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JVC

Dates of Tests: August 06 ~ 10, 2007

Test Report S/N: LR500190708B

Test Site : LTA CO., LTD.

CERTIFICATION OF COMPLIANCE

FCC ID. / IC

ASIJ7V004 / 2320A-AAT100BT

APPLICANT

Victor Company of Japan Ltd

FCC Classification	:	FHSS Sequence Spread Spectrum (FHSS)
Manufacturing Description	:	WIRELESS TRANSMITTER
Manufacturer	:	SAMBON PRECISION & ELECTRONICS CO., LTD
Model name	:	AA-T100BT
Test Device Serial No.:	:	Identical prototype
Rule Part(s)	:	FCC Part 15.247 Subpart C; ANSI C-63.4-2003 RSS-210, Issue 7: 2007
Frequency Range	:	2402 ~ 2480MHz
RF power Class	:	0.0018 W - Conducted
Emission designator	:	893KF1D
Data of issue	:	August 28, 2007

This test report is issued under the authority of:

The test was supervised by:

Dong -Min JUNG, Technical Manager

Kyung-Taek LEE, Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. This report must not be used by the applicant to claim product endorsement by any agency.

NVLAP LAB Code.: 200723-0

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1. General information's

1-1 Test Performed

Company name : LTA Co., Ltd.
 Address : 243, Jubug-ri, Yangji-Myeon, Youngin-Si, Kyunggi-Do, Korea. 449-822
 Web site : <http://www.ltalab.com>
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Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competents of calibration and testing laboratory”.

1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2007-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	2009-06-20	EMC accredited Lab.
FCC	U.S.A	610755	2008-03-28	FCC filing
VCCI	JAPAN	R2133, C2307	2008-06-22	VCCI registration
IC	CANADA	IC5799	2008-04-23	IC filing

2. Information's about test item

2-1 Applicant

Company name : Victor Company of Japan Ltd
 Address : 12,3-chome, Moriya-cho,Kanagawa-ku,Yokohama,Kanagawa,221-8528, Japan
 Tel / Fax : +81-46-278-1804 / +81-46-278-1807

2-2 Manufacturer List

Company name : SAMBON PRECISION & ELECTRONICS CO., LTD
 Address : 204,Samjeong-dong,Ojeong-gu,Bucheon-City,Kyeonggi-Do,Korea
 Tel / Fax : +82-32-683-7300 / +82-32-672-7300

2-3 Equipment Under Test (EUT)

Trade name : WIRELESS TRANSMITTER
 FCC ID : ASIJ7V004
 IC : 2320A-AAT100BT
 Model name : AA-T100BT
 Serial number : Identical prototype
 Date of receipt : August 06, 2007
 EUT condition : Pre-production, not damaged
 Antenna type : Chip antenna, Gain 0dBi typ.
 Frequency Range : 2402 ~ 2480MHz
 RF output power Range : 0.0018 W - Conducted
 Number of channels : 79
 Channel spacing : 1MHz
 Channel Access Protocol : Frequency Hopping
 Type of Modulation : GFSK
 Power Source : 3.3V from a iPod mp3 device system

2-4 Tested frequency

	LOW	MID	HIGH
Frequency (MHz)	2402	2441	2480

2-5 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
iPod mp3 player	A1199	6U642NYSVQ5	APPLE-
-	-	-	-

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	RSS-210 Section	Parameter	Limit	Test Condition	Status (note 1)
15.247(a)	A8.1 (2)	Carrier Frequency Separation	> 25 kHz	Conducted	C
15.247(a)	A8.1 (4)	Number of Hopping Frequencies	> 75 hops		C
15.247(a)	A8.1 (1)	20 dB Bandwidth	< 1 MHz		C
15.247	A8.1 (4)	Dwell Time	< 0.4 seconds		C
15.247(b)	A8.4 (2)	Transmitter Output Power	< 1Watt		C
15.247(d)	A8.5	Conducted Spurious emission	> 20 dBc		C
15.247(d)	A8.5	Band Edge	> 20 dBc		C
15.249 / 15.209	A8.5	Field Strength of Harmonics	< 54 dBuV (at 3m)	Radiated	C
15.109	-	Field Strength	-		C
15.207 /15.107	-	AC Conducted Emissions	EN 55022	Line Conducted	NA
-	2.6	Spurious Emission of the Receiver	RSS-210 Table2	Radiated	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The Power of device is operated by 3.3Vdc from a iPod mp3 device system.

Note 3: The data in this test report are traceable to the national or international standards.

The sample was tested according to the following specification:

FCC Parts 15.247; ANSI C-63.4-2003

RSS-210, Issue 7:2007

3.2 Transmitter requirements

3.2.1 Carrier Frequency Separation

Procedure:

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

After the trace being stable, the reading value between the peaks of the adjacent channels using the marker-delta function was recorded as the measurement results.

The spectrum analyzer is set to:

Span = 3 MHz (wide enough to capture the peaks of two adjacent channels)

RBW = 30 kHz (1% of the span or more) Sweep = auto

VBW = 30 kHz Detector function = peak

Trace = max hold

Measurement Data:

Test Results	
Carrier Frequency Separation (MHz)	Result
0.997	Complies

- See next pages for actual measured spectrum plots.

Minimum Standard:

The EUT shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

Measurement Setup

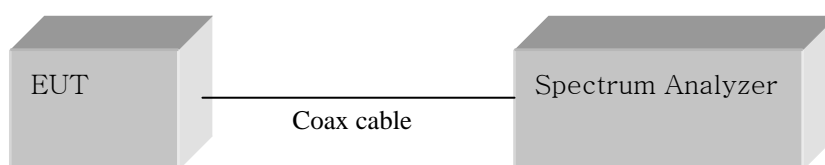
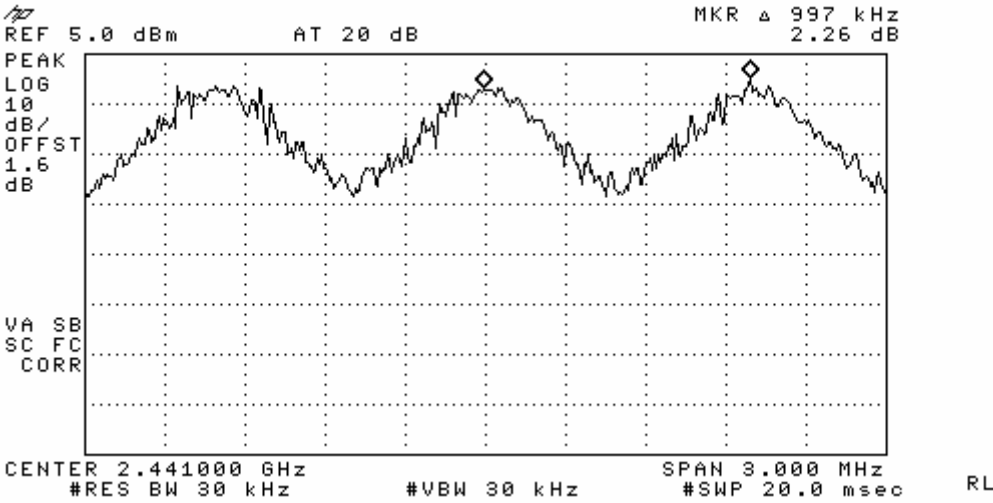


Figure 1: Measurement setup for the carrier frequency separation

Carrier Frequency Separation



3.2.2 Number of Hopping Frequencies

Procedure:

The number of hopping frequencies was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

To get higher resolution, four frequency ranges within the 2400 ~ 2483.5 MHz FH band were examined.

The spectrum analyzer is set to:

Frequency range 1: Start = 2389.5MHz, Stop = 2414.5 MHz

 2: Start = 2414.5MHz, Stop = 2439.5 MHz

 3: Start = 2439.5MHz, Stop = 2464.5 MHz

 4: Start = 2464.5MHz, Stop = 2489.5 MHz

RBW = 300 kHz (1% of the span or more) Sweep = auto

VBW = 300 kHz (VBW \geq RBW) Detector function = peak

Trace = max hold Span = 25MHz

Measurement Data: Complies

Total number of Hopping Channels	79
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- See next pages for actual measured spectrum plots.

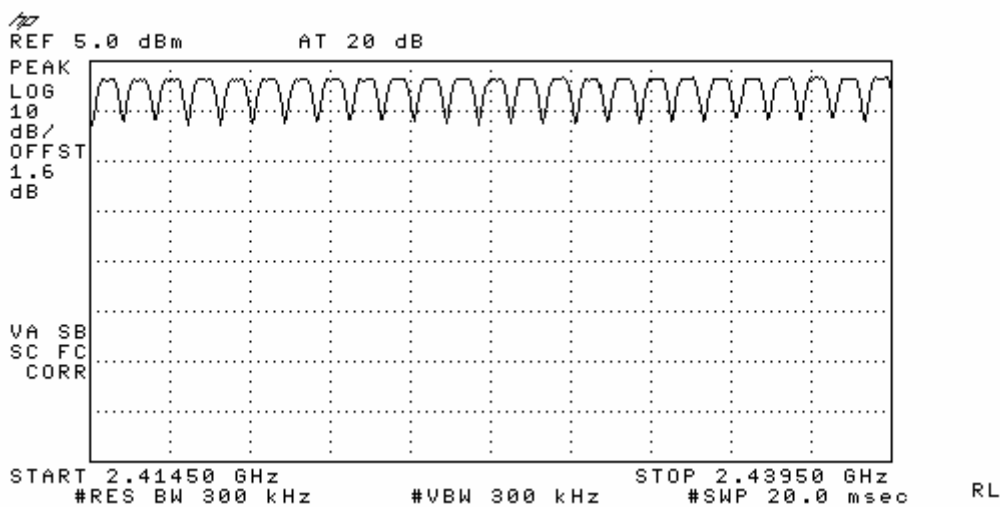
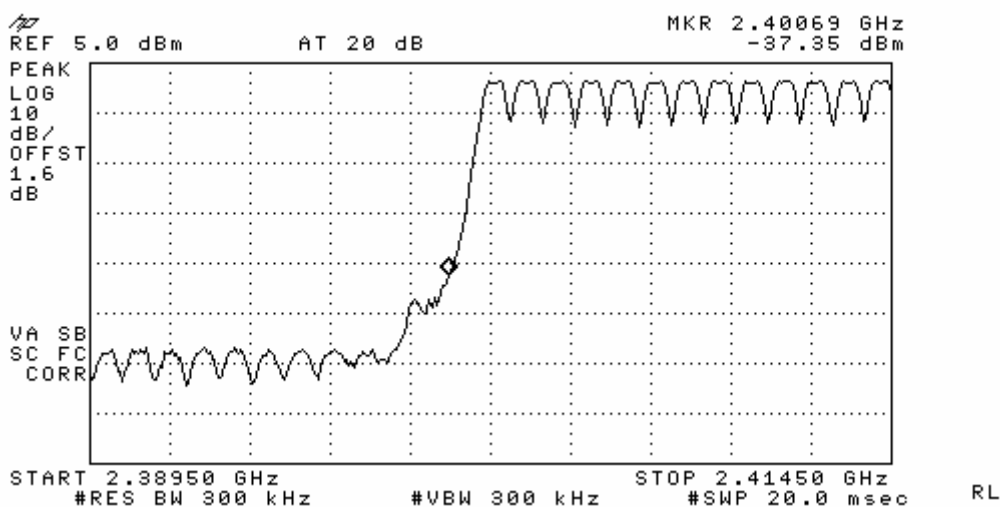
Minimum Standard:

At least 15 hops

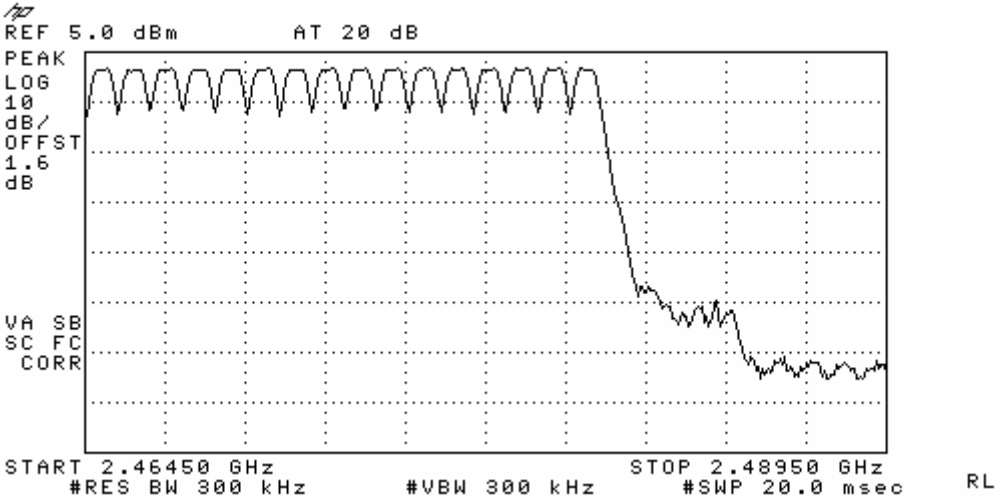
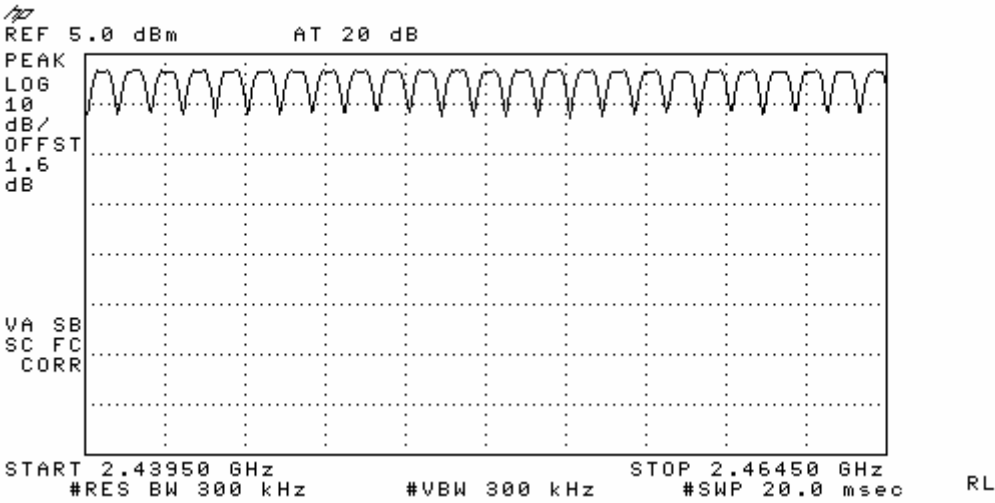
Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

Number of Hopping Frequencies



Number of Hopping Frequencies



3.2.3 20 dB Bandwidth

Procedure:

The bandwidth at 20 dB below the highest inband spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels..

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

Span = 2 MHz (approximately 2 or 3 times of the 20 dB bandwidth)

RBW = 30 kHz

Sweep = auto

VBW = 30 kHz (VBW \geq RBW)

Detector function = peak

Trace = max hold

Measurement Data:

Frequency (MHz)	Channel No.	Measured Bandwidth (MHz)	
		20dB Bandwidth	99% Bandwidth
2402	0	0.930	0.8925
2441	39	0.930	0.8700
2480	78	0.920	0.8925

- See next pages for actual measured spectrum plots.

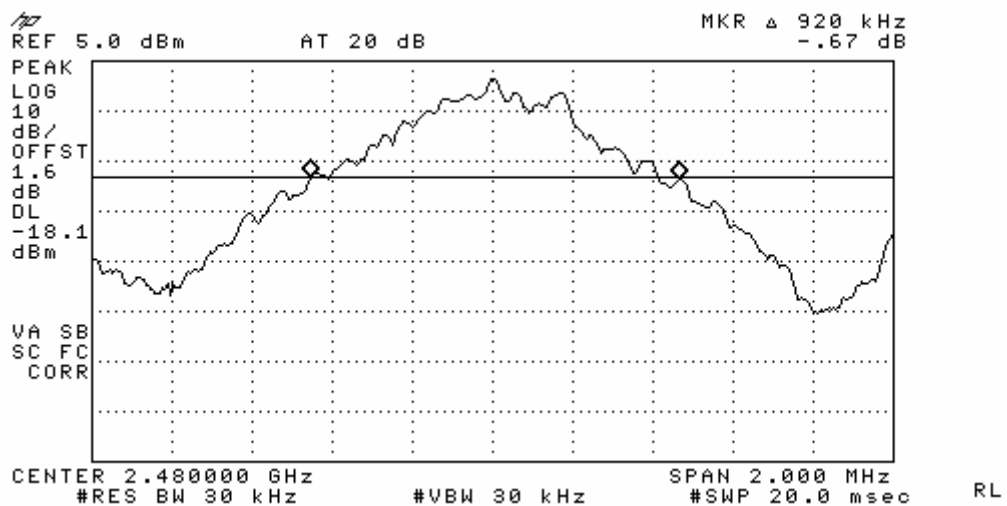
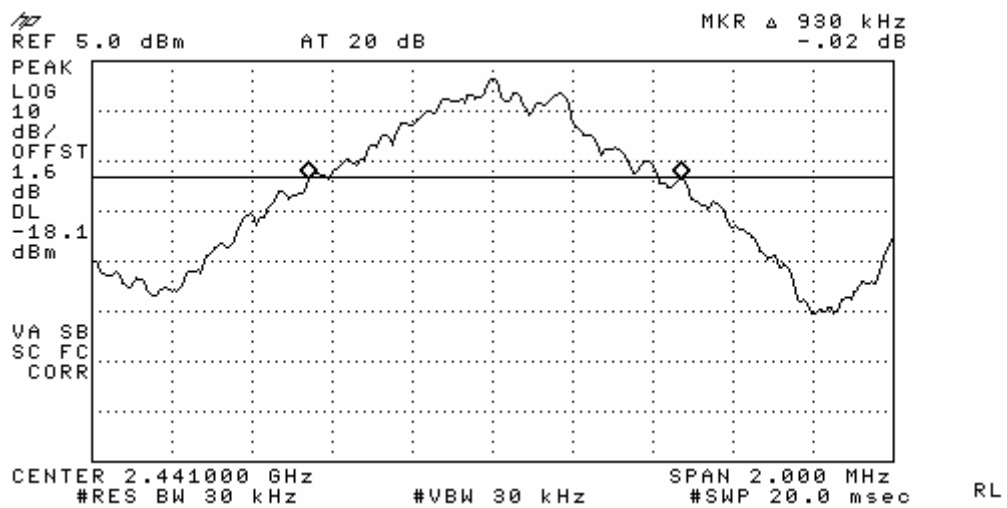
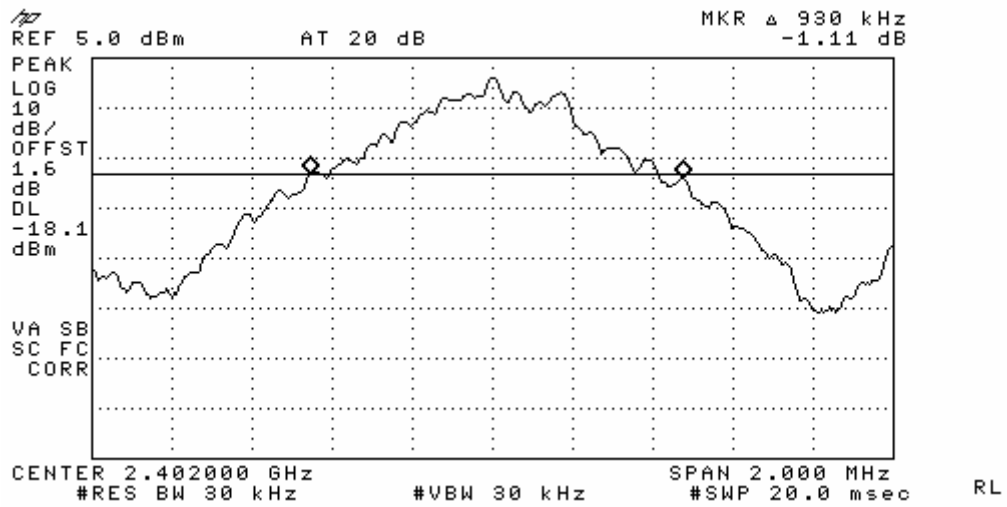
Minimum Standard:

The transmitter shall have a maximum 20dB bandwidth of 1 MHz.

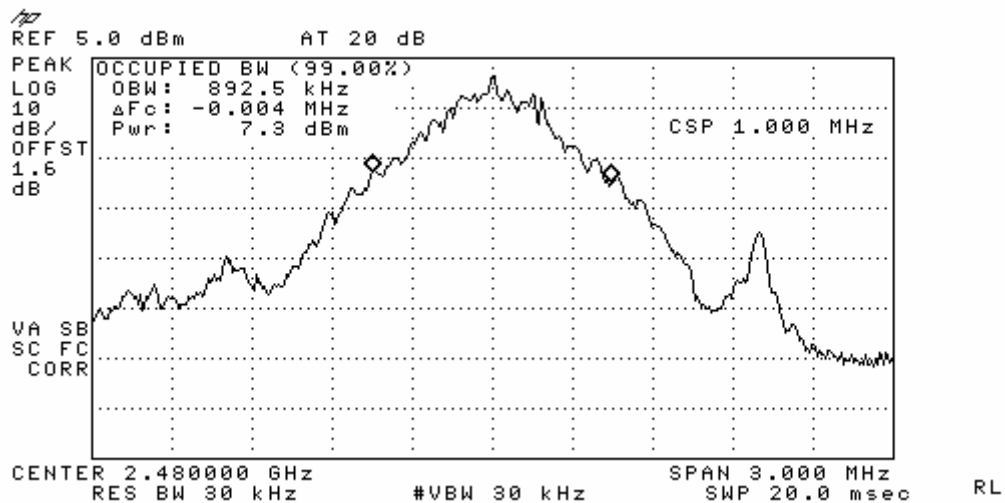
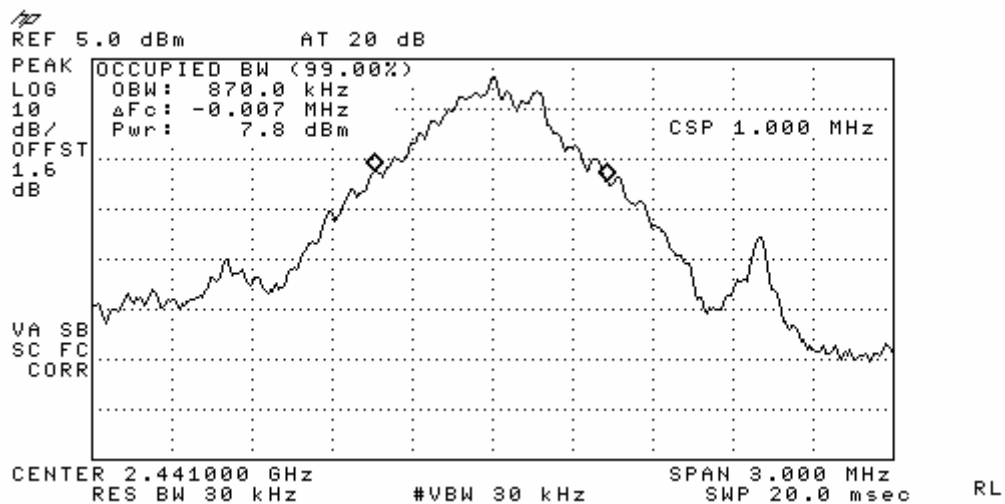
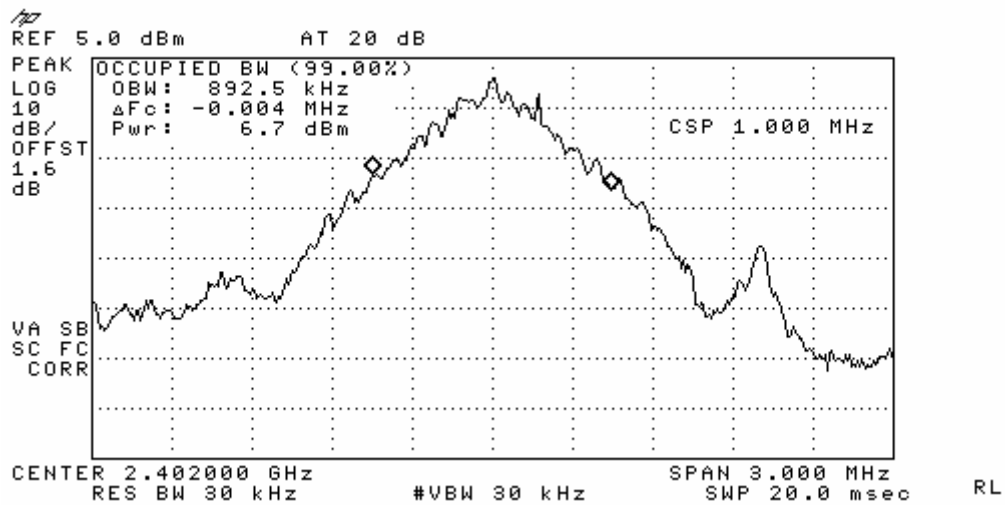
Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

20 dB Bandwidth



99% Bandwidth



3.2.4 Time of Occupancy (Dwell Time)

Procedure:

The dwell time was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

The spectrum analyzer is set to:

Center frequency = 2441 MHz

Span = zero

RBW = 1 MHz

VBW = 1 MHz (VBW \geq RBW)

Trace = max hold

Detector function = peak

Measurement Data:

Channel Number	Channel Frequency (MHz)	Packet Type	Test Results	
			Dwell Time (ms)	Result
39	2441	DH 1	144.05	Complies
		DH 3	269.94	Complies
		DH 5	314.15	Complies

- See next pages for actual measured spectrum plots.

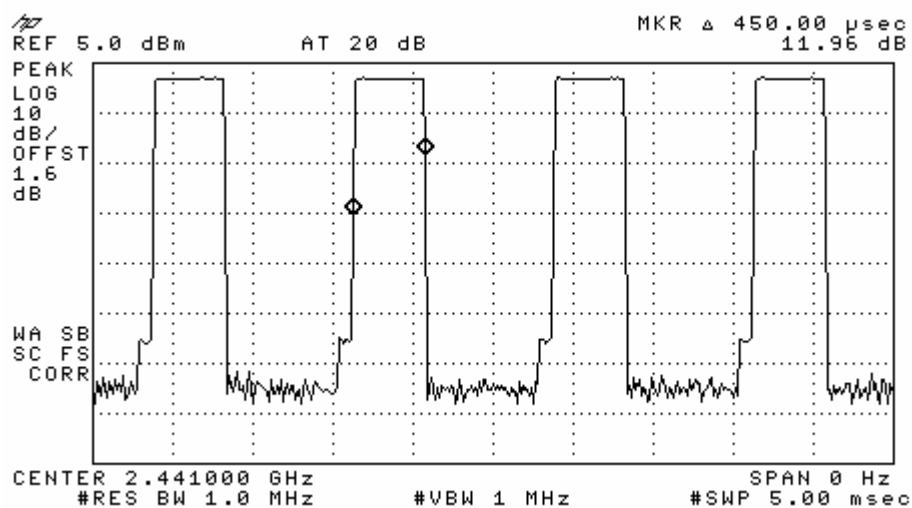
Minimum Standard:

0.4 seconds within a 30 second period per any frequency

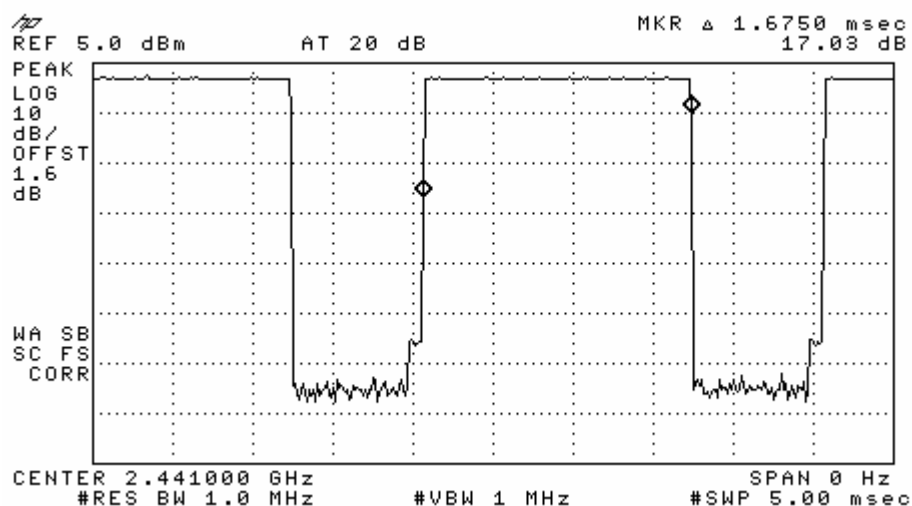
Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

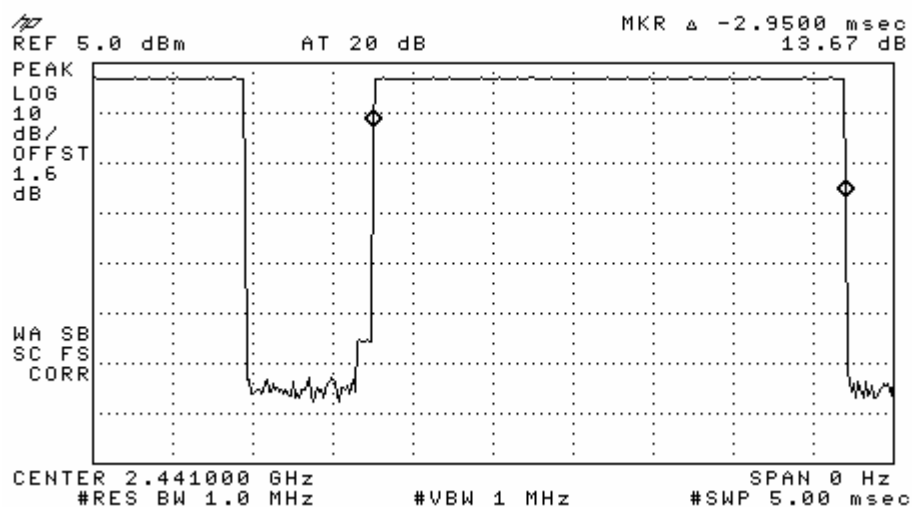
DH 1



DH 3



DH 5



3.2.5 Transmitter Output Power

Procedure:

The peak output power was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels..

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

Span = 3 MHz (approximately 5 times of the 20 dB bandwidth)

RBW = 1 MHz (greater than the 20dB bandwidth of the emission being measured)

VBW = 1 MHz (VBW \geq RBW)

Detector function = peak

Trace = max hold

Sweep = auto

Measurement Data:

Frequency (MHz)	Ch.	Test Results		
		dBm	W	Result
2402	0	1.75	0.001496	Complies
2441	39	2.38	0.001730	Complies
2480	78	2.53	0.001791	Complies

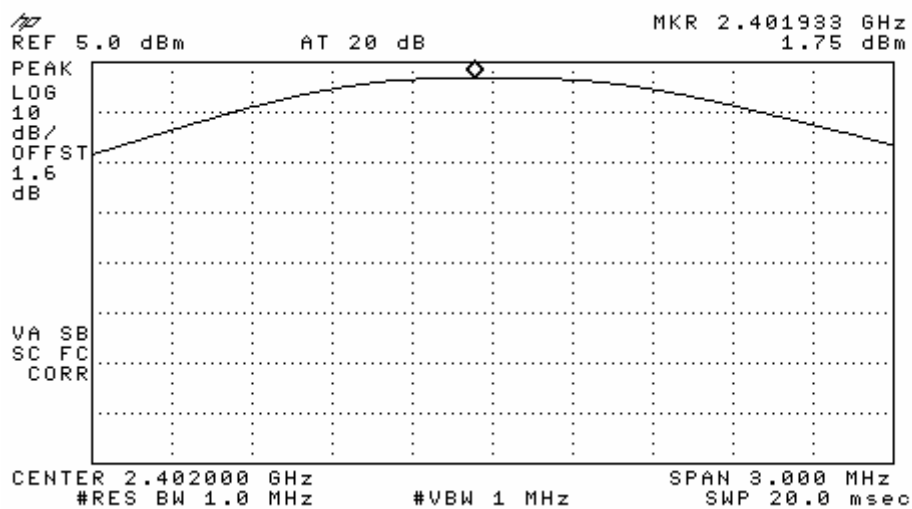
- See next pages for actual measured spectrum plots.

Minimum Standard:	< 1W
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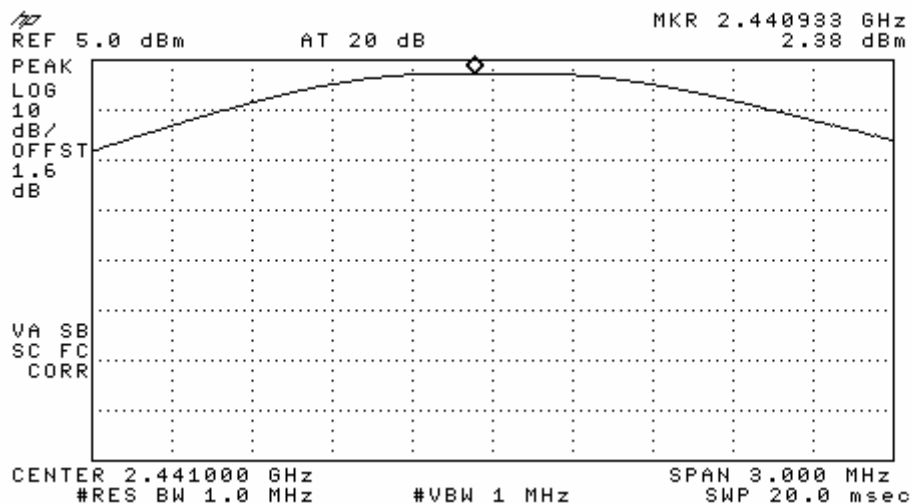
Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

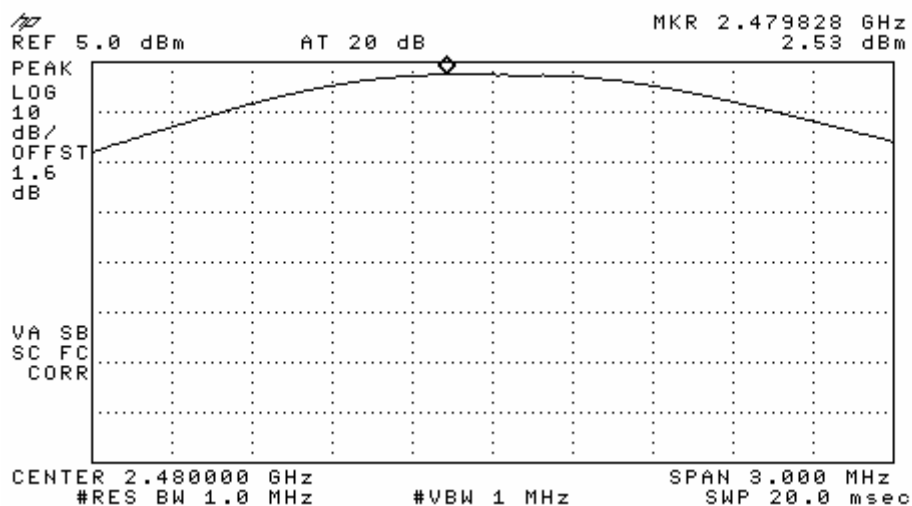
Peak Output Power



RL



RL



RL

3.2.6 Band Edge

Procedure:

The bandwidth at 20dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels.

After the trace being stable, Use the marker-to-peak function to measure 20 dB down both sides of the intentional emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz

VBW = 100 kHz

Span = 10 MHz

Detector function = peak

Trace = max hold

Sweep = auto

Measurement Data: Complies

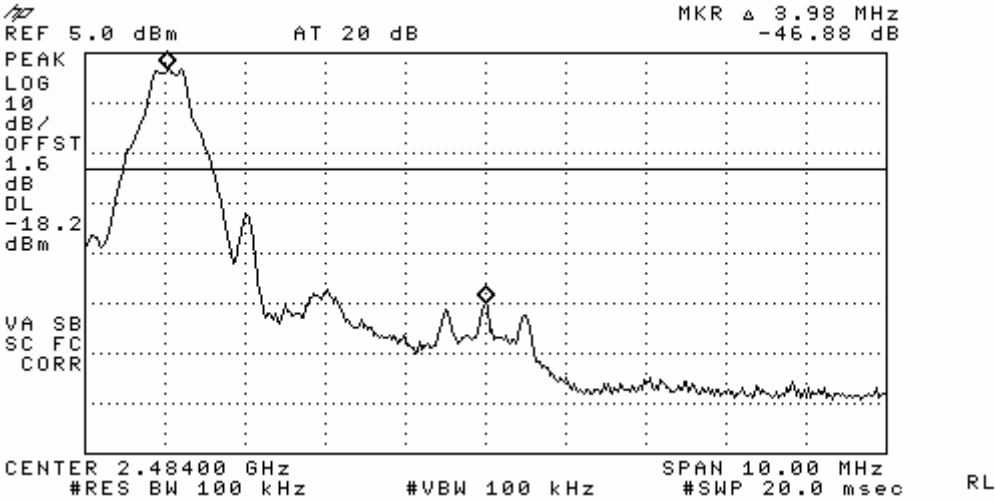
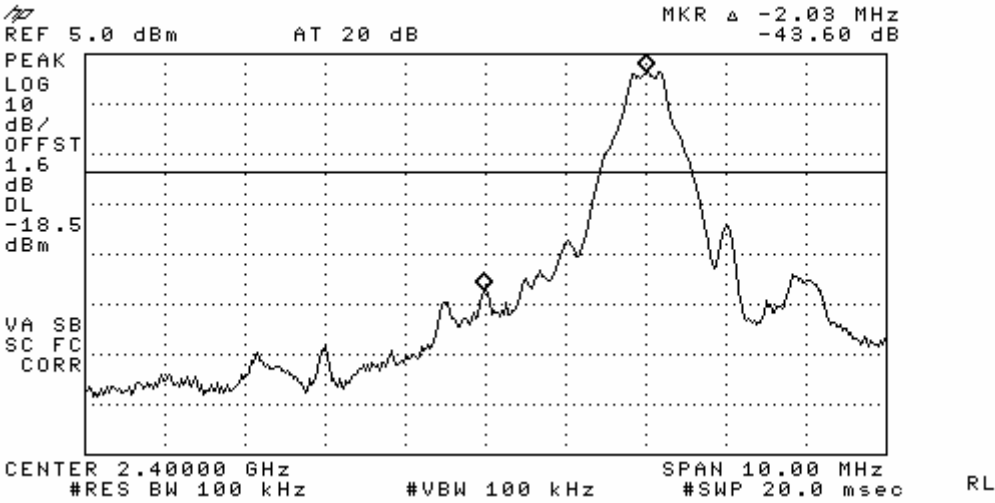
- All conducted emission in any 100kHz bandwidth outside of the spread spectrum band was at least 20dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.
- See next pages for actual measured spectrum plots.

Minimum Standard:	> 20 dBc
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Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

Band - edge



Band-edges in the restricted band 2483.5 ~ 2500 MHz measurement

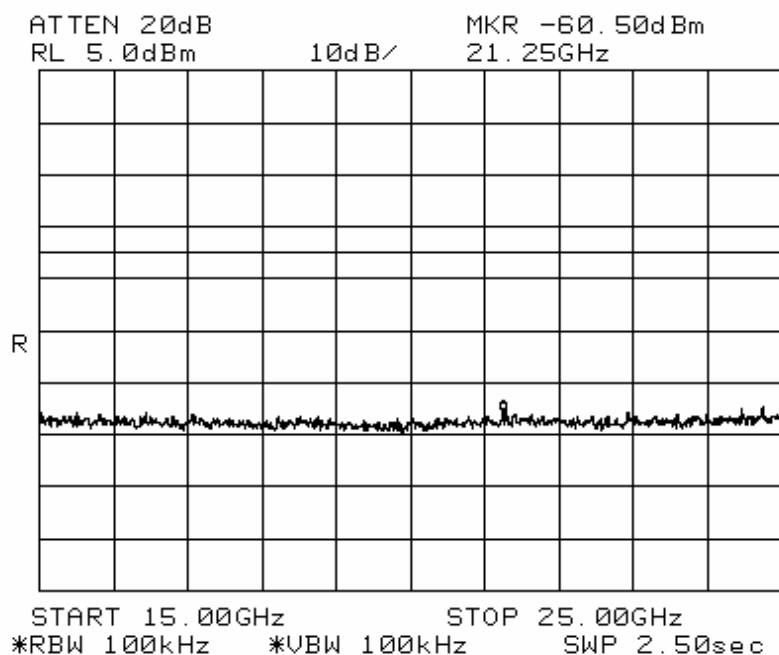
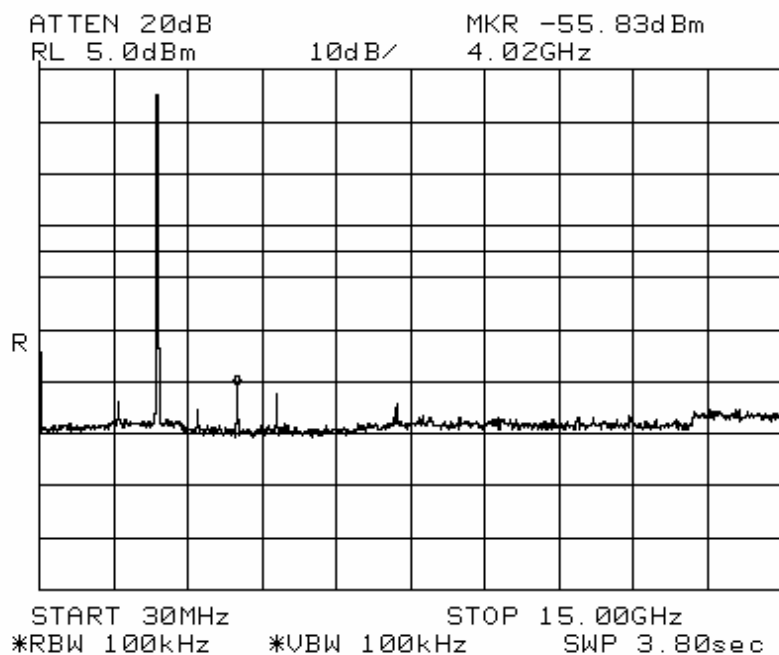
- Document DA 00-705 Marker Delta Method

Frequency (MHz)	Detect mode	Pol.	Reading (dBUV/m)	T.F (dB)	Step 1 Data	delta	Step 3 Data	Limit
2480	PK	V	53.81	34.6	88.41	46.88	41.53	74
	AV	V	43.01	34.6	77.61	46.88	30.73	54

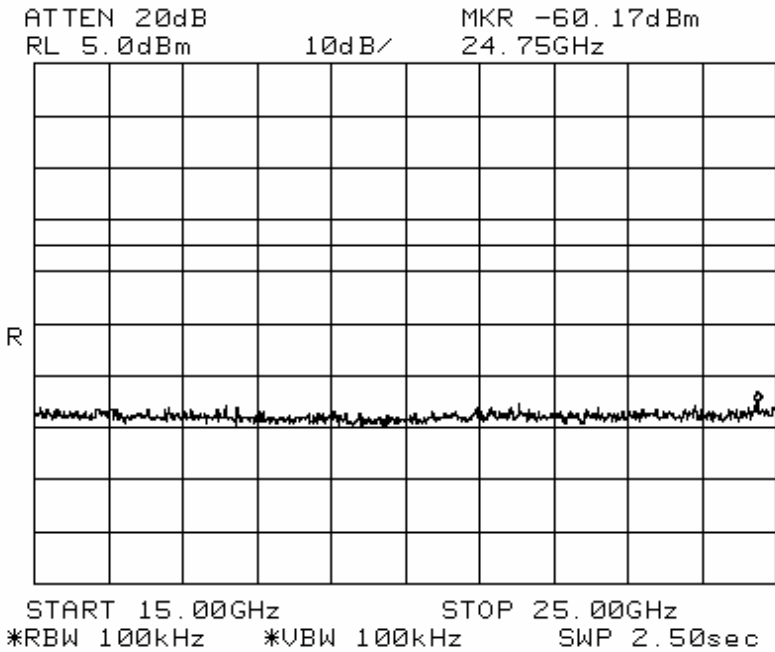
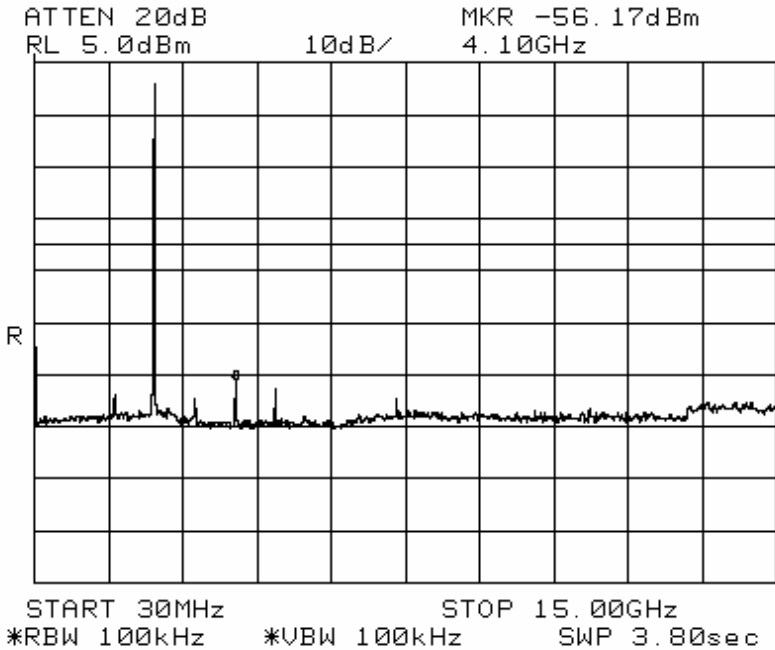
Note) Step 1 = Reading + T.F

T.F = Ant.F + Cable loss Step 3 = Step 1 – Delta Value

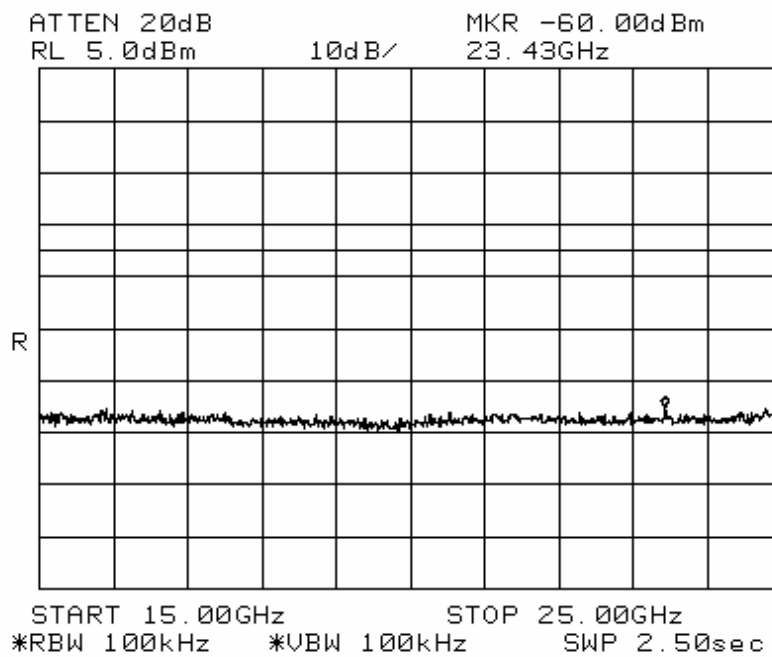
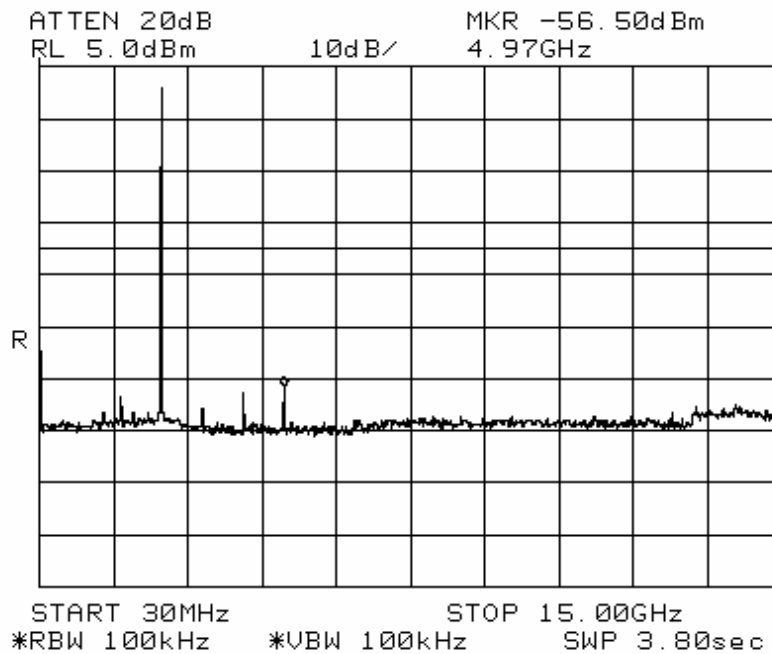
Band - edge (at 20 dB blow) – Low channel
Frequency Range = 30 MHz ~ 10th harmonic.



Band - edge (at 20 dB blow) – Mid channel
Frequency Range = 30 MHz ~ 10th harmonic.



Band - edge (at 20 dB blow) – High channel
Frequency Range = 30 MHz ~ 10th harmonic.



3.2.7 Field Strength of Harmonics

Procedure:

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency Range = 30 MHz ~ 10th harmonic.

RBW = 100 kHz (30MHz ~ 1 GHz)

VBW \geq RBW

= 1 MHz (1 GHz ~ 10th harmonic)

Span = 100 MHz

Detector function = Average

Trace = max hold

Sweep = auto

Measurement Data: Complies

Low channel		Mid channel		High channel	
Frequency (MHz)	Level (dBuV/m)	Frequency (MHz)	Level (dBuV/m)	Frequency (MHz)	Level (dBuV/m)
1602	40.2	1628	43.87	1654	50.91
4804	47.7	4882	48.37	4134	41.7
-	-	-	-	4960	45.23
Measurement uncertainty		± 6 dB			

No other emissions were detected at a level greater than 20dB below limit.

Minimum Standard: FCC Part 15.209(a)

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.



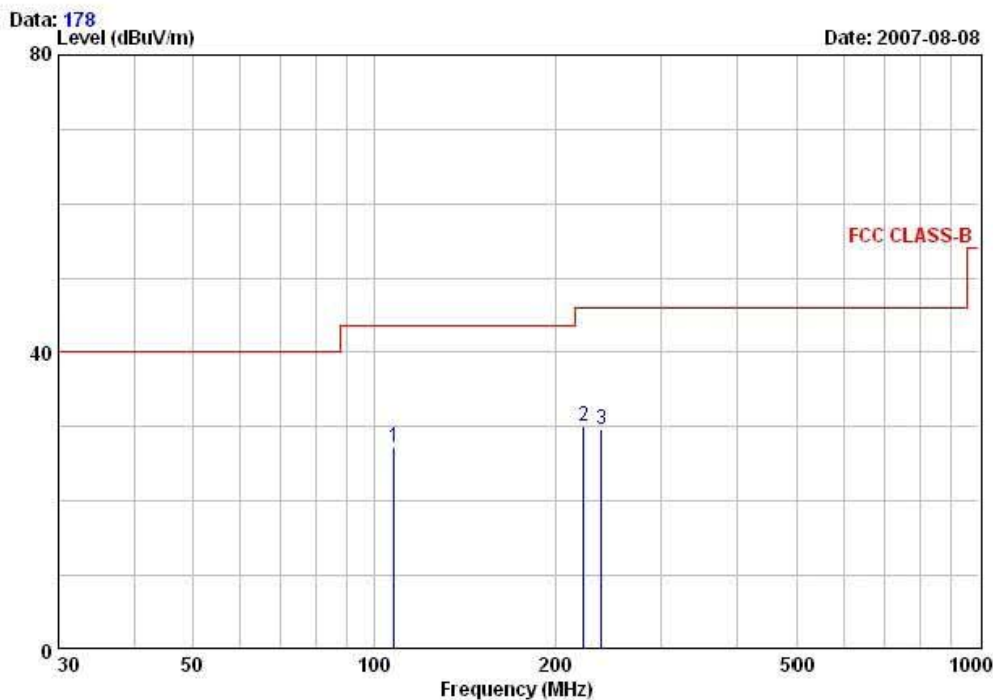
243 Jubug-ni, yangji-Myeon, Youngin-si,
Gyeonggi-do 449-822 Korea
Tel :+82-31-3236008,9
Fax:+82-31-3236010

EUT/Model No.: AA-T100BT

TEST MODE: BT mode

Temp Humi : 30 / 74

Tested by: KIM.B.S



	Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg	
1	108.25	41.00	-13.84	27.16	43.50	16.34	380	119	HORIZONTAL
2	222.98	42.50	-12.42	30.08	46.00	15.92	100	204	VERTICAL
3	238.25	41.20	-11.53	29.67	46.00	16.33	205	110	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

3.2.8 AC Conducted Emissions

Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

Measurement Data: Not Applicable

- The Power of device is operated by 3.3Vdc from a iPod mp3 device system.

Minimum Standard: FCC Part 15.207(a)/EN 55022

Frequency Range (MHz)	Conducted Limit (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

3.2.9 Receiver Spurious Emissions

Definition:

Receiver spurious emissions are emissions at any frequency when the equipment is in received mode.

Test method	:	RSS-210
Assigned Frequency band	:	2400 ~ 2483.5 MHz
Test mode	:	Receiving mode
Detect mode	:	Peak
Result	:	Complies

Measurement Data: Complies

Lowest frequency			Highest frequency		
Frequency (MHz)	Band-width (kHz)	Level (dBuV/m)	Frequency (MHz)	Band-width (kHz)	Level (dBuV/m)
1600.3	1000	43.44	1652.4	1000	47.70
-	-	-	2478.5	1000	47.03
-	-	-	3305.0	1000	49.87
-	-	-	-	-	-
Measurement uncertainty		± 6 dB			

No other emissions were detected at a level greater than 20dB below limit.

Minimum Standard:

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100
88 ~ 216	150
216 ~ 960	200
Above 960	500

Note: Transmitting devices are not permitted in Table 1 bands or in TV bands (54-72 MHz, 76-88MHz, 174-216MHz, 470-608MHz, and 614-806MHz). Prohibition of operation in TV bands does not apply to momentary devices, or to medical telemetry devices in the band 174-216 MHz, and to perimeter protection systems in the bands 54-72 and 76-88MHz. The perimeter protection devices are to meet Table 3 field strengths limits.

APPENDIX

TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Next Cal. Date
1	Spectrum Analyzer	8594E	3649A03649	HP	Apr-08
2	Signal Generator	8648C	3623A02597	HP	Apr-08
3	Attenuator (3dB)	8491A	37822	HP	Nov-07
4	Attenuator (10dB)	8491A	63196	HP	Nov-07
5	EMI Test Receiver	ESVD	843748/001	R&S	Jan-08
6	LISN	KNW-407	8-1430-1	Kyoritsu	Jan-08
7	Two-Line V-Network	ESH3-Z5	893045/017	R&S	Jan-08
8	RF Amplifier	8447D	2949A02670	HP	Jan-08
9	RF Amplifier	8447D	2439A09058	HP	Jan-08
10	RF Amplifier	8449B	3008A02126	HP	Apr-09
11	Test Receiver	ESHS10	828404009	R&S	Jan-08
12	TRILOG Antenna	VULB 9160	9160-3212	SCHWARZBECK	Jul-08
13	Log.-Per. Antenna	VULP 9118	9118 A 401	SCHWARZBECK	Apr-09
14	Biconical Antenna	BBA 9106	VHA 9103-2315	SCHWARZBECK	Apr-09
15	Horn Antenna	3115	00055005	ETS LINDGREN	Mar-09
16	Dipole Antenna	VHA9103	2116	Schwarzbeck	Nov-07
17	Dipole Antenna	VHA9103	2117	Schwarzbeck	Nov-07
18	Dipole Antenna	UHA9105	2261	Schwarzbeck	Nov-07
19	Dipole Antenna	UHA9105	2262	Schwarzbeck	Nov-07
20	Spectrum Analyzer	8591E	3649A05888	HP	Jan-08
21	Spectrum Analyzer	8563E	3425A02505	HP	Apr-08
22	Hygro-Thermograph	THB-36	0041557-01	ISUZU	Feb-08
23	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	Jun-08
24	RF Switch	MP59B	6200414971	ANRITSU	Jun-08
25	RF Switch	MP59B	6200438565	ANRITSU	Jun-08
26	Power Divider	11636A	6243	HP	Nov-07
27	DC Power Supply	6622A	3448A03079	HP	Oct-07
28	Attenuator (30dB)	11636A	6243	HP	Nov-07
29	Frequency Counter	5342A	2826A12411	HP	Apr-08
30	Power Meter	EPM-441A	GB32481702	HP	Apr-08
31	Power Sensor	8481A	2702A64048	HP	Apr-08
32	Audio Analyzer	8903B	3729A18901	HP	Nov-07
33	Modulation Analyzer	8901B	3749A05878	HP	Nov-07
34	TEMP & HUMIDITY Chamber	YJ-500	L05022	JinYoung Tech	Oct-07
35	LOOP-ANTENNA	FMZB 1516	151602/94	SCHWARZBECK	Mar-09