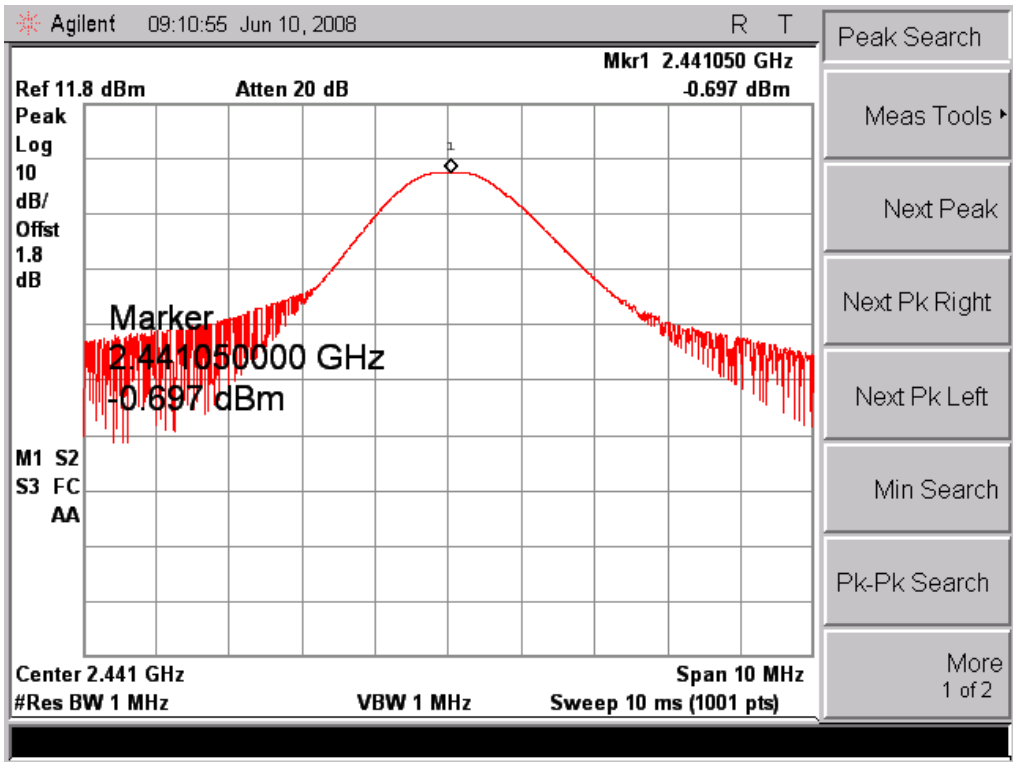
- Set RBW of Spectrum analyzer to 1 MHz
- The Maximum Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt.

3.2.3. Test result

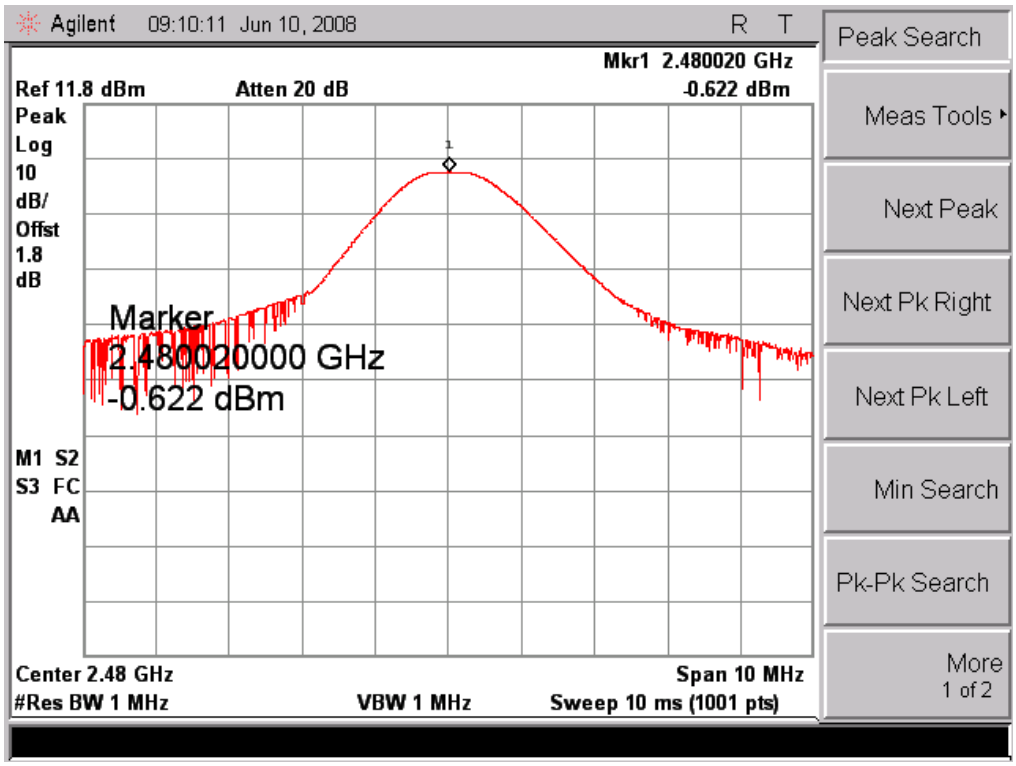
Channels	Frequency (MHz)	Result (dBm)	Limit (dBm)	Verdict
0	2402	-1.251	30	Pass
39	2441	-0.697	30	Pass
78	2480	-0.622	30	Pass



- Frequency 2402 CH 0 -



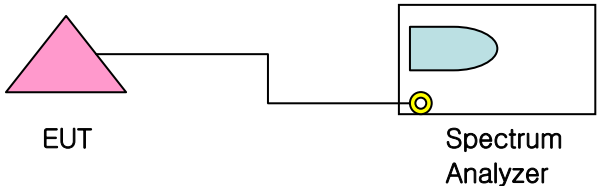
- Frequency 2441 CH 39 -



- Frequency 2480 CH 78 -

3.3.100 KHz Bandwidth of Frequency Band Edges

3.3.1. Test Setup Layout

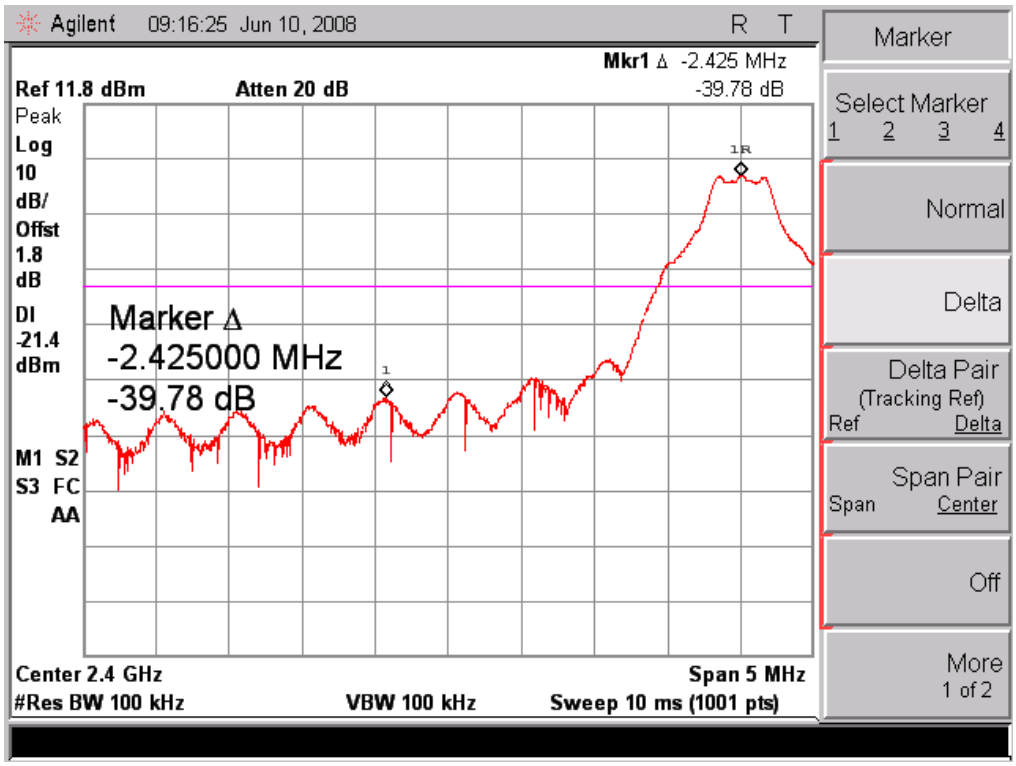


3.3.2. Test Condition

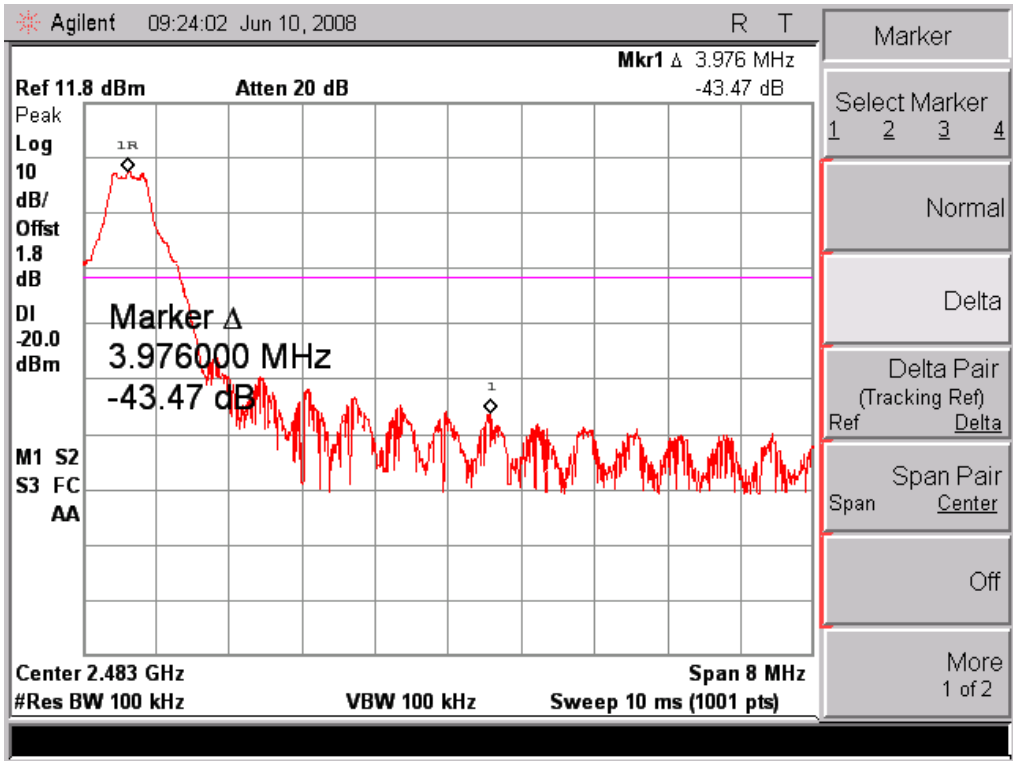
- Set RBW of Spectrum analyzer to 100 kHz
- The radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.
- The maximum frequency range measuring with the spectrum from 30 MHz to 25 GHz is investigated with the transmitter

3.3.3. Test result

Channels	Frequency (MHz)	Result (dBc)	Limit (dBc)	Verdict
0	2402	-39.78	- 20	Pass
78	2480	-43.47	- 20	Pass



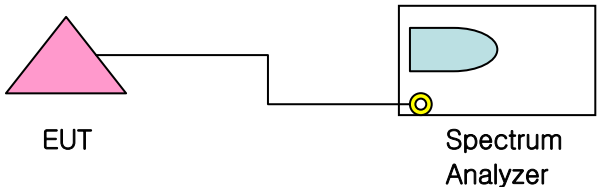
- Frequency 2402 CH 0 -



- Frequency 2480 CH 78 -

3.4. Hopping Channel Separation

3.4.1. Test Setup Layout



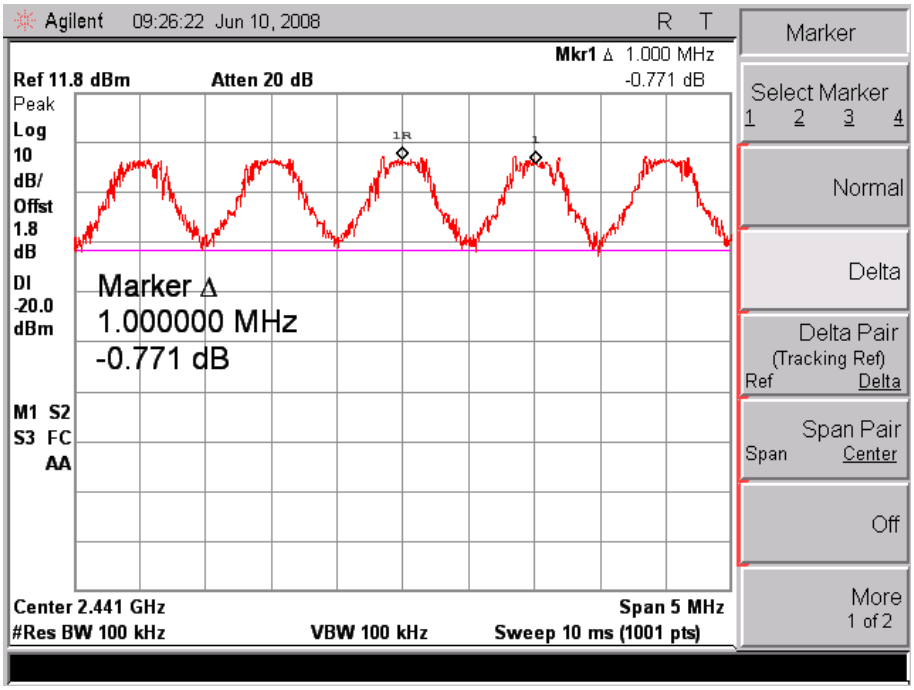
3.4.2. Test Condition

- Set RBW of Spectrum analyzer to 100 kHz
- Frequency hopping system shall have hopping channel carrier frequencies separated by minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

3.4.3. Test result

Mode	Frequency (MHz)	Result (kHz)	Limit (kHz)	Verdict
Hopping mode	2441	1,000	966.07	Pass

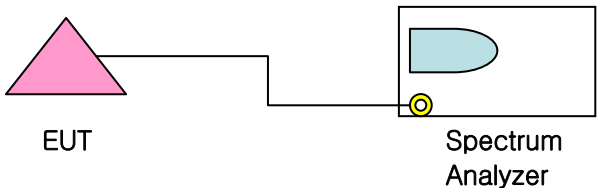
※Remark : 20dB bandwidth is 966.07 kHz



- Frequency 2441 CH 39 -

3.5. Number of Hopping Channels

3.5.1. Test Setup Layout

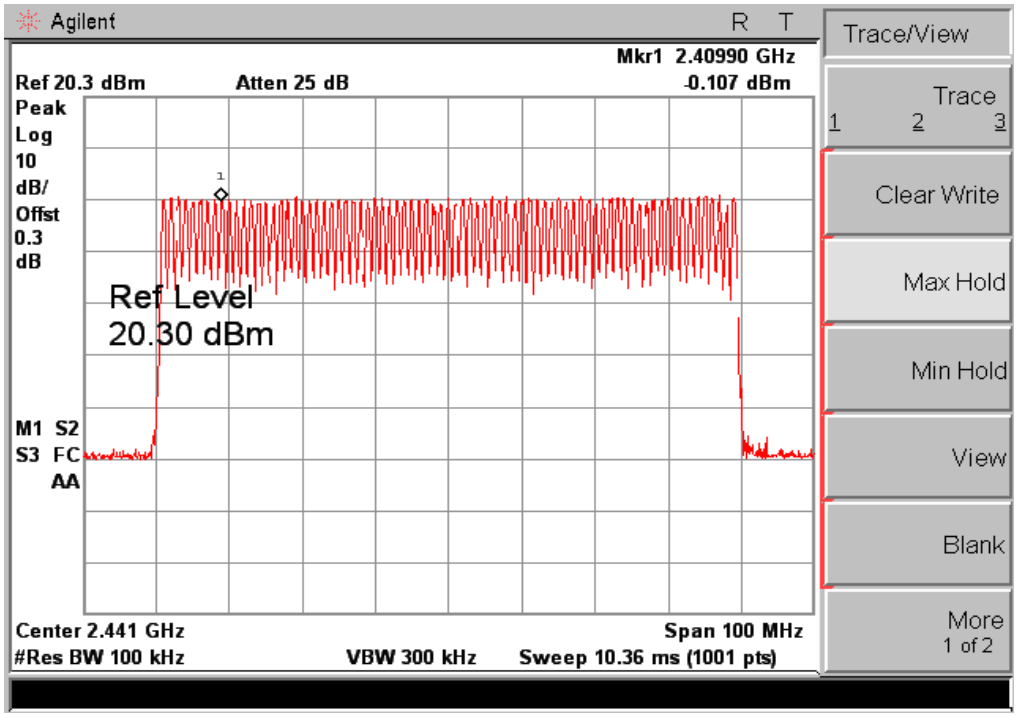


3.5.2. Test Condition

- Set RBW of Spectrum analyzer to 100 kHz
- Frequency hopping system shall have hopping channel carrier frequencies separated by minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

3.5.3. Test result

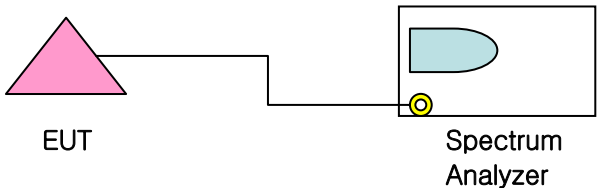
Mode	Frequency (MHz)	Result (channel)	Limit (channel)	Verdict
Hopping mode	--	79	15	Pass



- Frequency 2441 CH 39 -

3.6. Dwell Time

3.6.1. Test Setup Layout



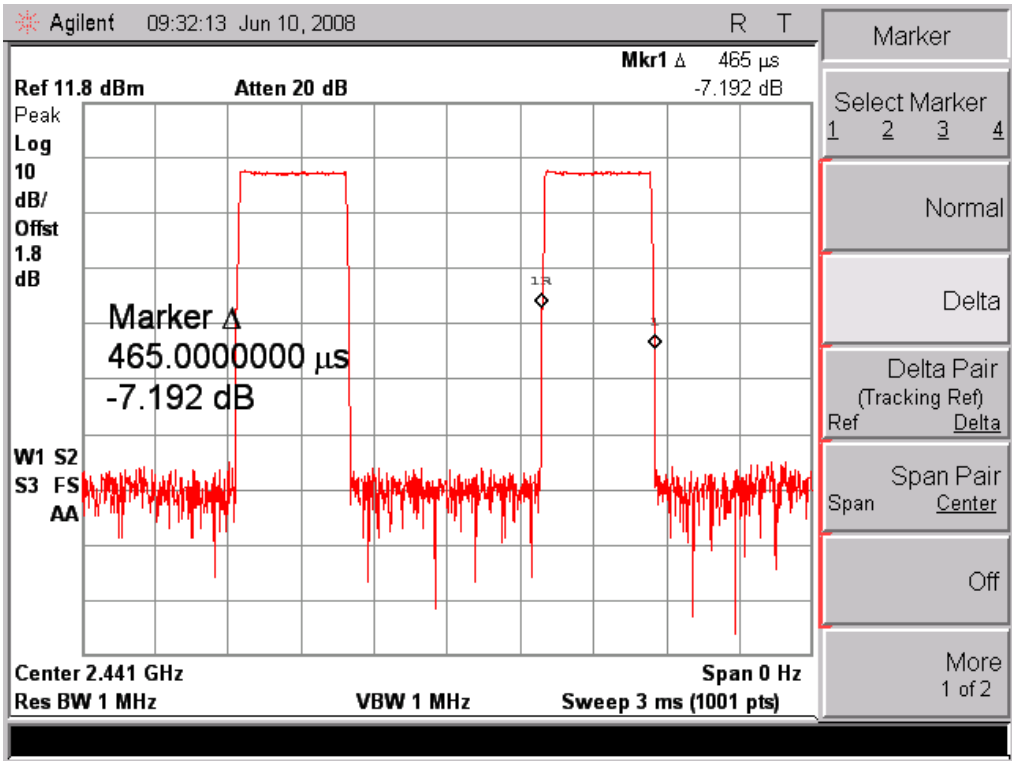
3.6.2. Test Condition

- Set RBW of Spectrum analyzer to 100 kHz
- Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Since the Bluetooth technology uses 79 channels this period is calculated to be 31.6 seconds.

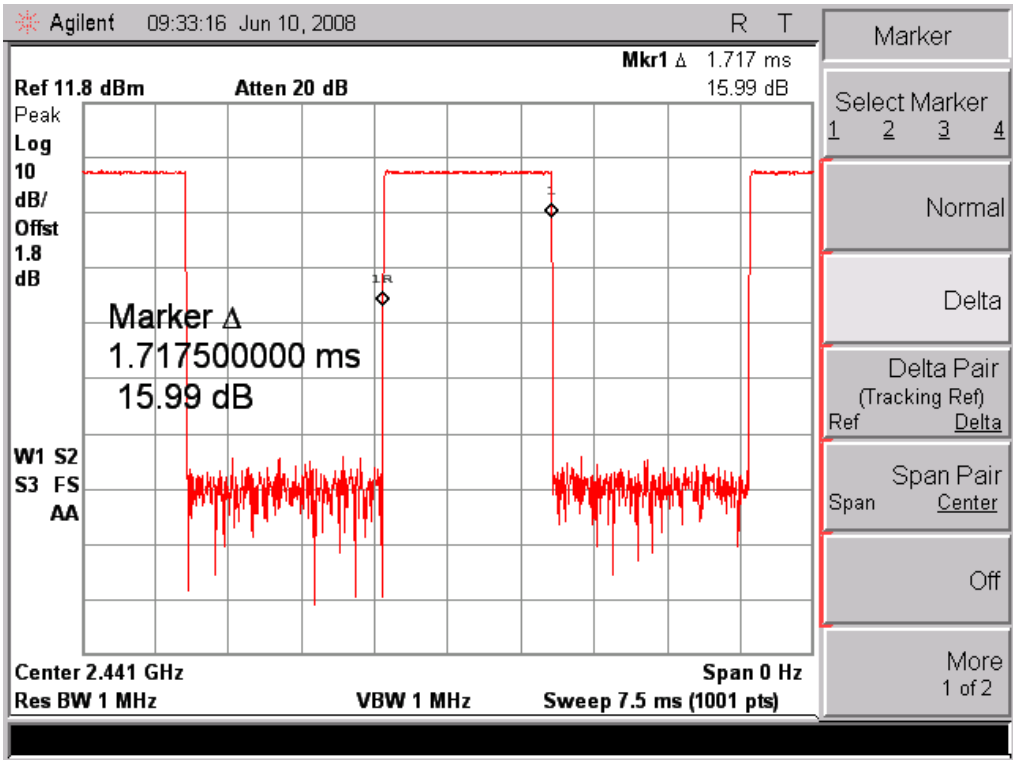
The dwell time is calculated by:
Dwell time = duty-cycle (Measured time length/Time slot) * 0.4 sec with:
- DH1 Time slot = 2/1600 = 1250 us
- DH3 Time slot = 4/1600 = 2500 us
- DH5 Time slot = 6/1600 = 3750 us
- number of hopping channels=79

3.6.3. Test result

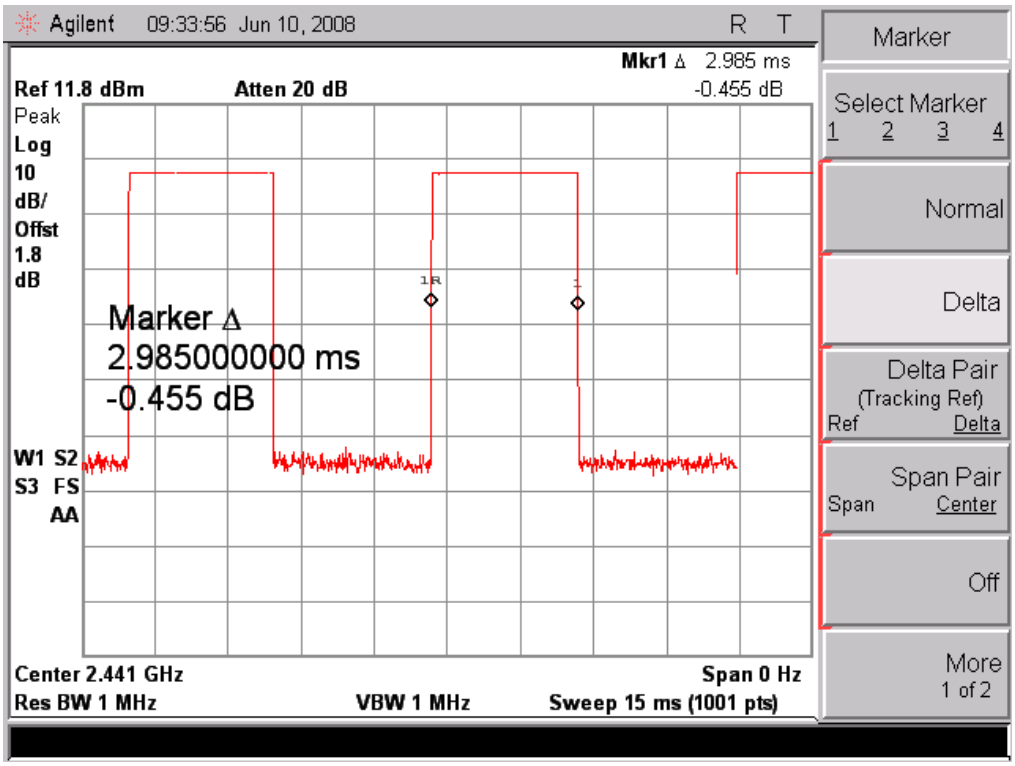
Channels	Type slot length(ms)	Dwell time (ms)	Limits (msec)	Packet type	Verdict
39	0.465	148.8	≤ 400	DH1	Pass
39	1.717	274.7	≤ 400	DH3	Pass
39	2.985	3.184	≤ 400	DH5	Pass



- Frequency 2441 CH39 Packet type DH1 -



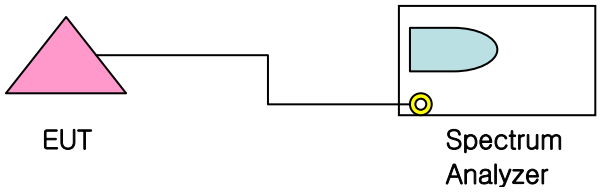
- Frequency 2441 CH39 Packet type DH3 -



- Frequency 2480 CH 78 Packet type DH5 -

3.7.Conducted Spurious Emission

3.7.1. Test Setup Layout

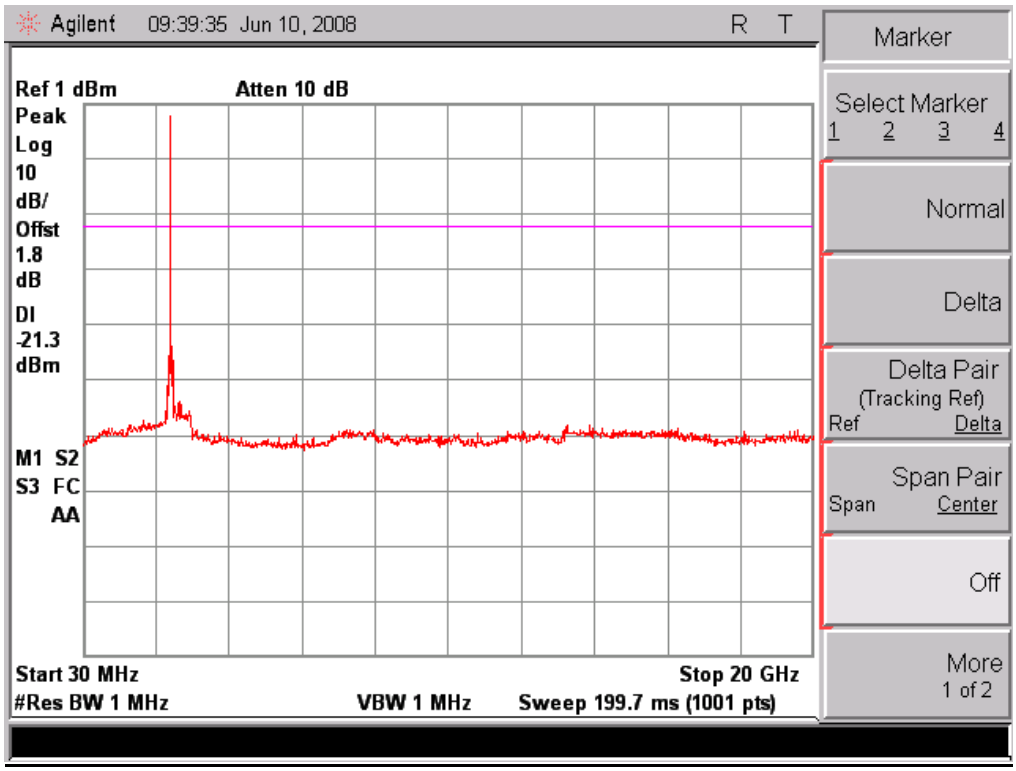


3.7.2. Test Condition

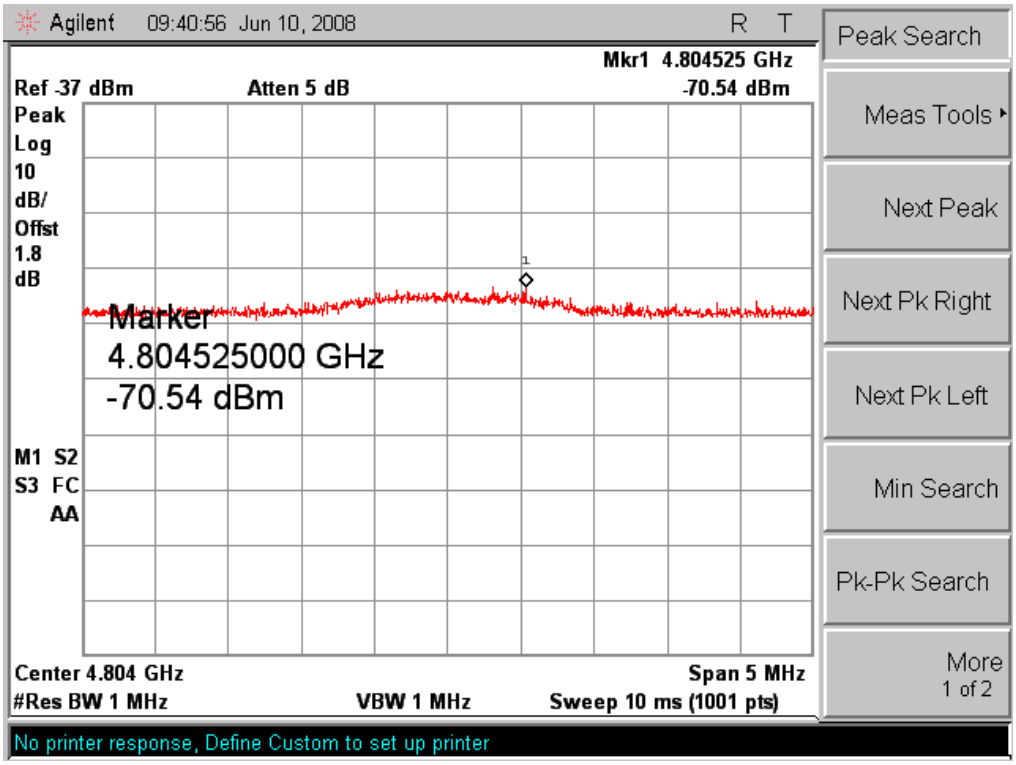
- The Equipment Under Test (EUT) was set up in a shielded room to perform the spurious emissions measurements.
- The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss.
- The reference value for the measurement of the spurious RF conducted emissions is determined during the test “band edge compliance” (cf. chapter 4.5). This value is used to calculate the 20 dBc limit.

3.7.3. Test result

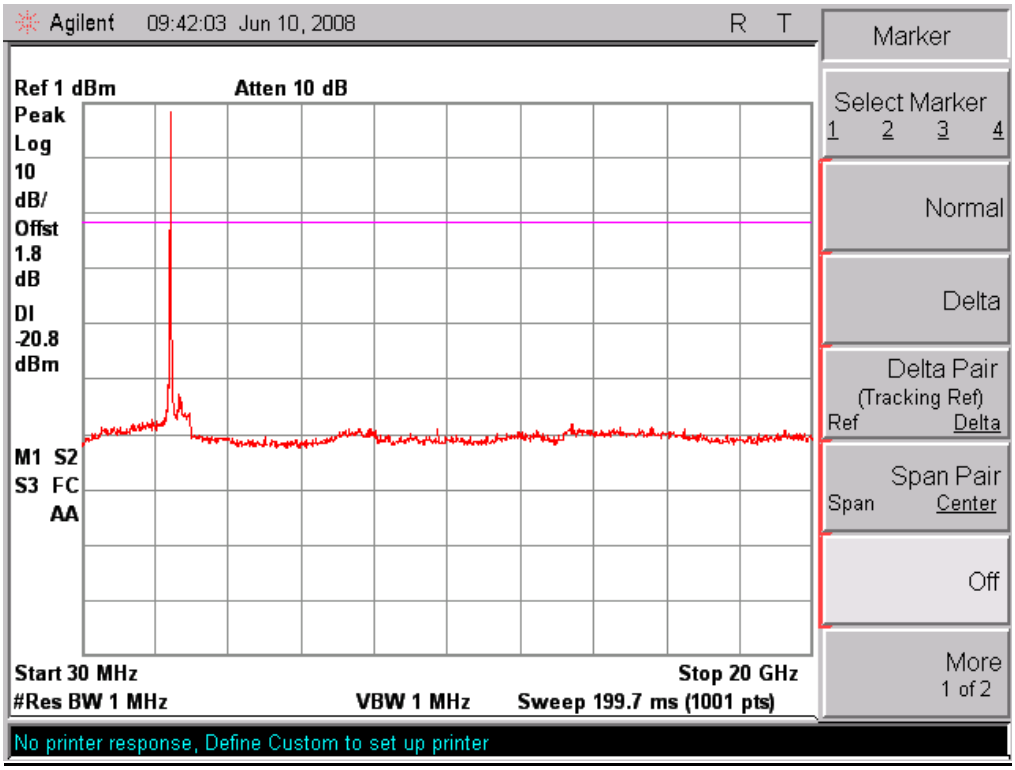
Channels	Frequency (MHz)	Result (dBc)	Limit (dBc)	Verdict
0	2402	70 >	- 20	Pass
3	2441	70 >	- 20	Pass
78	2480	70 >	- 20	Pass



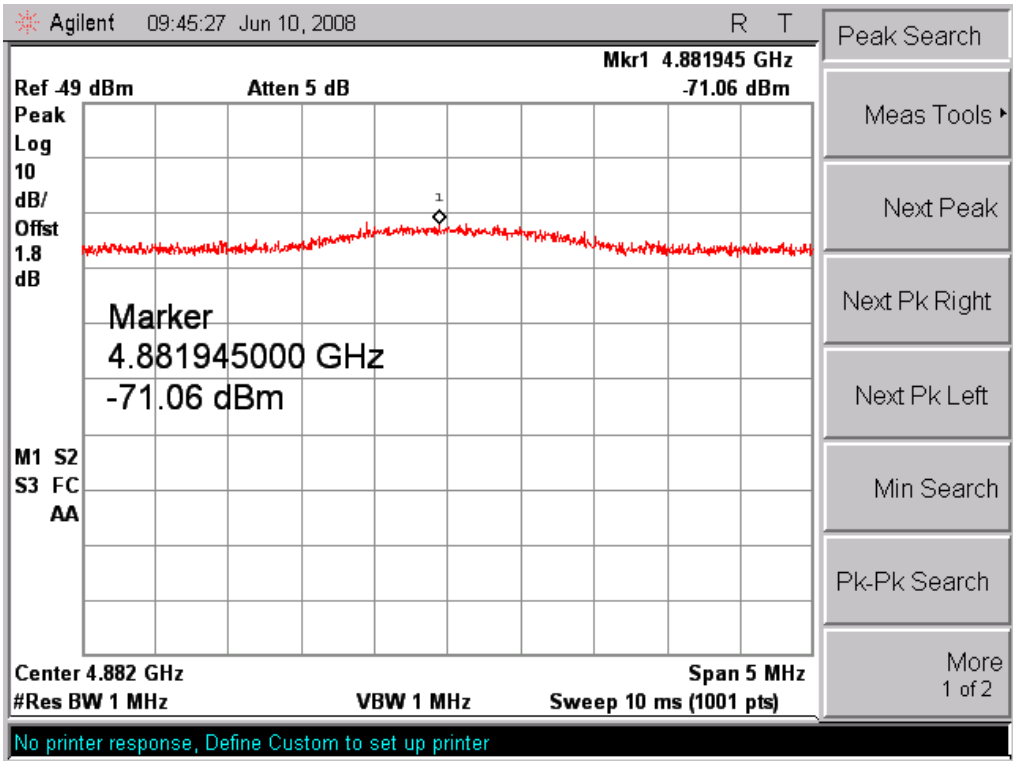
- Frequency 2402 CH0 -



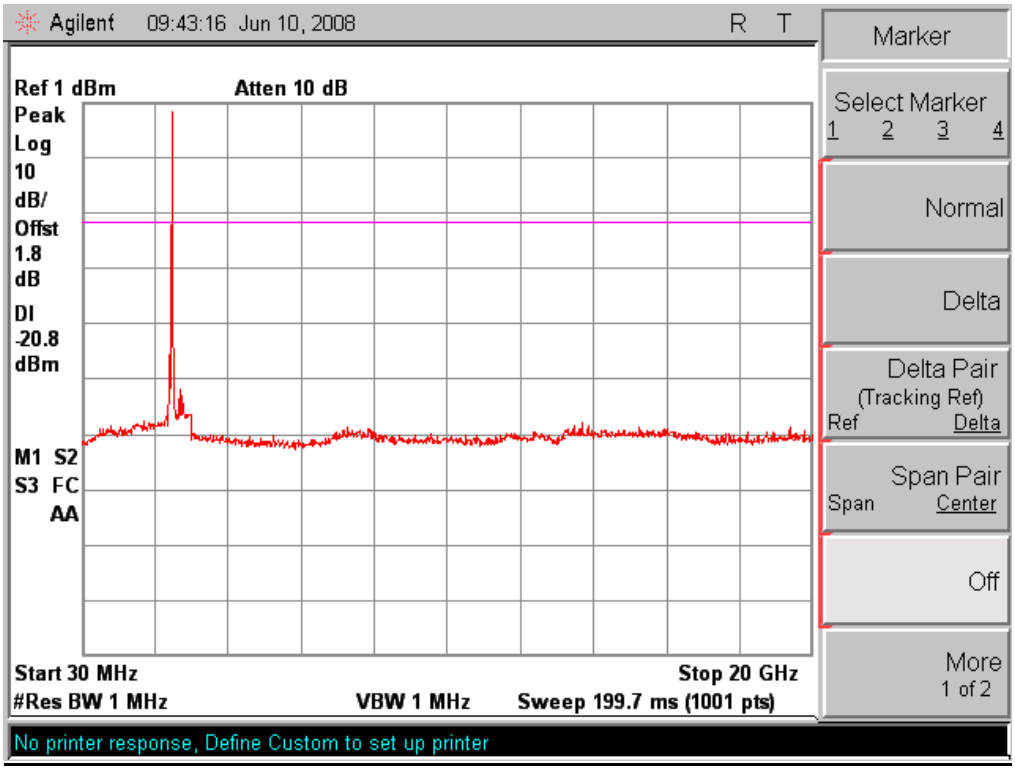
- Frequency 2402 CH0 -



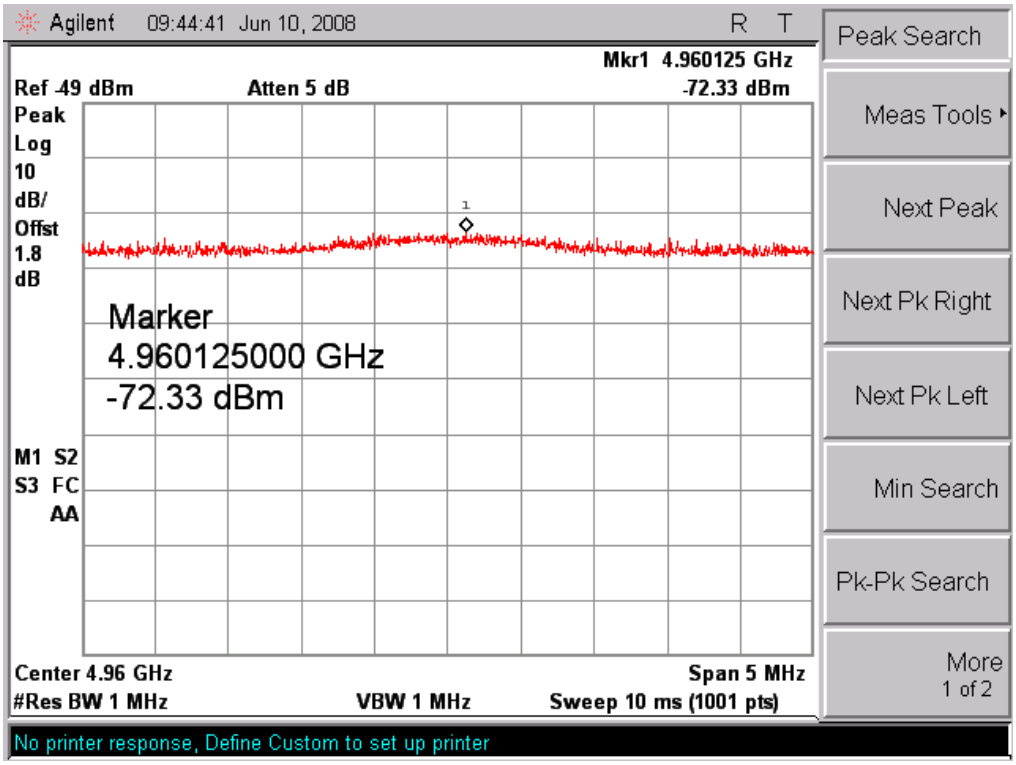
- Frequency 2441 CH39 -



- Frequency 2441 CH39 -



- Frequency 2480 CH78 -



- Frequency 2480 CH78 -

3.8. Radiated Spurious Emissions

3.8.1. Test Procedure

3.8.1.1 Preliminary Testing for Reference

Preliminary testing was performed in a KTL absorber-lined room to determine the emission characteristics of the EUT. The EUT was placed on the wooden table which has dimensions of 0.8 meters in height, 1 meter in length and 1.5 meters in width. Receiving antenna (Biconi-Log antenna : 30 to 1000 MHz or Horn Antenna : 1 to 40 GHz) was placed at the distance of 3 meter from the EUT.

An attempt was made to maximize the emission level with the various configurations of the EUT. Emission levels from the EUT with various configurations were examined on a spectrum analyzer connected with a RF amplifier and graphed.
The emission was within the illumination area of the 3 dB beam width of the antenna so that the maximum emission from the EUT is measured.

3.8.1.2 Final Radiated Emission Test at an Absorber-Lined Room

The final measurement of radiated field strength was carried out in a KTL Absorber-Lined Room that was listed up at FCC according to the "Radiated Emissions Testing" procedure specified by ANSI C63.4.

Based on the test results in preliminary test, measurement was made in same test set up and configuration which produced maximum emission level. Receiving antenna was installed at 3-meter distance from the EUT, and was connected to an EMI receiver.

Turntable was rotated through 360 degrees and receiving antenna height was varied from 1 to 4 meters above the ground plane to read maximum emission level. Receiving antenna polarization was changed vertical and horizontal. The worst value was recorded.

If necessary, the radiated emission measurements could be performed at a closer distance than specified distance to ensure higher accuracy and their results were extrapolated to the specified distance using an inverse linear distance extrapolation factor (20 dB/decade) as per Section 15.31(f).

The maximum emission level from the EUT occurred in such configuration as shown in the following photograph.

Tested in x, y, z axis and worst case results are reported

The maximum frequency range measuring with the spectrum from 30 MHz to 40 GHz is investigated with the transmitter

3.8.2. Limits

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	MHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]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	[2]
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:
Frequency Field Strength Measurement Distance (MHz) (microvolts/meter) (meters)

30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200**	3
above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

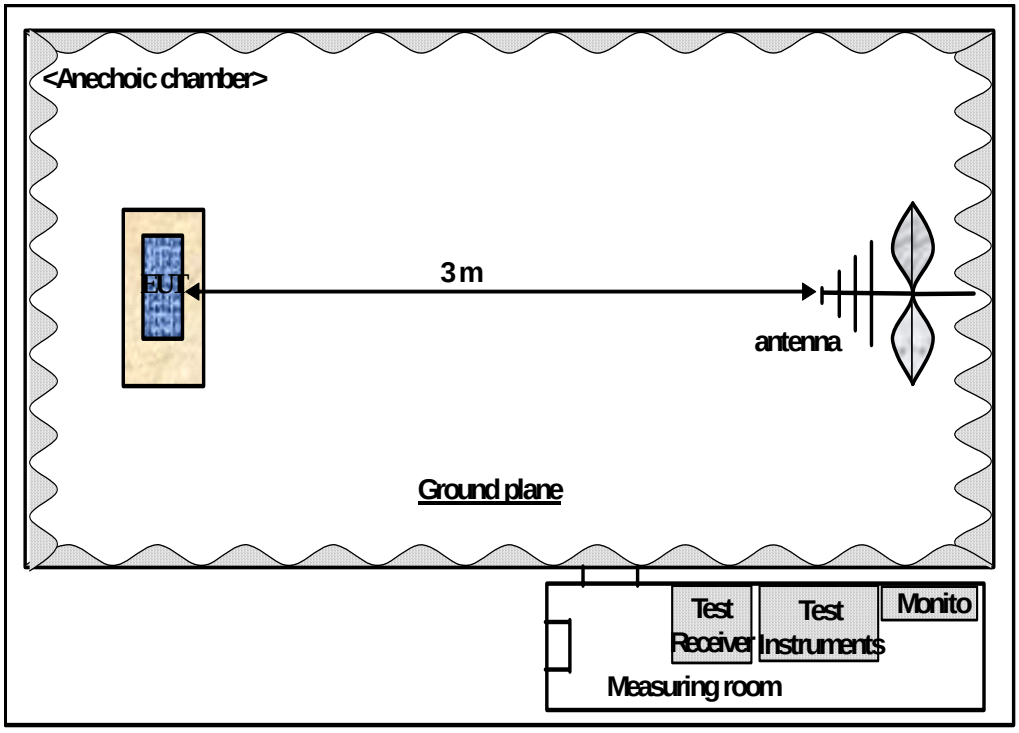
3.8.3. Sample Calculation

The emission level measured in decibels above one microvolt (dBμV) was following sample calculation.

For example ;

Measured Value at	4824 MHz	33.9 dBμV
Antenna Factor & Cable loss		45.0 dB
− Preamplifier		-30.0 dB
= Radiated Emission		48.9 dBμV/m

3.8.4. Photograph for the test configuration



3.8.5. Test Results

3.8.5.1 Spurious Radiated Emission

Measurement mode	Spurious Emission Measurement Bluetooth Mode continuous TX
Channel	Ch 0, 39, 78 (2402, 2441, 2480 MHz)
Resolution Bandwidth	■ Peak & Average (3dB Bandwidth : 1MHz for above 1GHz) □ Quasi-Peak (6dB Bandwidth : 120kHz for below 1GHz)

Frequency (MHz)		* D.M.	* A.P.	Measured Value (dBμV)	* A.F. (dB)	* A.G. + C.L. (dB)	* D.C.F. (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	** Margin (dB)
CH0	4804	P	V	48.8	39.7	-43.9	0	44.6	74	-29.4
	4804	A	V	36.4	39.7	-43.9	0	32.2	54	-21.8
CH39	4882	P	V	47.9	39.7	-44.0	0	43.6	74	-30.4
	4882	A	V	36.0	39.7	-44.0	0	31.7	54	-22.3
CH78	4960	P	V	47.7	40.1	-44.1	0	43.7	74	-30.3
	4960	A	V	35.9	40.1	-44.1	0	31.9	54	-22.1

Note

The observed EMI receiver (ESIB) & Spectrum Analyer(E4448A) noise floor level was 2.0 dBμV.
And all other emissions not reported on data were more than 25 dB below the permitted level.

* D.M. : Detect Mode (P : Peak, Q : Quasi-Peak, A : Average)
A.P. : Antenna Polarization (H : Horizontal, V : Vertical)
A.F. : Antenna Factor
C.L. : Cable Loss
A.G. : Amplifier Gain
D.C.F. : Distance Correction Factor
< : Less than
"--" indicates the spurious emission could not be detected due to noise limitations or ambients.
** Margin (dB) = Emission Level (dB) - Limit (dB)

3.9. AC Conducted Emissions

3.9.1. Test Procedure

Conducted emission measurements on the EUT were performed by "AC Power Line Conducted Emissions Testing" procedure as per ANSI C63.4. The EUT was set up on a wooden table 0.8 meters height, 1.0 by 1.5 meters in size, placed in the shielded enclosed with a side of wall of which constituted a vertical conducting surface of 2.2 m x 3.1 m in size to maintain 40 cm from the rear of EUT

LISN(Line Impedance Stabilization Network, ROHDE & SCHWARZ, ESH3-Z5, 50 ohm / 50 μH) was installed and electrically boned to the conducting ground plane. The EUT was connected to the LISN using a typical power adapter.
One of two 50 ohm output terminals of the LISN was connected to the EMI Receiver (ROHDE & SCHWARZ, ESCI, 9 kHz to 3 GHz) and the other was terminated in 50 ohms. Measurements were again performed after interchanging such a connection oppositely.
The frequency range from 150 kHz to 30 MHz was examined and the remarkable frequencies were measured with Quasi-peak and Average values using the EMI receiver instrument (ROHDE & SCHWARZ, ESI, 9 kHz to 3 GHz ; Detector Function ; CISPR Quasi-Peak & Average). The 6 dB bandwidth of the Receiver was set to 9 kHz

The position of connecting cables of the EUT was changed to find the worst case configuration during measurements. The maximum emission level from the EUT occurred in such configuration as shown in the following photograph.

3.9.2. Limits

Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency (MHz)	Conducted Limits (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

- Decreases with the logarithm of the frequency.

3.9.3. Sample calculation

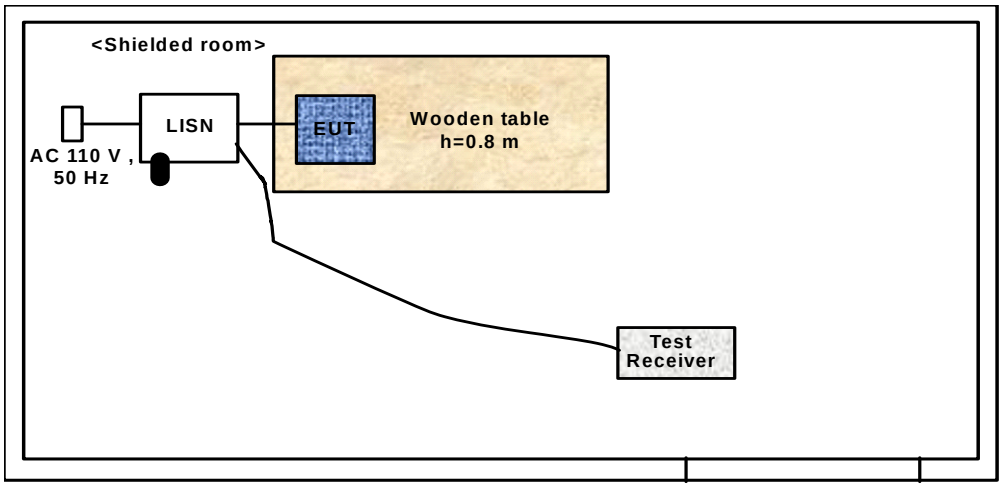
The emission level measured in decibels above one microvolt (dBμV) was converted into microvolt (μV) as shown in following sample calculation.

For example :

Measured Value at		0.438 MHz	44.2 dBμV @ Q-Peak mode
+	Correct factor *		0.1 dB
=	Conducted Emission		44.3 dBμV

* Correct factor is adding RF cable loss and Attenuation

3.9.4. Photograph for the test configuration



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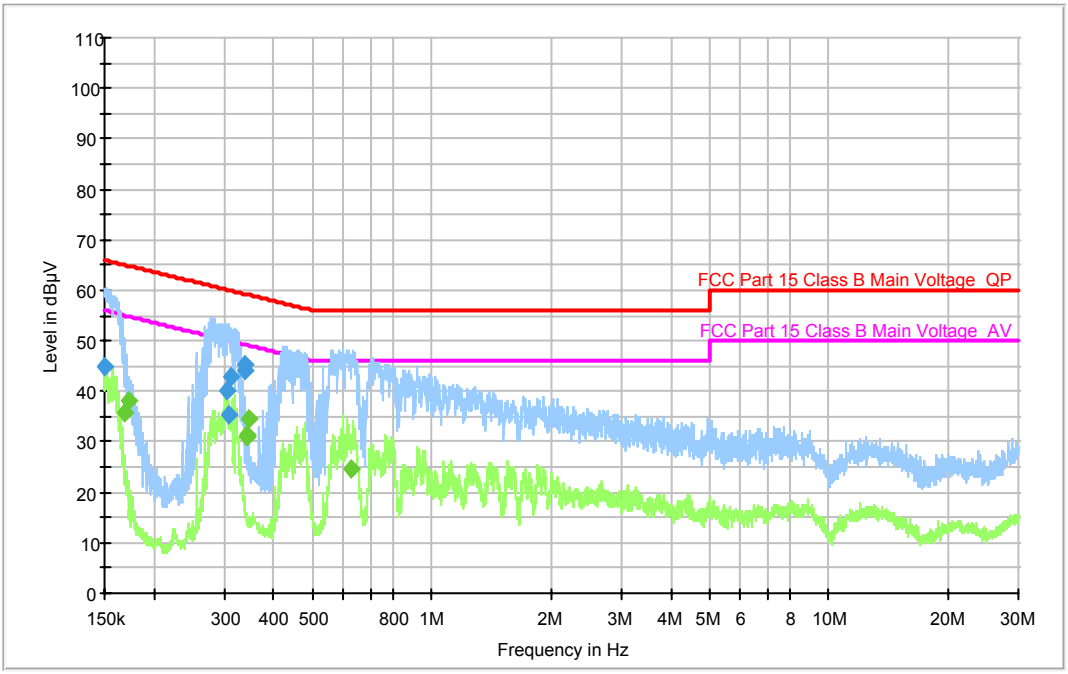
3.9.5. Test Results



Final Measurement - QuasiPeak

Frequency (MHz)	QuasiPeak (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.150450	45.1	L1	9.7	20.9	66.0
0.306444	40.3	N	9.8	19.8	60.1
0.307937	35.5	N	9.8	24.5	60.0
0.313065	43.1	N	9.8	16.8	59.9
0.339176	44.2	L1	9.7	15.0	59.2
0.339664	45.4	N	9.8	13.8	59.2

Final Measurement - Average

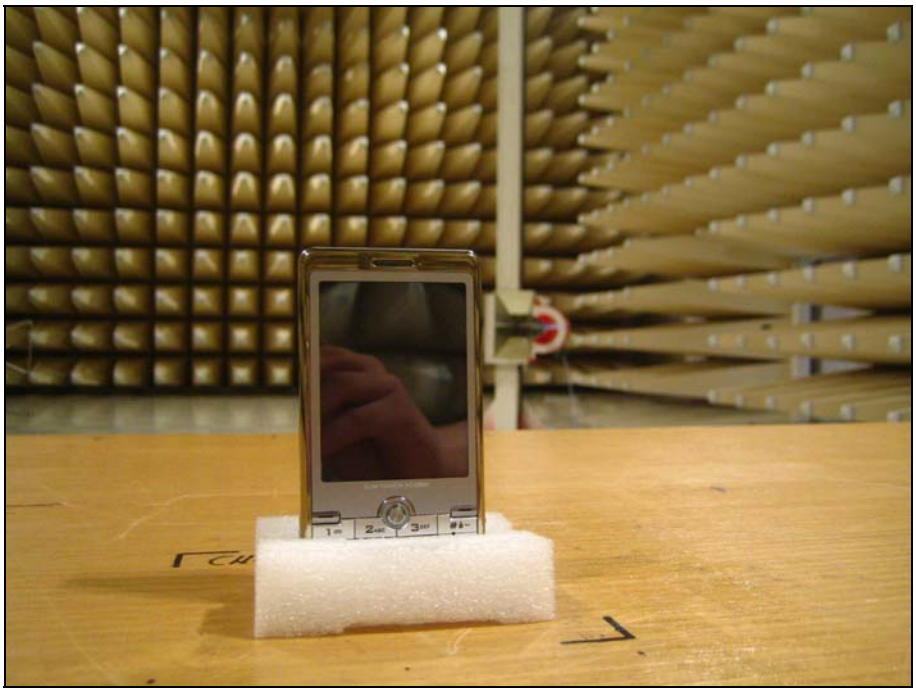
Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.168945	35.6	L1	9.7	19.4	55.0
0.172529	38.2	L1	9.7	16.6	54.8
0.342164	30.8	L1	9.7	18.4	49.2
0.343562	31.4	L1	9.7	17.7	49.1
0.348113	34.4	N	9.8	14.6	49.0
0.628551	24.8	L1	9.8	21.2	46.0

4. TEST EQUIPMENTS

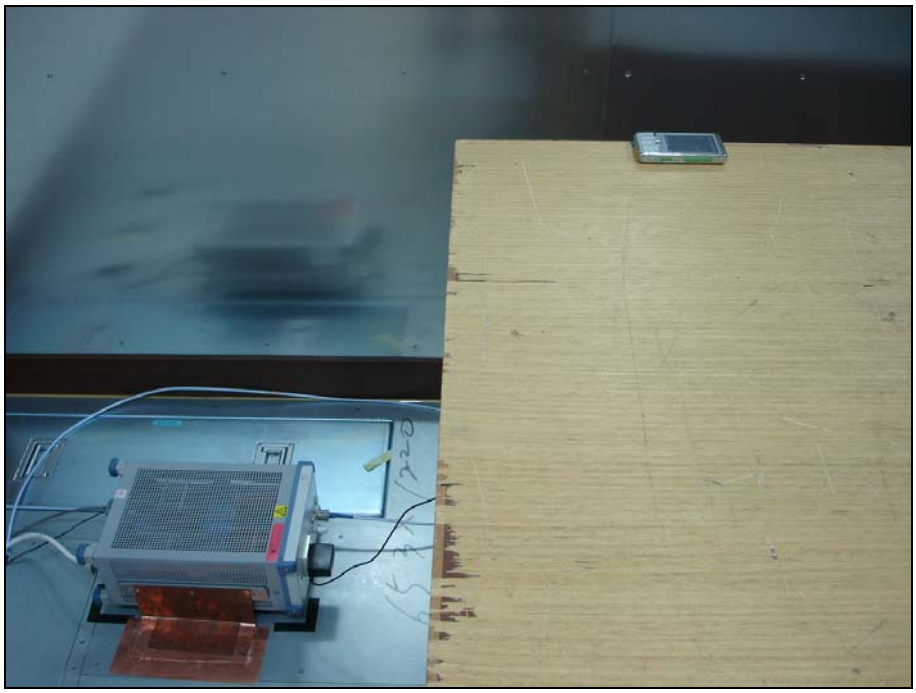
No.	Equipment	Manufacturer	Model	S/N	Effective Cal.Duration
1	EMI Receiver (20 Hz ~ 26.5 GHz)	R&S	ESIB	100280	08/17/2007 ~ 08/17/2008
2	Spectrum Analyzer (100 Hz ~ 26.5 GHz)	Agilent	E4407B	US41443316	12/01/2007 ~ 12/01/2008
3	Spectrum Analyzer (3 Hz ~ 50 GHz)	Agilent	E4448A	MY43360322	08/30/2007 ~ 08/30/2008
4	Pre-Amplifier (100 kHz ~ 1 GHz)	SONOMA.	310N	186270	08/25/2007 ~ 08/25/2008
5	Pre-Amplifier (0.5 GHz ~ 26.5 GHz)	Agilent	83017A	MY39500982	04/02/2008 ~ 04/02/2009
6	LISN(50 Ω , 50 μH) (10 kHz ~ 100 MHz)	R&S	ESH3-Z5	826789009	07/05/2007 ~ 07/05/2008
7	Biconi-Log Ant. (30 MHz ~ 1000 MHz)	Schwarzbeck	VULB9168	9168-180	08/24/2007 ~ 08/24/2008
8	Horn Ant. (1 GHz ~ 18 GHz)	EMCO	3115	9012-3595	03/26/2007 ~ 03/26/2009
9	Horn Ant. (18 GHz ~ 40 GHz)	EMCO	3116	2664	03/26/2007 ~ 03/26/2009
10	Active Loop Ant. (9 kHz ~ 30 MHz)	EMCO	6502	2532	06/08/2007 ~ 06/08/2008
11	DC Power Supply	Agilent	E4356A	MY41000296	10/01/2007 ~ 10/01/2008
12	Power Meter	Agilent	E4417A	GB4129075	09/17/2007 ~ 09/17/2008
13	Bluetooth tester	anrisu	MT8852B	6K00006994	03/03/2008 ~ 03/03/2009

Appendix.1 EUT photo

Appendix.2 Test setup photo



<Radiated Emission>



<AC Conducted Emission>