

FCC EVALUATION REPORT FOR CERTIFICATION

Manufacturer : Unision Tech Co., Ltd.

478, Mokhaeng-Dong, Chungju-Si,

Chungcheongbuk-Do, Korea

Attn : Mr. Ki Chang Lee / CEO

Date of Issue : June 29, 2009

Order Number : GETEC-C1-09-135

Test Report Number : GETEC-E3-09-083

Test Site : Gumi College EMC Center

FCC Registration Number: (100749, 443957)

FCC ID

XGVBCX-300

APPLICANT

AUTOVISION Co., Ltd.

Rule Part(s) : FCC Part 15 Subpart C-Intentional Radiator § 15.247

Test method : Public Notice DA 00-705
(Guidance on measurement for Frequency hopping spread spectrum system)

Equipment Class : Part 15 Spread Spectrum Transmitter (DSS)

EUT Type : Bluetooth handsfree car kit

Model Name : BCX-300

Trade Name : CYANICS

This equipment has been shown to be in compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Tested by,



Jae-Hoon Jeong, Senior Engineer
GUMI College EMC center

Reviewed by,



Tae-Sig Park, Technical Manager
GUMI College EMC center



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Scope: Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and / or unintentional radiators for compliance with technical rules and regulations of the Federal Communications Commission.

1. General Information

Applicant	: AUTOVISION Co., Ltd.
Applicant address	: Shinsegae YBS Bldg, 102, 227-1, Yongdap-Dong, Seongdong-Gu, Seoul, Korea
Manufacturer	: Unision Tech Co., Ltd.
Manufacturer address	: 478, Mokhaeng-Dong, Chungju-Si, Chungcheongbuk-Do, Korea
Contact person	: Hyoung-Jin Kim / Director
Telephone number	: +82-2-454-3222
Fax. number	: +82-2-454-3227

- **FCC ID.** XGVBCX-300
- **Equipment Class** Spread Spectrum Transmitter (DSS)
- **EUT Type** Bluetooth handsfree car kit
- **Power Source** DC 3.7 V supplied from the lithium polymer battery
- **Model Name** BCX-300
- **Rule Part(s)** FCC Part 15, Subpart C-Intentional Radiator § 15.247
- **Test Method** Public Notice DA 00-705
(Guidance on measurement for frequency hopping spread spectrum systems)
- **Type of Authority** Certification
- **Test Procedure(s)** ANSI C63.4 (2003)
- **Dates of Test** June 22 ~ 25, 2009
- **Place of Test** **Gumi College EMC Center** (FCC Registration No.: 100749)
407, Bugok-Dong, Gumi-si, Gyeongsangbuk-Do, Korea
- **Test Report Number** GETEC-E3-09-083
- **Dates of Issue** June 29, 2009



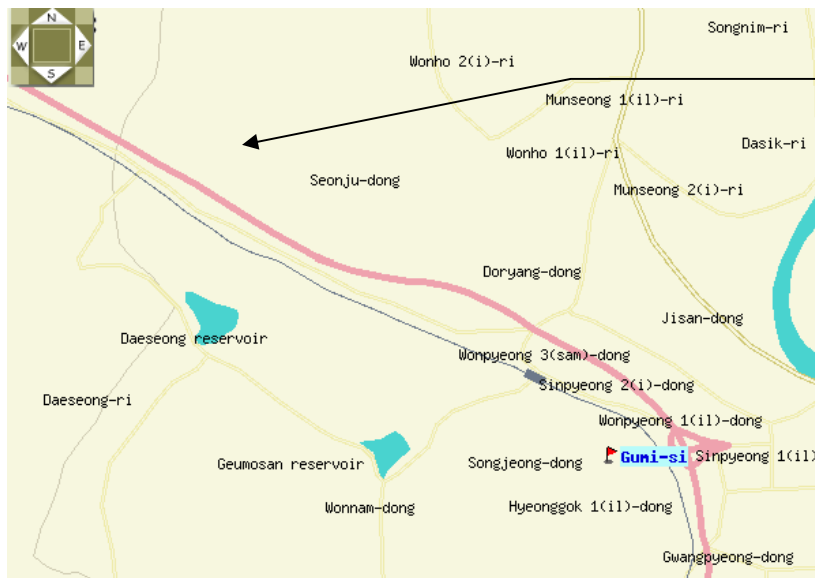
2. Introduction

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Nose Emissions From Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ASNI C63.4-2003) was used in determining radiated and conducted emissions emanating from **Autovision Co., Ltd. Bluetooth handsfree car kit (Model Name: BCX-300)**

These measurement tests were conducted at **Gumi College EMC Center**.

The site address is 407, Bugok-Dong, Gumi-si, Gyeongsangbuk-Do, Korea

This test site is one of the highest point of Gumi 1 college at about 200 kilometers away from Seoul city and 40 kilometers away from Daejeon city. It is located in the valley surrounded by mountains in all directions where ambient radio signal conditions are quiet and a favorable area to measure the radio frequency interference on open field test site for the computing and ISM devices manufactures. The detailed description of the measurement facility was found to be in compliance with the requirements of §2.948 according to ANSI C63.4 on October 19, 1992



GUMI COLLEGE EMC CENTER
407, Bugok-Dong, Gumi-si,
Gyeongsangbuk-Do 730-711, Korea
Tel: +82-54-440-1195~8
Fax: +82-54-440-1199

Fig 1. The map above shows the Gumi College in vicinity area.



3. Product Information

3.1 Description of EUT

The Equipment under Test (EUT) is the **AUTOVISION Co., Ltd. Bluetooth handsfree car kit (Model Name: BCX-300) FCC ID.: XGVBCX-300**

External connector	Ear set jack, Charging port
--------------------	-----------------------------

Frequency Band	Channel	Freq. [MHz]	Channel	Freq. [MHz]	Channel	Freq. [MHz]	Channel	Freq. [MHz]
2400-2483.5MHz	0	2402	20	2422	40	2442	60	2462
	1	2403	21	2423	41	2443	61	2463
	2	2404	22	2424	42	2444	62	2464
	3	2405	23	2425	43	2445	63	2465
	4	2406	24	2426	44	2446	64	2466
	5	2407	25	2427	45	2447	65	2467
	6	2408	26	2428	46	2448	66	2468
	7	2409	27	2429	47	2449	67	2469
	8	2410	28	2430	48	2450	68	2470
	9	2411	29	2431	49	2451	69	2471
	10	2412	30	2432	50	2452	70	2472
	11	2413	31	2433	51	2453	71	2473
	12	2414	32	2434	52	2454	72	2474
	13	2415	33	2435	53	2455	73	2475
	14	2416	34	2436	54	2456	74	2476
	15	2417	35	2437	55	2457	75	2477
	16	2418	36	2438	56	2458	76	2478
	17	2419	37	2439	57	2459	77	2479
	18	2420	38	2440	58	2460	78	2480
	19	2421	39	2441	59	2461		



3.2 Support Equipment / Cables used

3.2.1 Used Support Equipment

Description	Manufacturer	Model Name	S/N & FCC ID
None	-	-	

See “Appendix E – Test Setup Photographs” for actual system test set-up

3.2.2 Used Cable(s)

Cable Name	Condition	Description
None	-	-

3.3 Modification Item(s)

-. None

4. Antenna Requirement - §15.203

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the applicant can be used with the device. The use of permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with this requirement.

4.1 Description of Antenna

The **AUTOVISION Co., Ltd. Bluetooth handsfree car kit** comply with the requirement of §15.203 with a built-in monopole antenna permanently attached to the transmitter.



5. Description of tests

5.1 Test Condition

The EUT was installed, arranged and operated in a manner that is most representative of equipment as typically used. The measurements were carried out while varying operating modes and cable positions within typically arrangement to determine maximum emission level.

The representative and worst test mode(s) were noted in the test report.

Test Voltage / Frequency:

- DC 3.7 V supplied from the lithium polymer battery
(The EUT used battery power. So, the conducted emission test was skipped.)

- Test Mode(s)

- Executed “Bluetooth tester (TESCOM, TC-3000A)” to control the EUT continuously transmit RF signal



5.2 Conducted Emission

The Line conducted emission test facility is inside a 4 m × 8 m × 2.5 m shielded enclosure. (FCC Registration No.: 100749)

The EUT was placed on a non-conducting 1.0 m by 1.5 m table, which is 0.8 m in height and 0.4 m away from the vertical wall of the shielded enclosure.

The EUT is powered from the Rohde & Schwarz LISN (ESH2-Z5) and the support equipment is powered from the Rohde & Schwarz LISN (ESH3-Z5). Powers to the LISN are filtered by high-current high insertion loss power line filter.

Sufficient time for EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.

The RF output of the LISN was connected to the EMI test receiver (Rohde & Schwarz, ESCS30).

The EMI test receiver was scanned from 150 kHz to 30 MHz with 20 ms sweep time to determine the frequency producing the maximum EME from the EUT. The frequency producing the maximum level was re-examined using Quasi-Peak mode of the EMI test receiver.

The bandwidth of Quasi-peak mode was set to 9 kHz. Each emission was maximized consistent with typical applications by varying the configuration of the test sample. Interface cables were connected to the available interface ports of the test unit. The effect of varying the position of cables was investigated to find the configuration that produces maximum diagram emission. Excess cable lengths were bundled at center with 30 cm ~ 40 cm.

Each EME reported was calibrated using the R/S signal generator

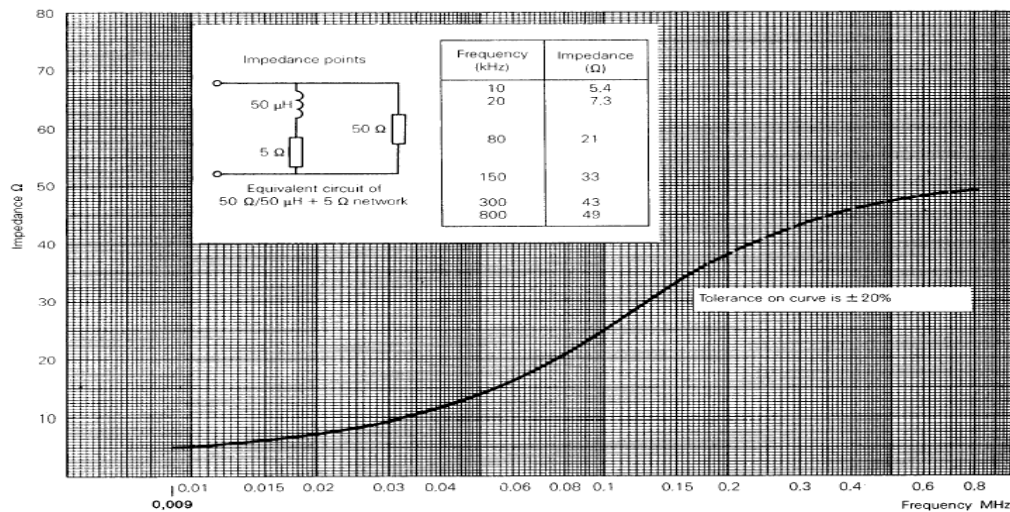


Fig 2. Impedance of LISN



5.3 Radiated Emission

The measurements were conducted 3 m anechoic chamber (FCC Registration No.: 443957) using broadband antennas to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The technology configuration, mode of operation and turntable azimuth with respect to antenna was note for each frequency found.

The spectrum was scanned from 30 to 1000 MHz, using bicornical log antenna (Schwarzbeck, VULB9160).

Above 1 GHz, horn antenna (Schwarzbeck, BBHA9120D / EMCO 3160) was used.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.

Each frequency found during pre-scan measurements was re-examined and investigated using EMI test receiver. The detector function was set to CISPR quasi-peak mode average mode and the bandwidth of the receiver was set to 120 kHz or 1MHz depending on the frequency or type of signal.

The EUT, support equipment and interconnecting cables were reconfigured to the setup producing the maximum emission for the frequency and were placed on top of a 0.8 m high non-metallic 1.0 m × 1.5 m table.

The turntable containing the test sample was rotated; the antenna height was varied 1 m to 4 m and stopped at the azimuth or height producing the maximum emission.

Each EME reported was calibrated using the R/S signal generator

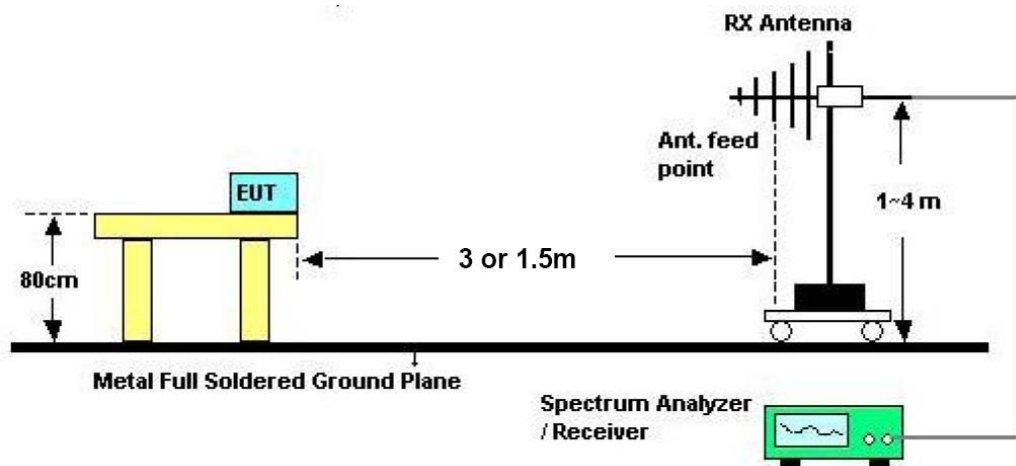


Fig 3. Dimensions of test site.

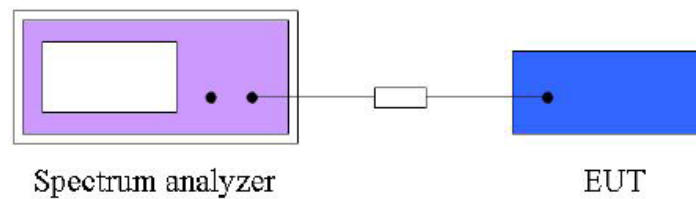


6. Number of Hopping Frequency Used

6.1 Operating Environment

Temperature : 25.0 °C
Relative Humidity : 30.0 % R.H.

6.2 Test Set-up (Layout)



6.3 Limit

At least 15 channels frequencies, and should be equally spaced

6.4 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESI	Rohde & Schwarz	EMI test receiver	830482/010	12. 14. 2009

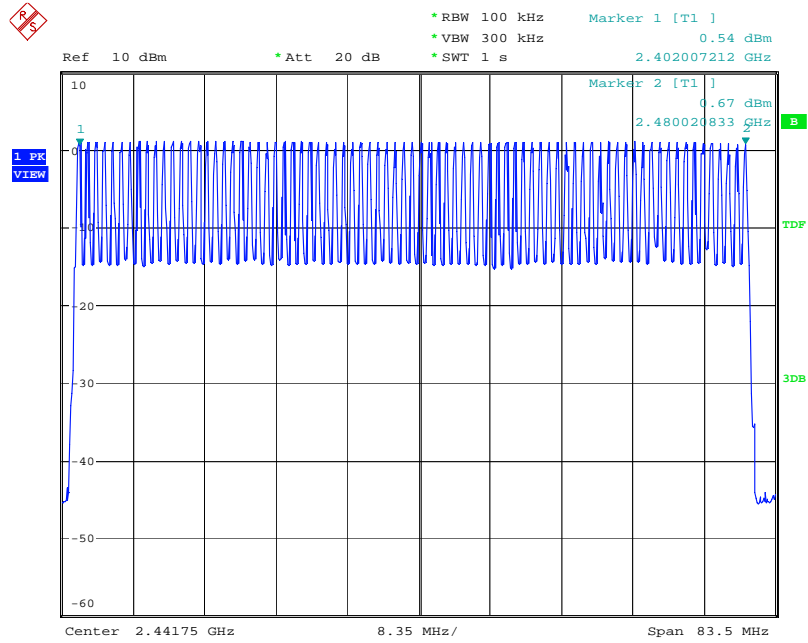
6.5 Test Result

- Test Date : June 22, 2009
- Reference Standard : Part 15 Subpart C, Sec. 15.247(a)(1)(iii)
- Modulation : GFSK
- Operating Condition : Bluetooth RF transmitting mode
- Power Source : DC 3.7 V supplied from the lithium polymer battery

Modulation	Channel number	Limit	Result
GFSK	79	> 15	Complies



Number of Hopping frequency used Plot on Configuration GFSK



Date: 22.JUN.2009 12:29:25

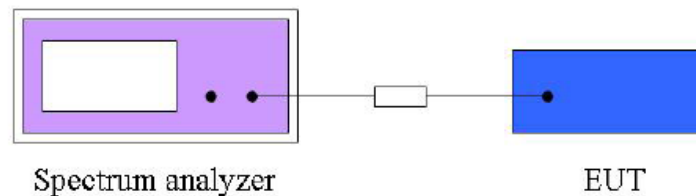


7. Dwell Time On Each Channel

7.1 Operating Environment

Temperature : 25.0 °C
Relative Humidity : 30.0 % R.H.

7.2 Test Set-up (Layout)



7.3 Limit

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.

7.4 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESI	Rohde & Schwarz	EMI test receiver	830482/010	12. 14. 2009

7.5 Test Result

- Test Date : June 22, 2009
- Reference Standard : Part 15 Subpart C, Sec. 15.247(a)(1)(iii)
- Modulation : GFSK
- Operating Condition : Bluetooth RF transmitting mode
- Power Source : DC 3.7 V supplied from the lithium polymer battery

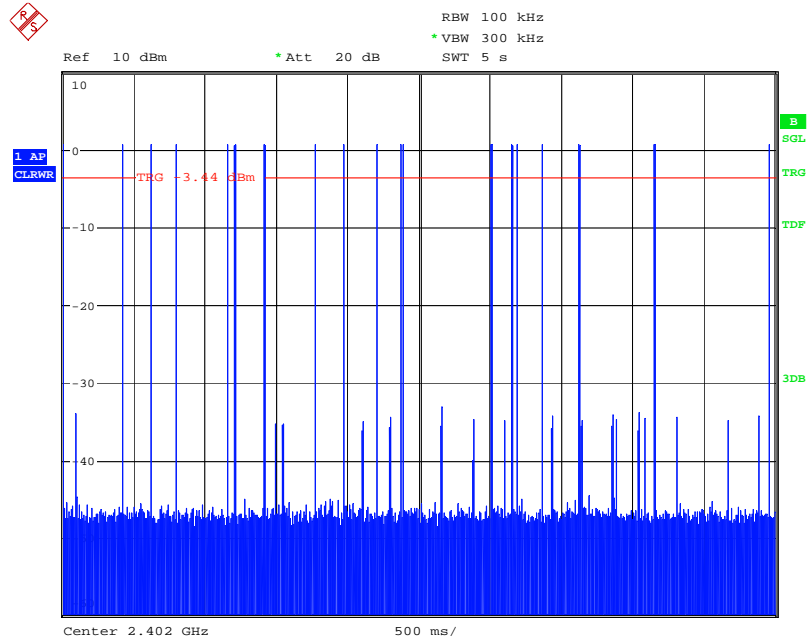
Spectrum Parameter

- Attenuation : Auto
- Span frequency : zero
- Resolution band width : 100 kHz
- Video band with : 300 kHz
- Sweep time : 5 s

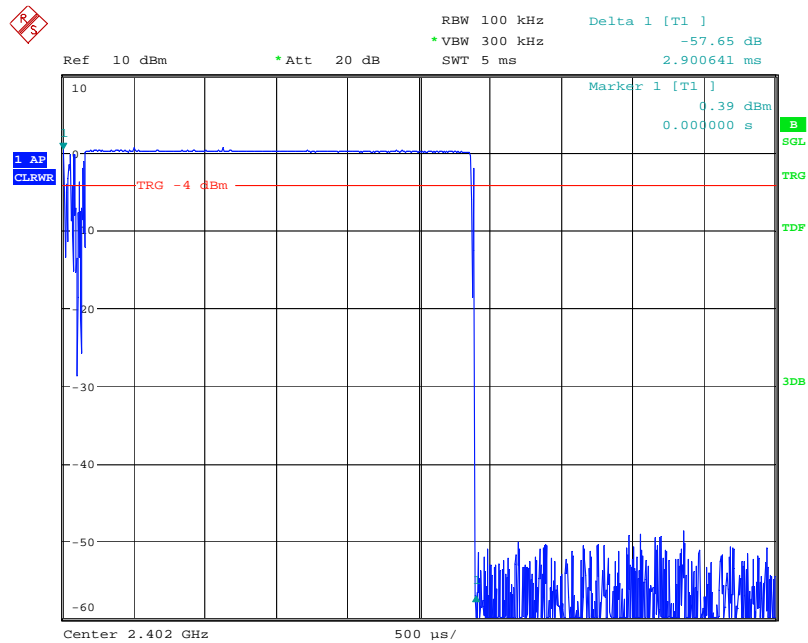
Mode	Number of transmission in a 31.6 (79 Hopping *0.4)	Length of transmission time (ms)	Measured (ms)	Limit (ms)	Result
GFSK DH5	19 (times / 5 s) * 6.32 = 120.08	2.90	348.232	400	Complies



Dwell time on each time used Plot on Configuration GFSK



Date: 22.JUN.2009 12:10:46



Date: 22.JUN.2009 12:12:23

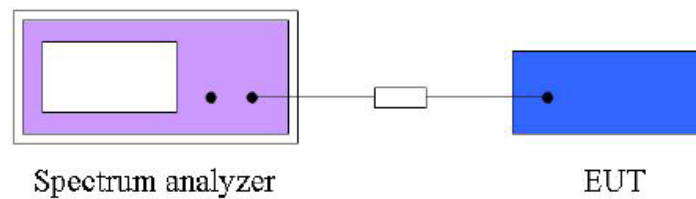


8. CHANNEL BANDWIDTH

8.1 Operating environment

Temperature : 25.0 °C
Relative Humidity : 30.0 % R.H.

8.2 Test Set-up (Layout)



8.3 Limit

For frequency hopping system operating in the 2 400 MHz ~ 2 483.5 MHz, If the 20 dB bandwidth of hopping channel is greater than 25 kHz, two-thirds 20 dB bandwidth of hopping channel shall be a minimum limit for the hopping channel separation.

8.4 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESI	Rohde & Schwarz	EMI test receiver	830482/010	12. 14. 2009

8.5 Test result

- Test Date : June 22, 2009
- Reference Standard : Part 15 Subpart C, Sec. 15.247(a)(1)
- Modulation : GFSK
- Operating Condition : Bluetooth RF transmitting mode
- Power Source : DC 3.7 V supplied from the lithium polymer battery

Spectrum Parameter

- Attenuation : Auto
- Span frequency : zero
- Resolution band width : 100 kHz
- Video band with : 100 kHz
- Sweep time : 5 s

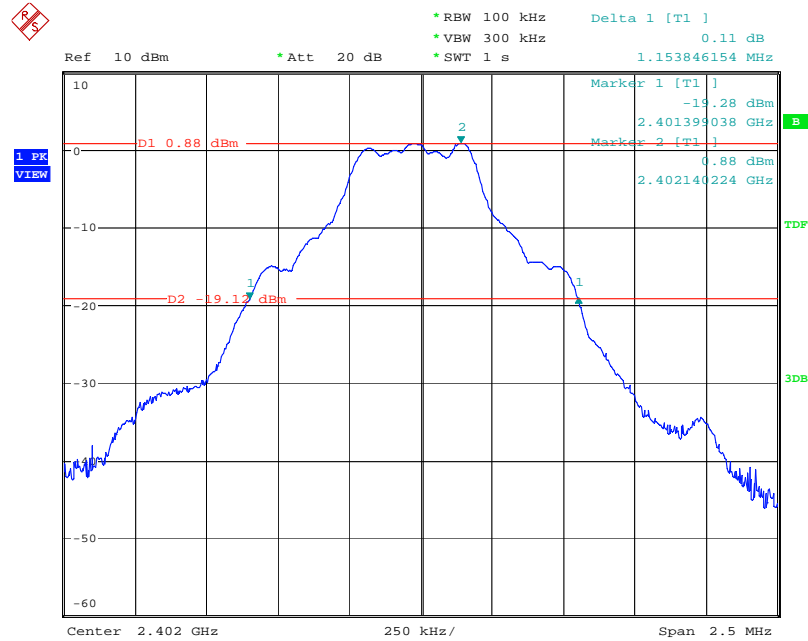


For GFSK

Channel	Channel frequency (MHz)	20 dB bandwidth (MHz)	Result
0	2 402	1.153	Complies
39	2 441	1.145	Complies
78	2 480	1.145	Complies

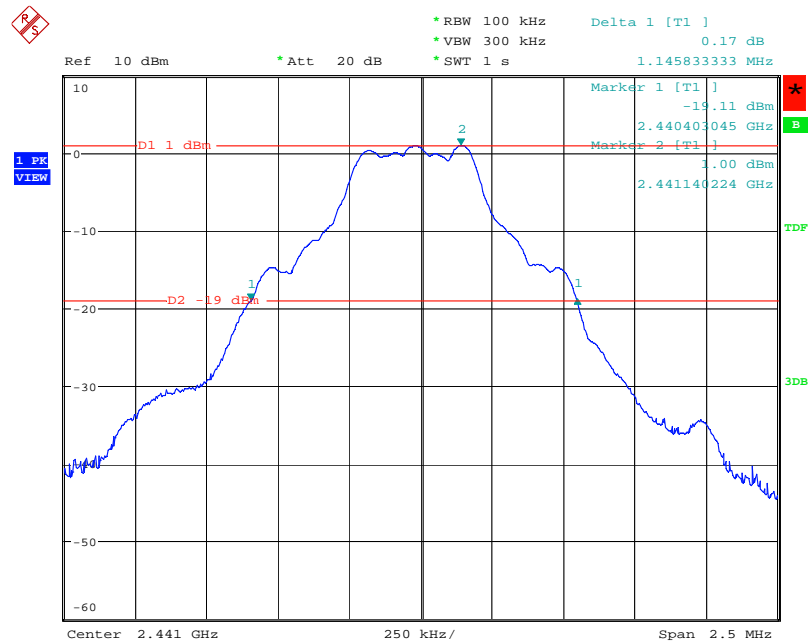


Channel bandwidth used Plot on Configuration GFSK/0 CH (2 402 MHz)



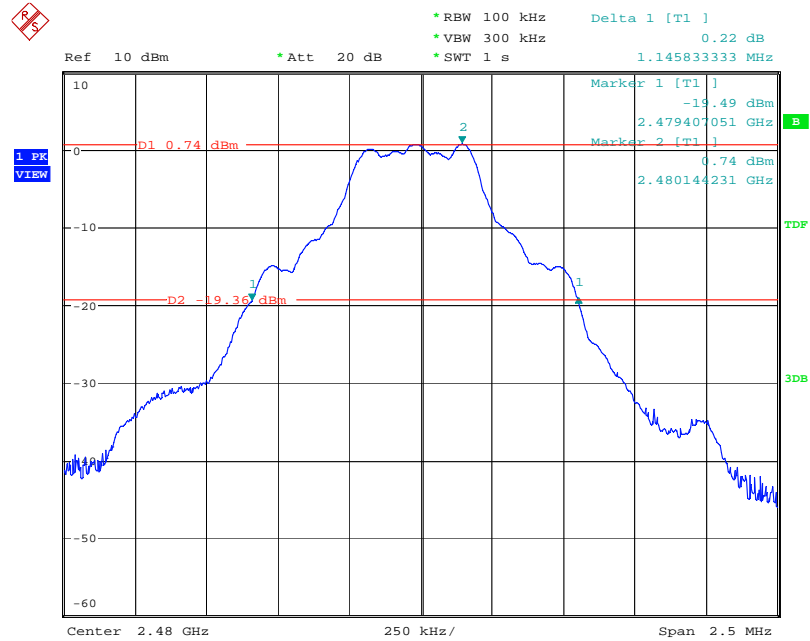
Date: 22.JUN.2009 12:38:47

Channel bandwidth used Plot on Configuration GFSK/39 CH (2 441 MHz)



Date: 22.JUN.2009 12:36:53

Channel bandwidth used Plot on Configuration GFSK/78 CH (2 480 MHz)



Date: 22.JUN.2009 12:34:40

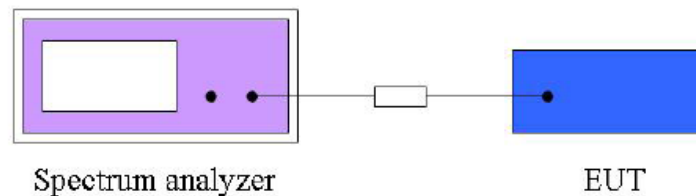


9. LIMIT OF HIPPIING CHANNEL SEPARATION

9.1 Operating Environment

Temperature : 25.0 °C
Relative Humidity : 30.0 % R.H.

9.2 Test Set-up (Layout)



9.3 Limit

For frequency hopping system operating in the 2 400 MHz ~ 2 483.5 MHz, If the 20 dB bandwidth of hopping channel is greater than 25 kHz, two-thirds 20 dB bandwidth of hopping channel shall be a minimum limit for the hopping channel separation.

9.4 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESI	Rohde & Schwarz	EMI test receiver	830482/010	12. 14. 2009

9.5 Test Result

- Test Date : February 18, 2009
- Reference Standard : Part 15 Subpart C, Sec. 15.247(a)(1)
- Modulation : GFSK
- Operating Condition : Bluetooth RF transmitting mode
- Power Source : DC 3.7 V supplied from the lithium polymer battery

Spectrum Parameter

- Attenuation : Auto
- Span frequency : 2.5 MHz
- Resolution band width : 100 kHz
- Video band with : 100 kHz
- Sweep time : 10 ms

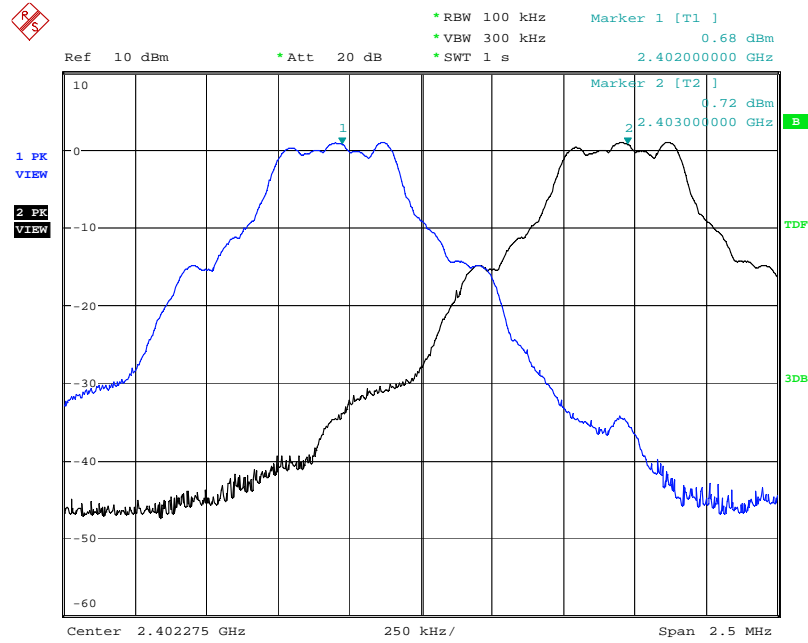


For GFSK

Channel	Channel frequency (MHz)	Adjacent channel separation (MHz)	Limit (MHz)	Result
0	2 402	1.000	> 0.5	Complies
39	2 441	1.000	> 0.5	Complies
78	2 480	1.000	> 0.5	Complies

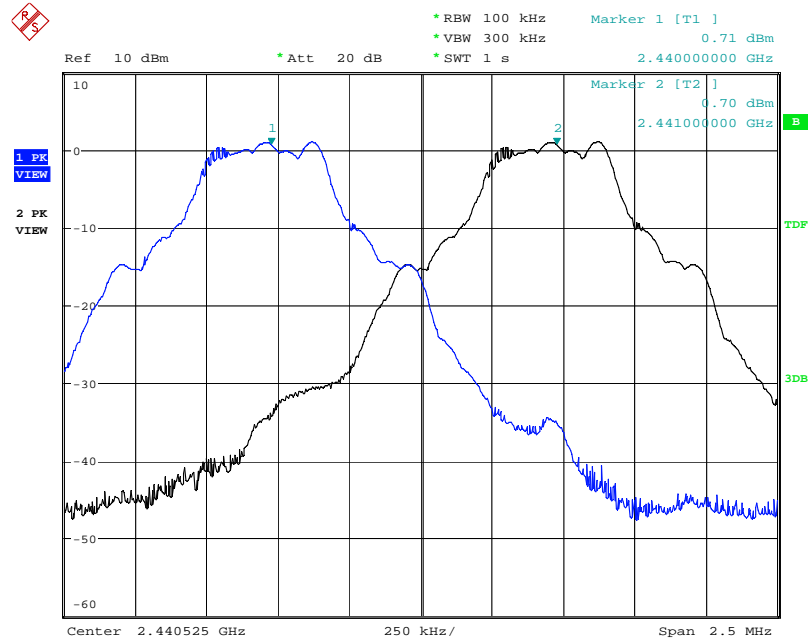


Channel separation used Plot on Configuration GFSK/0 CH (2 402 MHz)



Date: 22.JUN.2009 12:44:23

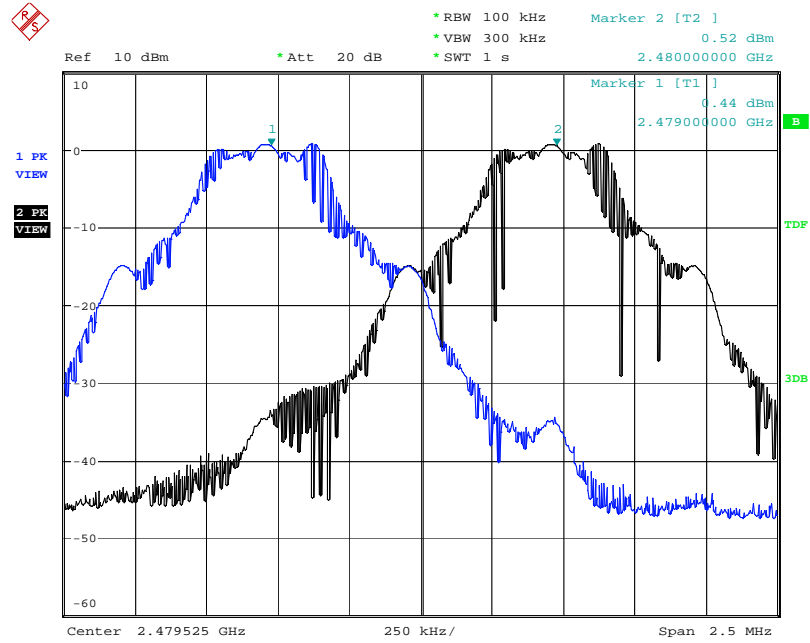
Channel separation used Plot on Configuration GFSK/39 CH (2 441 MHz)



Date: 22.JUN.2009 12:46:17



Channel separation used Plot on Configuration GFSK/78 CH (2 480 MHz)



Date: 22.JUN.2009 12:48:19

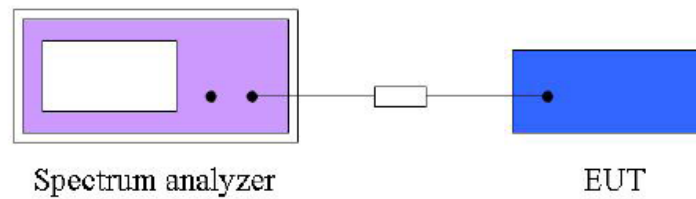


10. MAXIMUM PEAK OUTPUT POWER

10.1 Operating Environment

Temperature : 25.0 °C
Relative Humidity : 30.0 % R.H.

10.2 Test Set-up (Layout)



10.3 Limit

The maximum peak output power measurement is 125 mW

10.4 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESI	Rohde & Schwarz	EMI test receiver	830482/010	12. 14. 2009

10.5 Test Result

- Test Date : June 22, 2009
- Reference Standard : Part 15 Subpart C, Sec. 15.247(b)
- Modulation : GFSK
- Operating Condition : Bluetooth RF transmitting mode
- Power Source : DC 3.7 V supplied from the lithium polymer battery

Spectrum Parameter

- Attenuation : Auto
- Span frequency : 40 MHz
- Resolution band width : 3 MHz
- Video band with : 10 MHz
- Sweep time : 300 ms

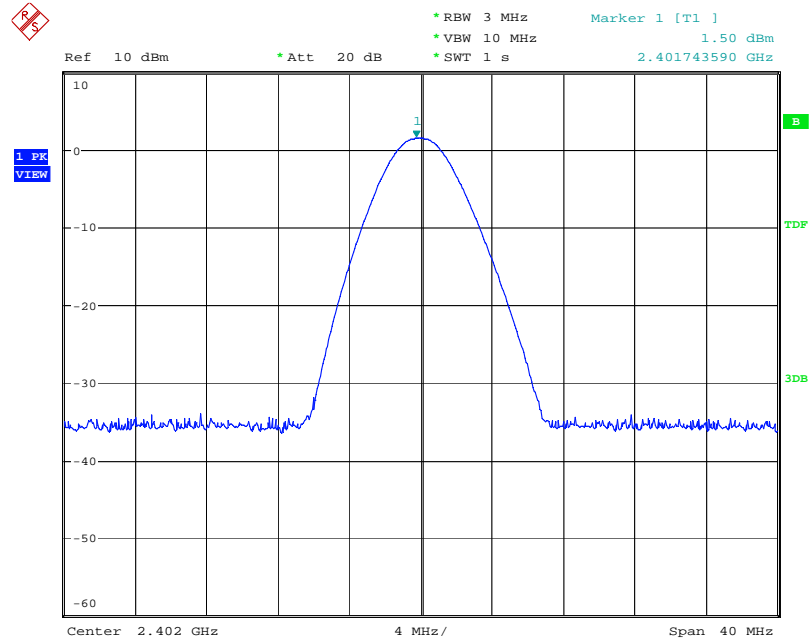


For GFSK

Channel	Channel frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Limit (mW)	Result
0	2 402	1.50	1.41	125	Complies
39	2 441	1.36	1.36	125	Complies
78	2 480	0.87	1.22	125	Complies

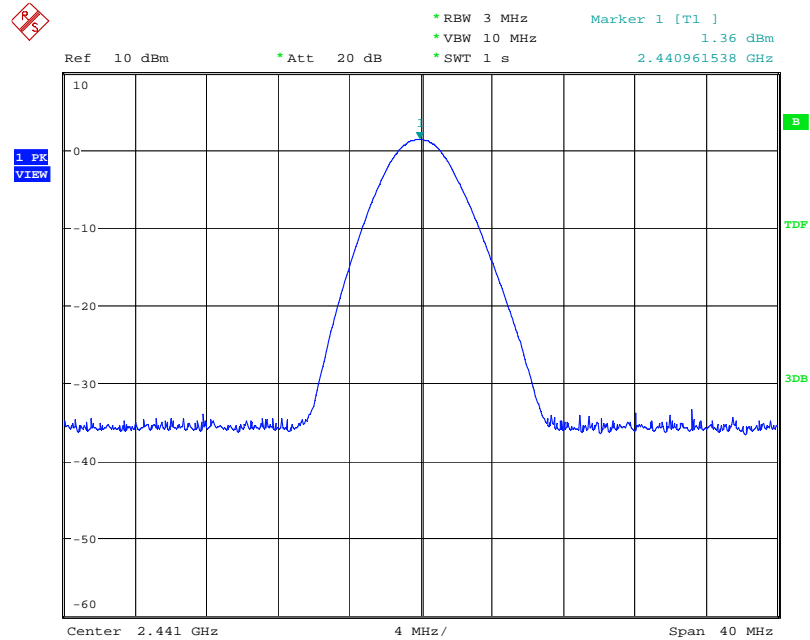


Maximum peak output power used Plot on Configuration GFSK/0 CH (2 402 MHz)



Date: 22.JUN.2009 13:05:19

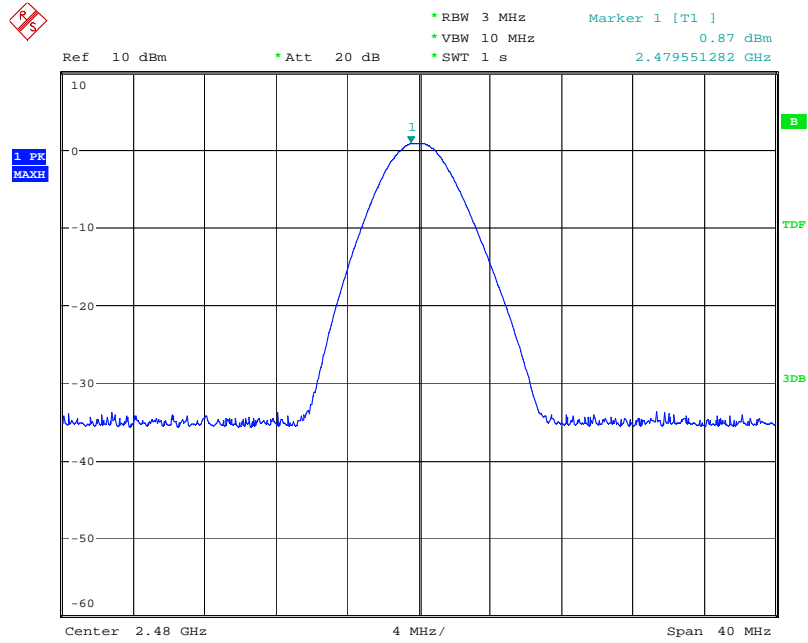
Maximum peak output power used Plot on Configuration GFSK/39 CH (2 441 MHz)



Date: 22.JUN.2009 13:07:01



Maximum peak output power used Plot on Configuration GFSK/78 CH (2 480 MHz)



Date: 22.JUN.2009 13:08:16

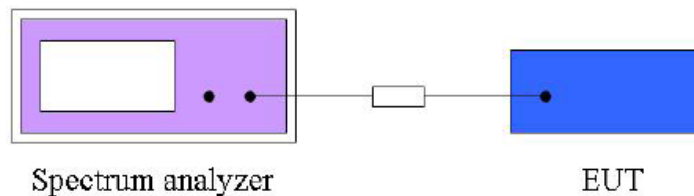


11. BAND EDGES MEASUREMENT

11.1 Operating Environment

Temperature : 25.0 °C
Relative Humidity : 30.0 % R.H.

11.2 Test Set-up (Layout)



11.3 Limit

Below -20 dB of the highest emission level of operating band (in 100 kHz resolution band width)

11.4 Test Equipment used

Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESI	Rohde & Schwarz	EMI test receiver	830482/010	12. 14. 2009
■ - ESCI	Rohde & Schwarz	EMI test receiver	830482/010	12. 14. 2009

11.5 Test Result

- Test Date : June 25, 2009
- Reference Standard : Part 15 Subpart C, Sec. 15.247(d)
- Modulation : GFSK
- Operating Condition : Bluetooth RF transmitting mode
- Power Source : DC 3.7 V supplied from the lithium polymer battery

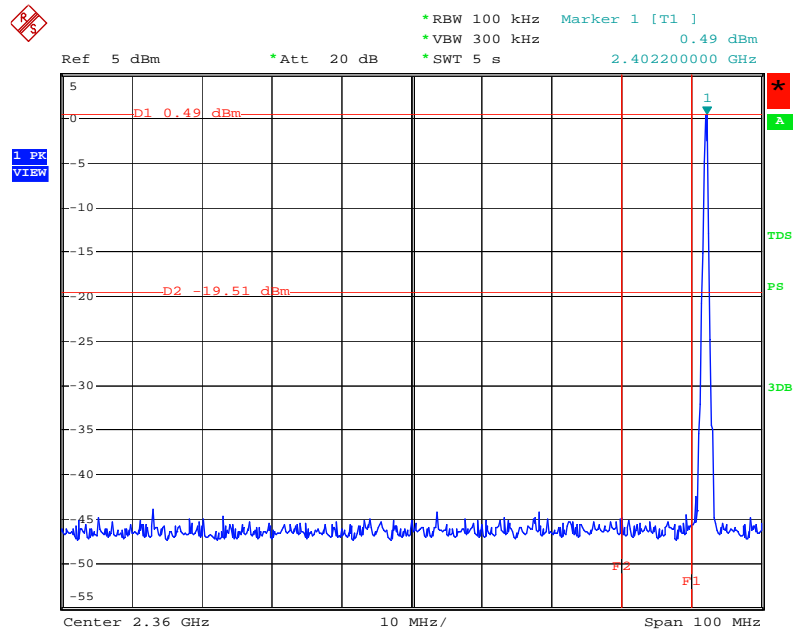
The spectrum plots are attached on the following 8 images. D1 line indicates the highest level, D2 line indicates the 20 dB offset below D1. It shows compliance with the requirement in part 15.247(d)

Spectrum Parameter

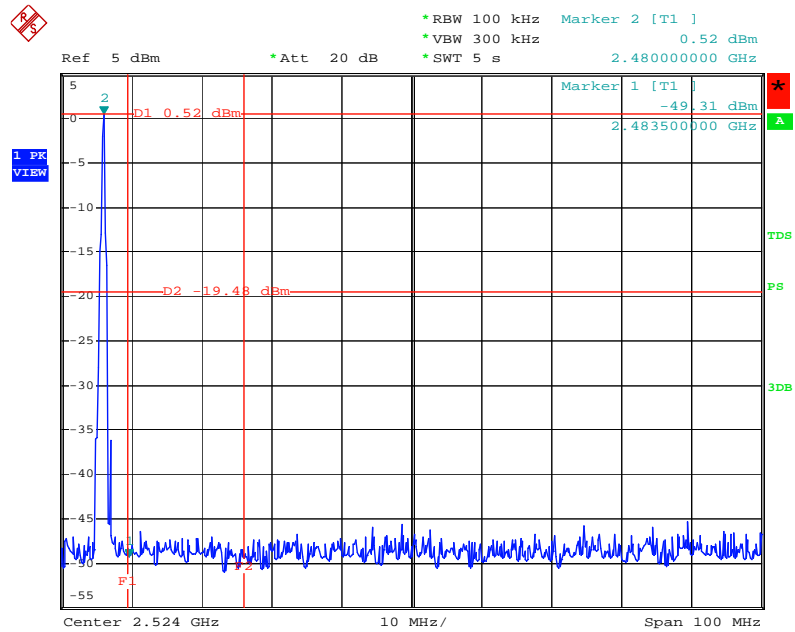
- Attenuation : Auto
- Resolution band width : 100 kHz
- Video band with : 100 kHz



Bandedge used Plot on Configuration



Date: 25.JUN.2009 12:55:25



Date: 25.JUN.2009 12:46:31



12. Radiated Emission

12.1 Operating Environment

Temperature : 20.0 °C
Relative Humidity : 47.0 % R.H.

12.2 Test Set-up

A preliminary scan with peak mode was performed in the semi anechoic chamber using the procedure in ANSI C63.4/2003 13.1.4.1 and found frequency for open area test site.

The formal radiated emission was measured at 3 m distance open area test site.

The EUT was placed on a non-conductive turntable approximately 0.8 m above the ground plane.

The turntable with EUT was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels.

This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

12.3 Measurement Uncertainty

The measurement uncertainty was calculated in accordance with ISO “Guide to the expression of uncertainty in measurement”.

The measurement uncertainty was given with a confidence of 95 %.

Test Items	Uncertainty	Remark
Radiated emission (30 MHz ~ 300 MHz, 3 m, Vertical)	± 3.54 dB	Confidence levels of 95 % (k=2)
Radiated emission (30 MHz ~ 300 MHz, 3 m, Horizontal)	± 3.49 dB	Confidence levels of 95 % (k=2)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Vertical)	± 3.85 dB	Confidence levels of 95 % (k=2)
Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Horizontal)	± 3.76 dB	Confidence levels of 95 % (k=2)
Radiated emission (30 MHz ~ 300 MHz, 10 m, Vertical)	± 3.21 dB	Confidence levels of 95 % (k=2)
Radiated emission (30 MHz ~ 300 MHz, 10 m, Horizontal)	± 3.32 dB	Confidence levels of 95 % (k=2)
Radiated emission (300 MHz ~ 1 000 MHz, 10 m, Vertical)	± 3.77 dB	Confidence levels of 95 % (k=2)
Radiated emission (300 MHz ~ 1 000 MHz, 10 m, Horizontal)	± 3.84 dB	Confidence levels of 95 % (k=2)



12.4 Limit

20dB in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009~0.490	2400/F (kHz)	300
0.490~1.705	2400/F (kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

12.5 Test Equipment used

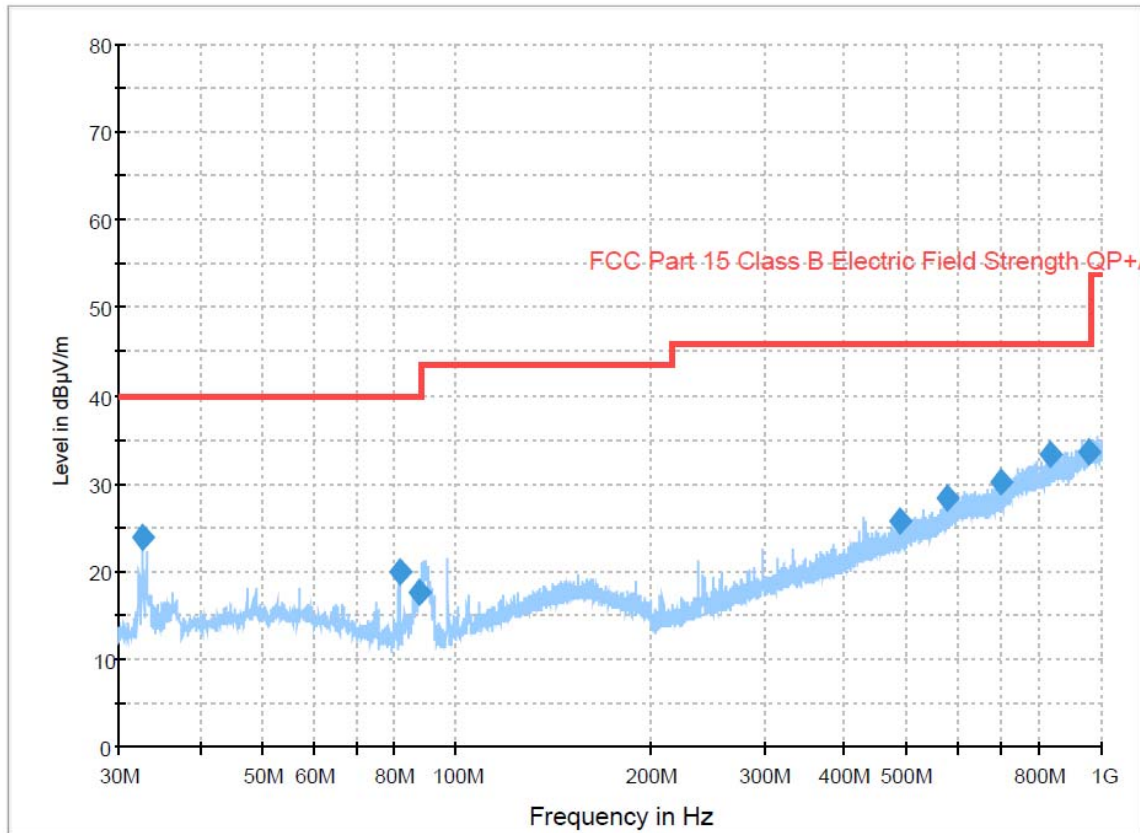
Model Name	Manufacturer	Description	Serial Number	Due to Calibration
■ - ESI	Rohde & Schwarz	EMI test receiver	830482/010	12. 14. 2009
■ - VULB3193	Schwarzbeck	Bi-log antenna	3193	12. 11. 2009
■ - MCU066	Maturo GmbH	Position Controller	1390306	N/A
■ - TT2.5SI	Maturo GmbH	Turntable	1390307	N/A
■ - AM4.0	Maturo GmbH	Antenna Mast	1390308	N/A
■ - BBHA9120D	Schwarzbeck	Horn antenna	207	12.26. 2009
■ - 3160	EMCO	Horn antenna	6741	12.26. 2009
■ - AFS44-00101800-25-10P-44	MITEQ	Preamplifier	1258943	11.11. 2009

12.6 Radiated emission test data

- Test Date	: June 25, 2009
- Reference Standard	: Part 15 Subpart C, Sec. 15.247(d)
- Modulation / Channel	: GFSK (0 CH / 39 CH / 78 CH)
- Operating Condition	: Bluetooth RF transmitting mode
- Measuring Distance	: 3 m
- Spectrum Resolution Bandwidth(6dB)	: 120 kHz / 1 MHz
- Detector mode	: Peak detector mode / Quasi Peak detector mode / Average detector mode
- Power Source	: DC 3.7 V supplied from the lithium polymer battery



Worst case result of radiated emission (30 MHz to 1 000 MHz): GFSK



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
32.640000	23.8	1000.0	120.000	150.0	V	262.0	12.0	16.2	40.0
81.600000	19.9	1000.0	120.000	330.0	V	315.0	9.6	20.1	40.0
87.920000	17.6	1000.0	120.000	341.0	V	37.0	9.6	22.4	40.0
485.200000	25.6	1000.0	120.000	324.0	V	24.0	20.2	20.4	46.0
577.320000	28.2	1000.0	120.000	400.0	V	7.0	22.6	17.8	46.0
700.320000	30.2	1000.0	120.000	268.0	H	26.0	24.6	15.8	46.0
833.440000	33.3	1000.0	120.000	285.0	V	16.0	27.2	12.7	46.0
957.320000	33.5	1000.0	120.000	175.0	H	60.0	28.9	12.5	46.0

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBμV/m)= 20 log Emission level(μV/m).

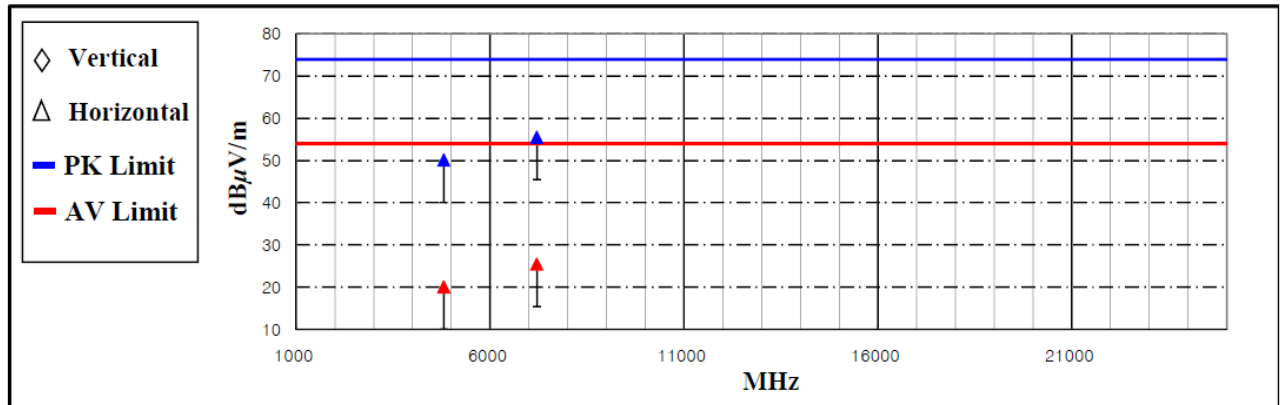
Corrected Reading: Antenna Factor + Cable Loss + Read value = Test result



Result of radiated emission (1 GHz to 10th harmonics)

(GFSK, 0 CH / 2402 MHz)

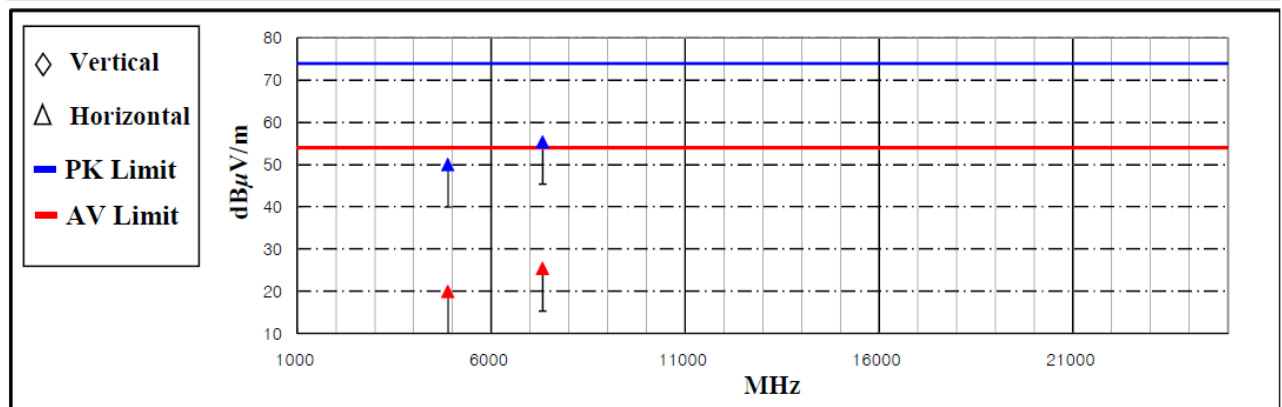
Frequency (MHz)	Measurement Level						Limit (dB μ V/m)		Margin (dB)		Positioning System		
	Reading Value (dB μ V/m)		AF	AMP / CL	Test Result (dB μ V/m)						Pol.	Height	Angle
	Peak	Average	(dB/m)	(dB)	Peak	Average	(H/V)	(cm)	(°)				
4804.00	52.52	22.52	31.35	-33.77	50.10	20.10	74.00	54.00	23.90	33.90	H	100	90
7206.00	48.04	18.04	36.18	-28.72	55.50	25.50	74.00	54.00	18.50	28.50	H	100	90



*Comment : AMP/CL_Cable loss value + AMP gain value
AF : Antenna factor value
Pol. : H(Horizontal), V(Vertical)

(GFSK, 39 CH / 2441 MHz)

Frequency (MHz)	Measurement Level						Limit (dBμ V/m)		Margin (dB)		Positioning System		
	Reading Value (dBμ V/m)		AF	AMP / CL	Test Result (dBμ V/m)						Pol.	Height	Angle
	Peak	Average	(dB/m)	(dB)	Peak	Average	(H/V)	(cm)	(°)				
4882.00	52.62	22.62	31.52	-34.16	49.98	19.98	74.00	54.00	24.02	34.02	H	100	90
7323.00	47.43	17.43	36.34	-28.39	55.38	25.38	74.00	54.00	18.62	28.62	H	100	90

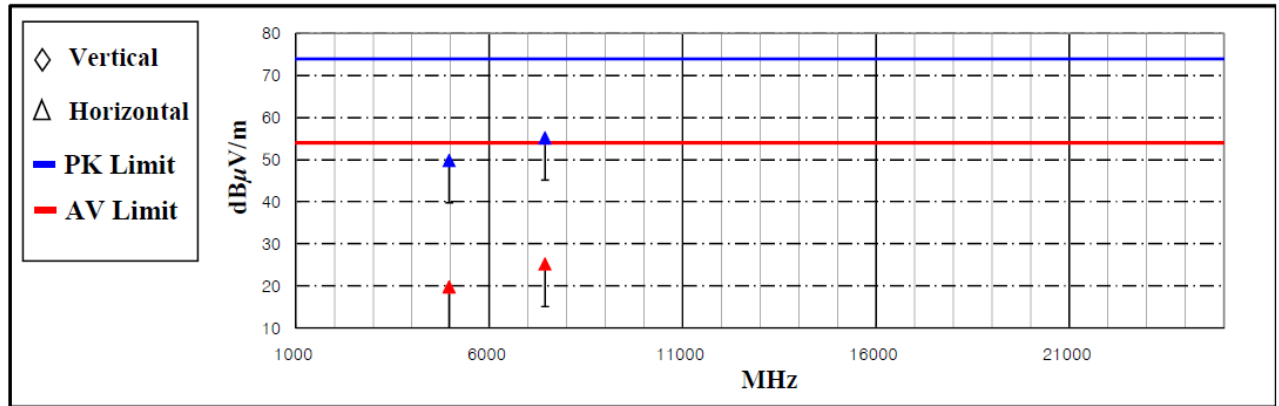


*Comment : AMP/CL_Cable loss value + AMP gain value
AF : Antenna factor value
Pol. : H(Horizontal), V(Vertical)



(GFSK, 78 CH / 2480 MHz)

Frequency (MHz)	Measurement Level						Limit (dBμ V/m)		Margin (dB)		Positioning System		
	Reading Value (dBμ V/m)		AF	AMP / CL	Test Result (dBμ V/m)						Pol.	Height	Angle
	Peak	Average	(dB/m)	(dB)	Peak	Average	Peak	Average	Peak	Average	(H/V)	(cm)	(°)
4960.00	52.28	22.28	31.70	-34.21	49.77	19.77	74.00	54.00	24.23	34.23	H	100	90
7440.00	46.73	16.73	36.50	-28.06	55.17	25.17	74.00	54.00	18.83	28.83	H	100	90



*Comment : AMP/CL_Cable loss value + AMP gain value
AF : Antenna factor value
Pol. : H(Horizontal), V(Vertical)

Note:

The DH5 packet was the worst case duty for a transmit dwell time on each channel, based upon Bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to:

$$20\log(3.125/100) = -30 \text{ dB}$$

$$\text{Average value} = \text{peak reading} - 20\log(\text{duty cycle}) = \text{peak value} - 30 \text{ dB}$$

$$\text{Emission level (dB}\mu\text{V/m)} = 20 \log \text{Emission level}(\mu\text{V/m})$$

$$\text{Corrected Reading: Reading value} + \text{AF (Antenna Factor)} + \text{AMP/CL (Cable Loss + Preamp factor)} = \text{Test result}$$