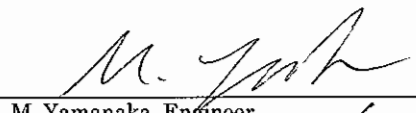


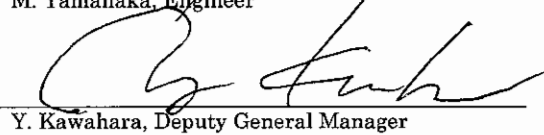
MEASUREMENT/TECHNICAL REPORT
FCC Part 15 Subpart C

Issued: October 4, 2007

Name and Address of the Applicant:	Welcat Inc. 4-12-8, Higashi-Shinagawa, Shinagawa Seaside East tower 6F, Sinagawa-ku Tokyo 140-0002, Japan
Test Item:	Handy Terminal (Bluetooth)
Identification:	GTX-100
Serial No.:	WBG0701031
Sample No.:	1
FCC ID:	Q98GTX100
Sample Receipt Date:	September 18, 2007
Test Specification:	CFR 47 Part.15 Subpart C 15.247
Date of Testing:	September 19 and 20, 2007
Test Result:	PASS

Report Prepared by:	Cosmos Corporation 2-3571 Ohnogi, Watarai-cho, Watarai-gun, Mie, Japan 516-2102 Phone: +81-596-63-0707 Fax: +81-596-63-0777
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Tested by:	 M. Yamanaka, Engineer	October 4, 2007 Date
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Reviewed by:	 Y. Kawahara, Deputy General Manager	October 4, 2007 Date
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Notes:

1. This report should not be reproduced except in full, without the written approval of Cosmos Corporation.
2. All measurement data contained in this report may have uncertainty. A judgment for the limitation should be taken into the count.
3. The report in this report apply only to the sample tested.

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1. Description of Equipment Under Test

1.1 Product Description

Manufacturer	: Welcat Inc.
Model (referred to as the EUT)	: GTX-100
Nominal Voltage	: DC 3.7V
Type of Modulation	: GFSK
Mode of Operation	: ☐ duplex ☐ 1/2 duplex ☒ simplex ☐ other
The type of the equipment	: ☒ Stand-alone ☐ Combined Equipment ☐ Plug –In Card ☐ Other (Module Unit)
The type of the antenna	: ☒ Integral ☐ external ☐ Other
The type of power source	: ☐ AC mains ☐ Dedicated AC adapter (V) ☐ DC Voltage ☒ Battery
The type of battery (if applicable)	: Lithium ion battery
Type of Operation	: ☐ Continuous ☒ Burst ☐ Intermittent
Stand by Mode	: ☐ Available ☒ N/A
Intended functions	: Bluetooth
The bandwidth of the IF filters	: N/A
Method of Communication Link	: Software to make maximum speed transmitting
The operating frequency band	: 2,402 to 2,480 MHz
The thermal limitation	: Not specified

1.2 Antenna Description

The following antenna is provided to EUT as the integrated original antenna.

No.	Type Name	Gain	Antenna Type	Remarks
1	KSCA-S2442CPLF	0.2dBi Max	Chip Monopole	Originally Integrated.

1.3 Accompanied Peripherals Description

The following equipment is accompanied with EUT as its peripheral.

No.	Equipment Name	Manufacturer	Type Name	Serial Number	Remarks
1	LITHIUM ION BATTERY PACK	Welcat	HBC-51	None	DC 3.7 V, 1700 mAh

2. General Information

2.1 Test Methodology

All measurement subject to the present report was carried out according to the procedures in ANSI C63.4: 2003.

2.2 Test Facility

All measurement was performed in the following facility;

Cosmos Corporation EMC Lab. Ohnogi

(2-3571 Ohaza-iwatachi, Ohnogi, Watarai-cho, Watarai-gun, Mie-ken 516-2102, Japan) The test firm has been filed since November 2, 2004 under CFR 47 Part.2.948.

2.3 Traceability

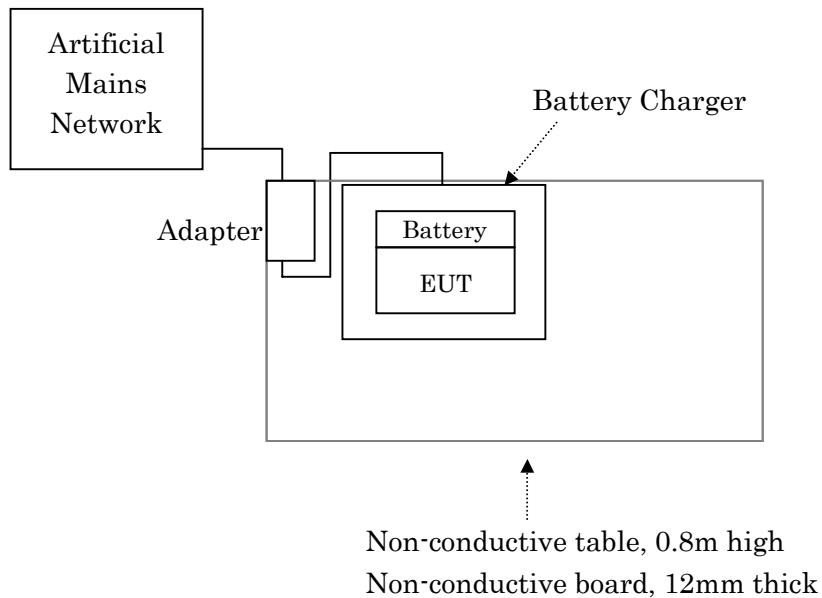
The calibration of measurement equipment used in the test subject to the present report is designed and operated to ensure that the measurement is traceable to national standards of measurement or equivalent abroad.

3. Summary of Test Results

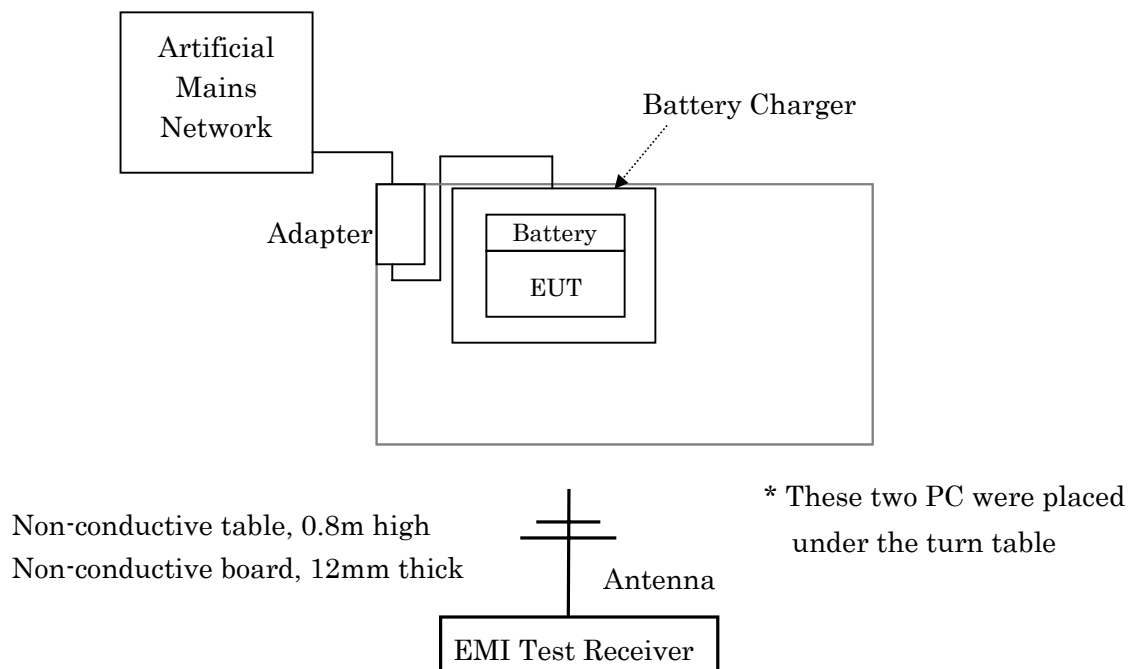
Section	Test Item	Limit	Result
15. 207	AC Power Conducted Emission	See 5.1.2	Pass
15. 247(a)(1)	Spectrum Bandwidth of Frequency Hopping Spread Spectrum System	< 1MHz if using less than 15 non-overlapping channels	Pass
15. 247(a)(1)	Channel Separation	> 2/3 of 20dB BW for systems with output power < 125mW	Pass
15. 247(a)(1)	Number of Channels	> 15 channels	Pass
15. 247(a)(1)	Time of Occupancy	< 0.4 sec in 30 sec period	Pass
15. 247(b)	Maximum Peak Output Power	Max. 30dBm	Pass
15. 247(c)	Transmitter Radiated Emissions	20dB less than the peak value	Pass
15. 247(c)	Band Edge Measurement	See 5.7.2	Pass

4. Test Configuration

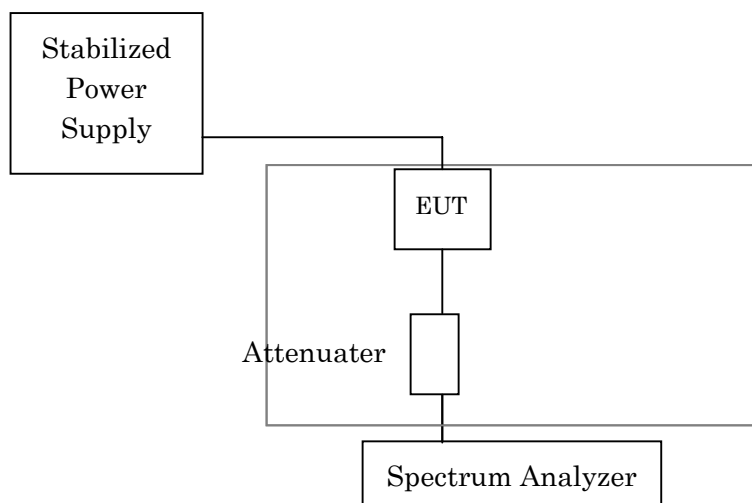
4.1 15. 207 AC Power Conducted Emission in Shield Room



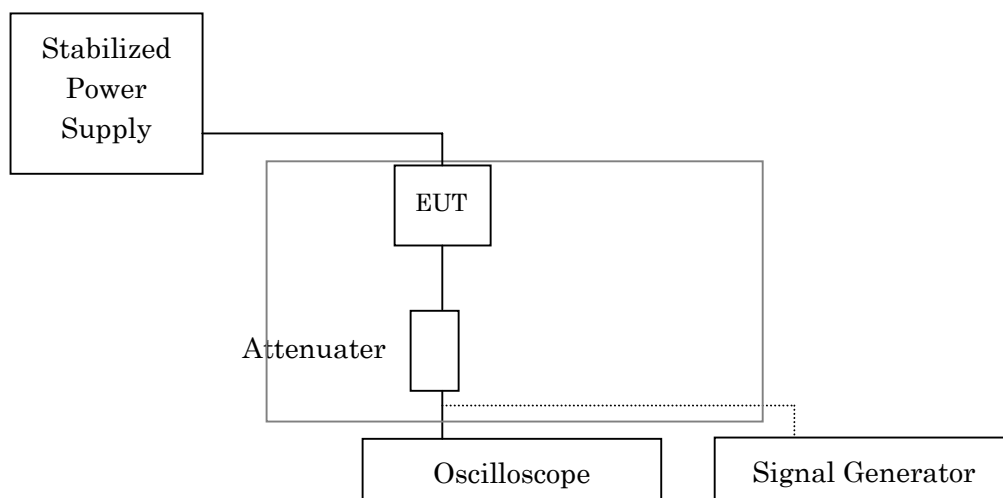
4.2 15. 247(c) Transmitter Radiated Emissions and Band Edge (Radiated) in 3m Anechoic Chamber



4.3 All Other Test Items (Except Maximum Peak Output Power)



4.4 Maximum Peak Output Power



4.5 Test Mode

In all test configurations above, EUT makes continuous RF transmitting with maximum power.

All conducted measurement is performed with an external stabilized power supply voltage varied between 85% and 115% of the nominal rated supply voltage in accordance with the section 15.31 (e) of the part.

5. Measurement Result

5.1 15. 207 AC Power Conducted Emission

5.1.1 Setting Remarks

- Configure the EUT System in accordance with ANSI C63.4-2003.
- A wooden test table (1.5m×1.0m, height 0.8m) is used.
- EUT's dedicated AC adapter connected to Artificial Mains Network (AMN).
- Other power cord of support equipment is connected to another AMN to isolate its emission from the measured emission of EUT.
- The measuring port of AMN for support equipment is terminated by the 50Ω
- Activate the EUT System and run the software prepared for the test, if necessary.
- See test configuration figure 4.1.

5.1.2 Minimum Standard

(a) 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 of Emission (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.

5.1.3 Result

EUT complies with the requirement.

Uncertainty of measurement : ± 2.26 dB
Temperature, Humidity : 23°C, 54%

5.1.4 Measured Data

Measured Value Table

Model Name : GTX-100
Serial No. : WBG0701075
Operator : M.Yamanaka
Power Supply : AC120V,50Hz

Job No : CJ07-064127E
Temp/Humi : 23 /54%
Condition : Charged
Remark :

Memo :

LIMIT : FCC 15.207(QP)
FCC 15.207(AV)

No	Freq. [MHz]	Reading Level		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		QP	AV		QP	AV	QP	AV	QP	AV		
		[dBuV]	[dBuV]		[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	41.9	28.2	10.2	52.1	38.4	66.0	56.0	13.9	17.6	La	
2	0.19830	35.1	22.6	9.9	45.0	32.5	63.7	53.7	18.7	21.2	La	
3	0.24805	27.7	15.0	9.9	37.6	24.9	61.8	51.8	24.2	26.9	La	
4	0.64335	23.4	19.3	10.3	33.7	29.6	56.0	46.0	22.3	16.4	La	
5	19.63580	20.7	13.0	10.9	31.6	23.9	60.0	50.0	28.4	26.1	La	
6	0.15000	40.6	26.8	10.2	50.8	37.0	66.0	56.0	15.2	19.0	Lb	
7	0.19930	33.5	20.7	9.9	43.4	30.6	63.6	53.6	20.2	23.0	Lb	
8	0.24735	26.0	14.1	9.9	35.9	24.0	61.8	51.8	25.9	27.8	Lb	
9	0.64440	21.2	15.9	10.3	31.5	26.2	56.0	46.0	24.5	19.8	Lb	
10	19.52210	20.7	12.6	10.8	31.5	23.4	60.0	50.0	28.5	26.6	Lb	

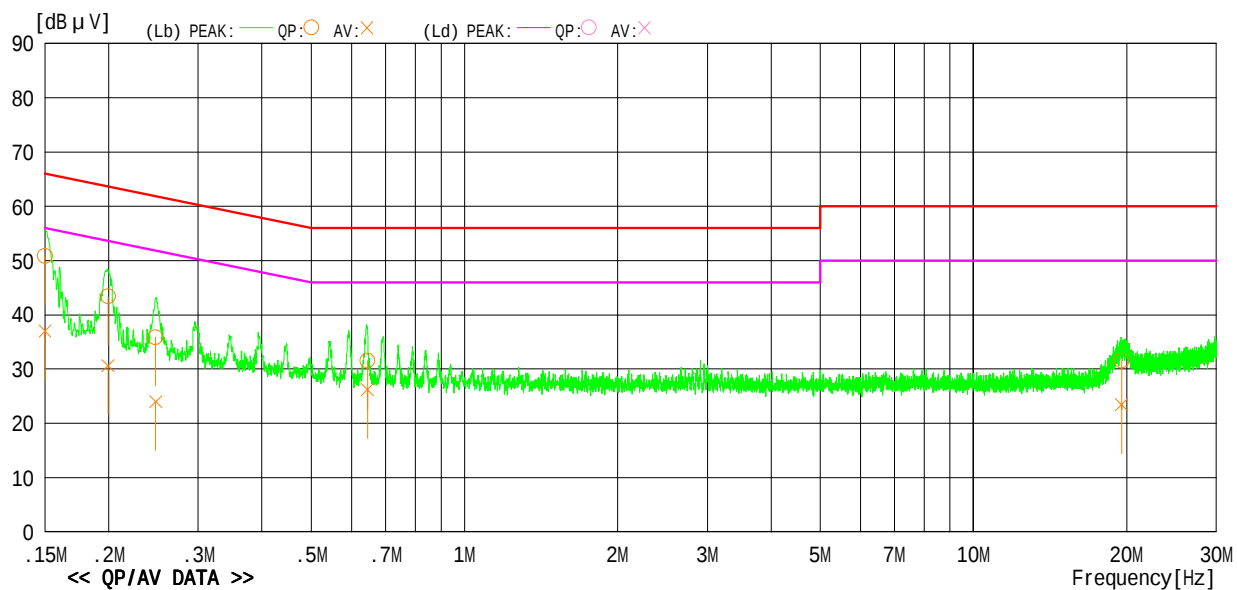
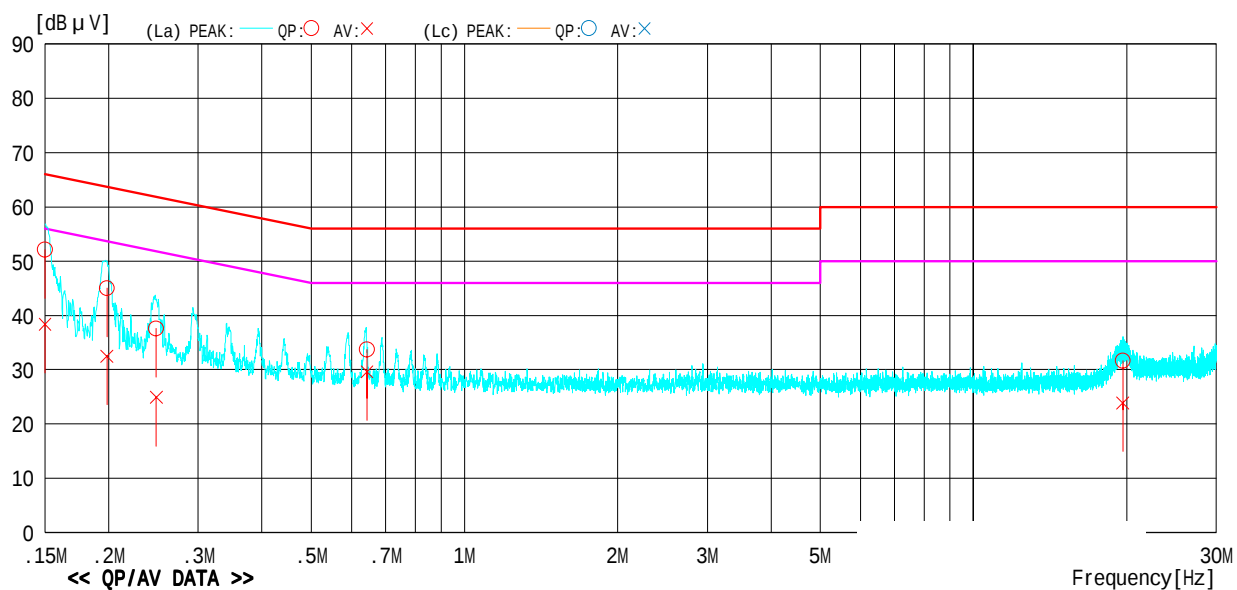
Peak Hold Wave Form

Model Name : GTX-100
Serial No. : WBG0701075
Operator : M.Yamanaka
Power Supply : AC120V,50Hz

Job No : C.J07-064127E
Temp/Humi : 2:
Condition : Cl -
Remark :

Memo :

LIMIT : FCC 15.207(QP)
FCC 15.207(AV)



5.2 15. 247(a)(1) Spectrum Bandwidth and Channel Separation of Frequency Hopping Spread Spectrum System

5.2.1 Setting Remarks

- The both side of 20dB down value from peak power are measured by using delta-maker function of the spectrum analyzer.
- The Oscilloscope is set-up as following;
 - ✓ Frequency Span : 10 MHz
 - ✓ Resolution bandwidth : 30 kHz
 - ✓ Video bandwidth : 30 kHz
 - ✓ Sweep : Auto
 - ✓ Detector function : Peak
 - ✓ Trace Mode : Max Hold
- See test configuration figure 4.3.

5.2.2 Minimum Standard

The maximum permissible 20dB bandwidth is 1MHz, unless more than 15 non-overlapping channels are employed.

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

5.2.3 Result

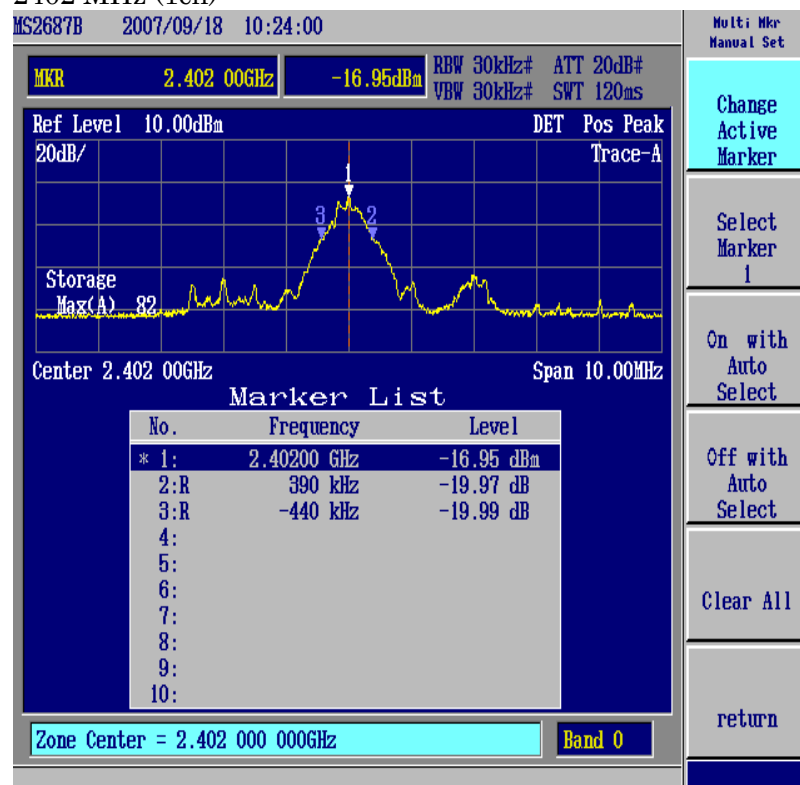
EUT complies with the requirement.

Uncertainty of measurement	: ± 1.2 dB
Temperature, Humidity	: 26°C, 49%

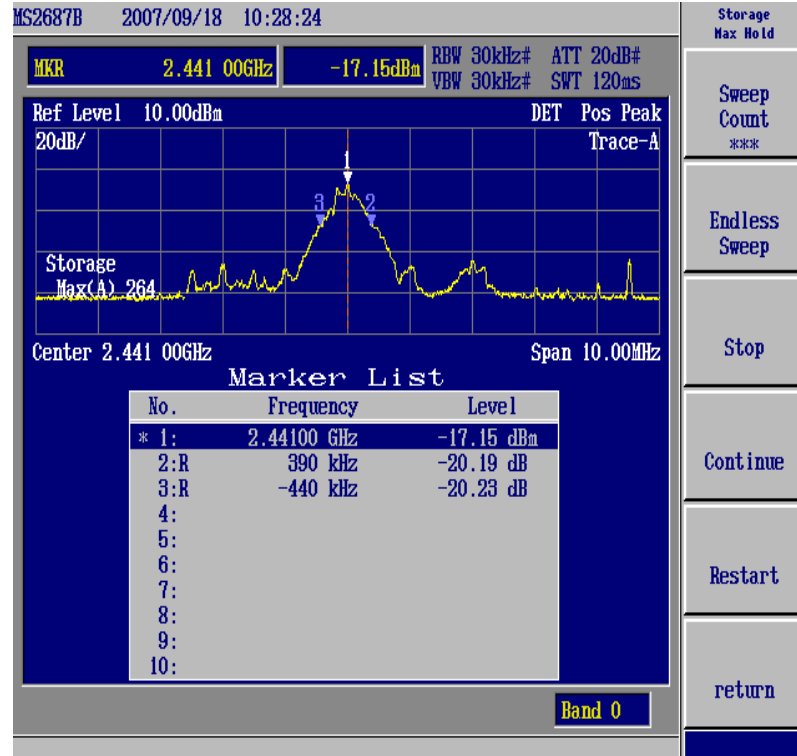
5.2.4 Measured Data

Frequency (MHz)	Measured Bandwidth (kHz)	Limit (MHz)
20 dB band width		
2441 (1ch)	830	< 1
2480 (39ch)	830	< 1
2402 (78ch)	830	< 1
Channel separation		
Hopping channel	1,250	

2402 MHz (1ch)



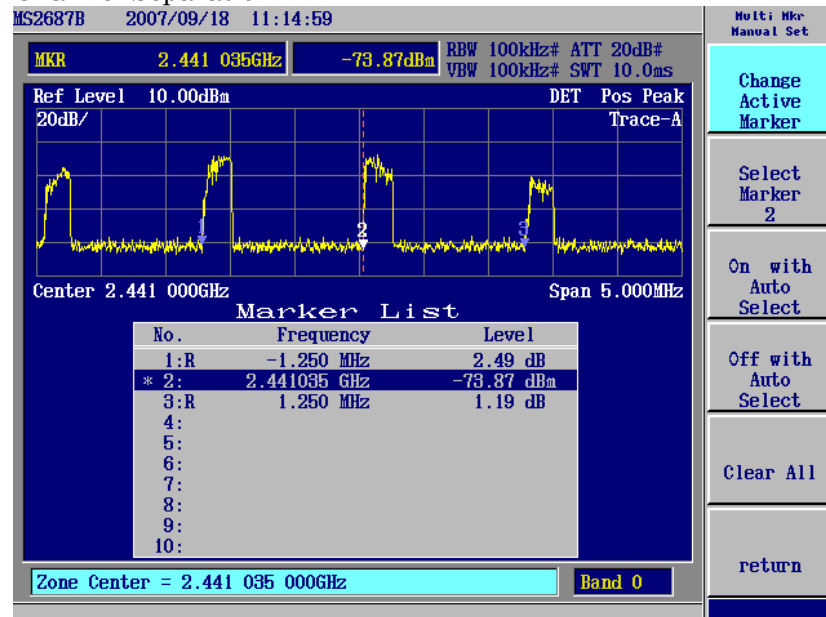
2441 MHz (39ch)



2480 MHz (78ch)



Channel Separation



5.3 15. 247(b) Maximum Peak Output Power

5.3.1 Setting Remarks

- See test configuration figure 4.4.
- The maximum peak output power is measured as following;
 1. The diode detector is inserted between EUT and the oscilloscope.
 2. The oscilloscope is used to read the peak response of the detector.
 3. Replaced EUT by the signal generator (SG).
 4. Adjusted the frequency of SG to the fundamental frequency.
 5. Adjusted the amplitude of SG to be the same peak recorded in 2.
- The oscilloscope is set-up as following;
 - ✓ Voltage level range : 10 mV / Div
 - ✓ Sampling time : 1.00GS / s
 - ✓ Function : Peak search

5.3.2 Minimum Standard

The maximum peak output power shall not exceed 1 watt. If transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.3.3 Result

EUT complies with the requirement.

Uncertainty of measurement result: ± 0.5 dB

Temperature, Humidity : 26°C, 49%

5.3.4 Measured Data

(Normal Rated Voltage, 3.7 VDC)

Frequency (MHz)	Peak Power (dBm)	Limit (dB)	Margin (dB)
2402 (1ch)	3.06	30	26.94
2441 (39ch)	2.6	30	27.4
2480 (78ch)	2.53	30	27.47

(High-varied voltage, 4.255 VDC)

Frequency (MHz)	Peak Power (dBm)	Limit (dB)	Margin (dB)
2402 (1ch)	3.05	30	26.95
2441 (39ch)	2.58	30	27.42
2480 (78ch)	2.52	30	27.48

(Low-varied voltage, 3.145 VDC)

Frequency (MHz)	Peak Power (dBm)	Limit (dB)	Margin (dB)
2402 (1ch)	3.03	30	26.97
2441 (39ch)	2.54	30	27.46
2480 (78ch)	2.41	30	27.59

5.4 15. 247(c) Transmitter Radiated Emissions (Conducted)**5.4.1 Setting Remarks**

- EUT directly connects to the spectrum analyzer via calibrated coaxial cable and a suitable attenuator.
- The Spectrums are scanned from the lowest generated frequency of EUT up to the 10th harmonics by using the spectrum analyzer.
- The spectrum analyzer is set-up as following;

✓ Resolution bandwidth	: 100 kHz
✓ Video bandwidth	: 1 MHz
✓ Sweep	: Auto
✓ Detector function	: Peak
✓ Trace Mode	: Max Hold

- See test configuration figure 4.3.

5.4.2 Minimum Standard

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, 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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required.

5.4.3 Result

EUT complies with the requirement.

Uncertainty of measurement result: ± 0.8 dB
Temperature, Humidity : 26°C, 49%

5.4.4 Measured Data (No emission exceeding the 20dB limit was found)

2402 MHz (1ch)



2441 MHz (39ch)



2480 MHz (78ch)



5.5 15. 247(c) Transmitter Radiated Emissions (Radiated)**5.5.1 Setting Remarks**

- The data lists in “5.5.4 Measured Data “ list the significant emission frequencies, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, plus the limit.
- In the frequency range between 30MHz to 25 GHz (as 10th harmonics), the Electric Field Strength is measured in accordance with ANSI C63.4: 2003 and CISPR22: 1997.
- The test setup is made in accordance with ANSI C63.4: 2003.
- The antenna is measured at 1-4m height.
- The EUT is placed on the non-conductive table in the center of turntable. The height of this table is 0.8m.
- The measurement is carried out with both horizontal and vertical antenna polarization.
- The highest radiation from the equipment is recorded.
- By varying the configuration of the test sample and the cable routing, it is attempted to maximize the emission.
- The test receiver with Quasi Peak and Average detector is in compliance with CISPR 16-1:1993.
- The spectrum analyzer is set-up as following;

(Frequency range : 30 - 1000 MHz)

- ✓ Resolution bandwidth : 100 kHz
- ✓ Video bandwidth : 300 kHz
- ✓ Detector function : Peak
- ✓ Trace Mode : Max Hold

(Frequency range : Above 1000 MHz)

- ✓ Resolution bandwidth : 1 MHz
- ✓ Video bandwidth : 1 MHz
- ✓ Detector function : Peak
- ✓ Trace Mode : Max Hold

- EMI Test Receiver analyzer is set-up as following;
 - ✓ IF bandwidth : 120 kHz (Quasi-Peak Detector)
 - ✓ IF bandwidth : 1 MHz (Average Detector)
- See test configuration figure 4.2.

Note: The equipment was tested for radiated emission using fully charged batteries.

5.5.2 Minimum Standard

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

5.5.3 Result

EUT complies with the requirement.

Uncertainty of measurement result: ± 3.28 dB

Temperature, Humidity : See each data table

5.4.4 Measured Data

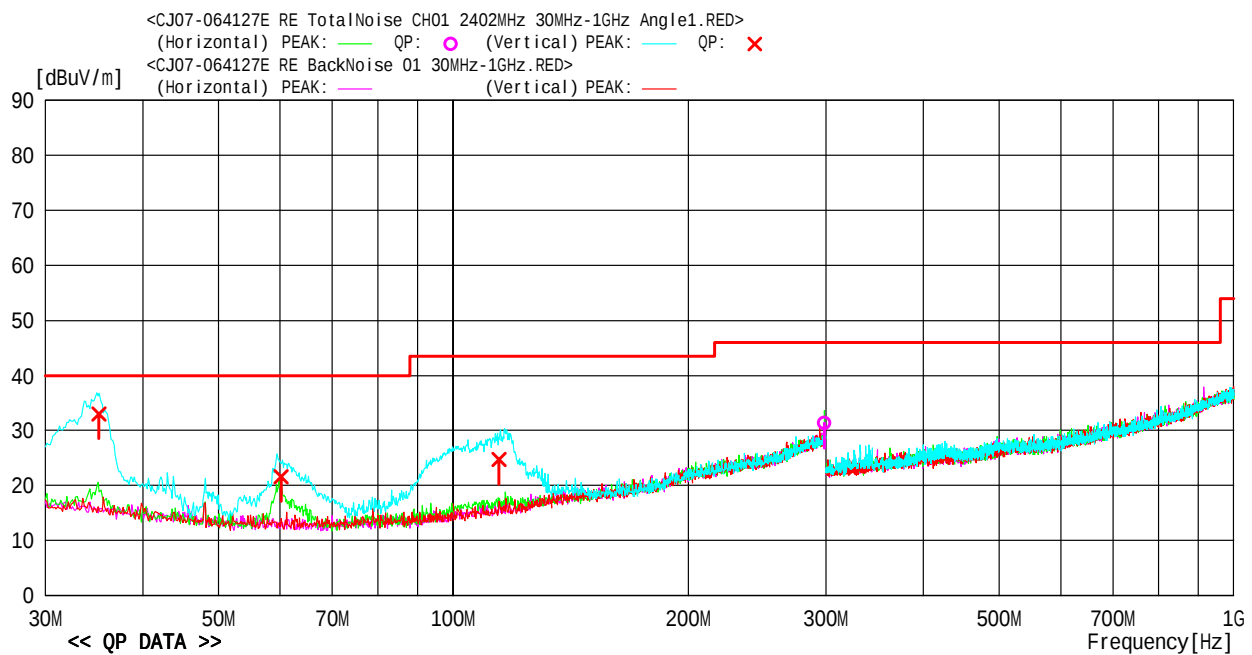
30MHz to 1GHz, Channel 1 (Angle1)

Model Name : GTX-100
 Serial No. : WBG0701075
 Operator : M.Yamanaka
 Power Supply : AC120V,60Hz

Job No : CJ07-064127E
 Temp./Humi. : 25 /43%
 Condition : Operated BT&WLAN (CH:01, 2402MHz)
 Remark : Charging (Angle 1) Rate:54Mbps

Memo : RBW:30M ~ 1GHz(120kHz)

LIMIT : FCC 15.209 3m



No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	298.652	32.1	-0.8	31.3	46.0	14.7	Hori.	113	282	BC	
2	35.135	45.1	-12.1	33.0	40.0	7.0	Vert.	100	285	BC	
3	60.115	36.8	-15.2	21.6	40.0	18.4	Vert.	100	176	BC	
4	114.404	38.2	-13.5	24.7	43.5	18.8	Vert.	100	184	BC	

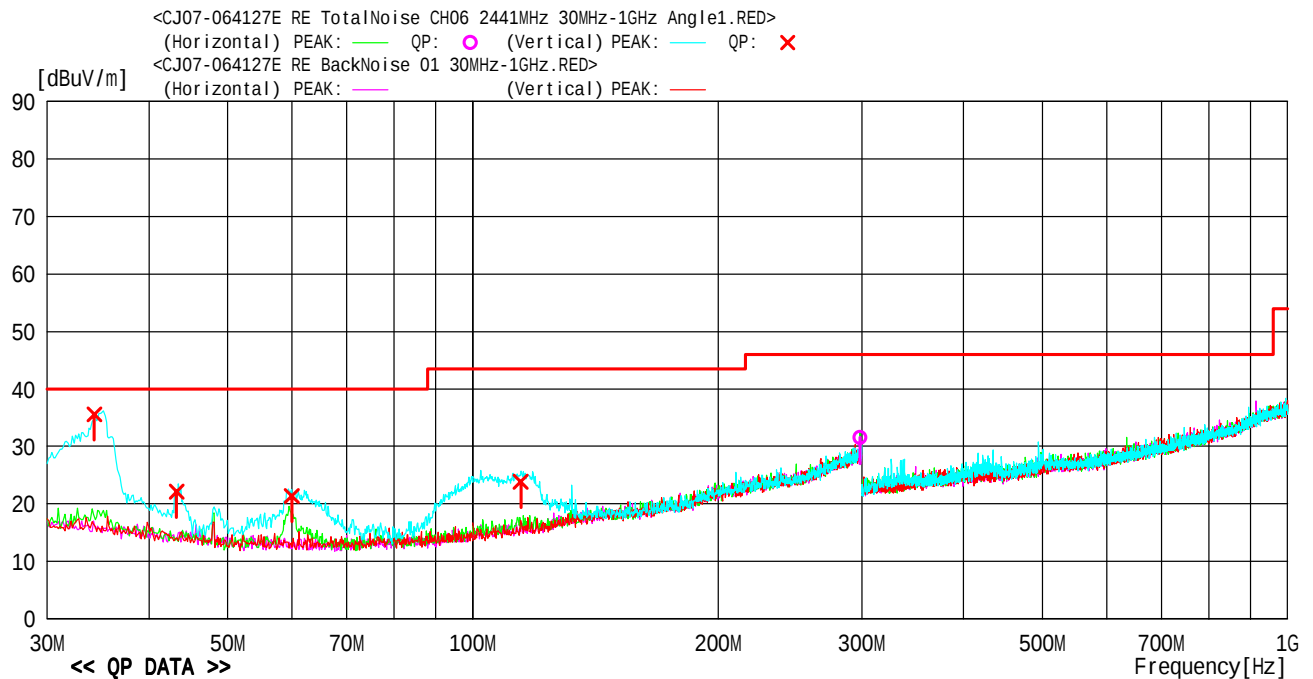
30MHz to 1GHz, Channel 6 (Angle1)

Model Name : GTX-100
 Serial No. : WBG0701075
 Operator : M.Yamanaka
 Power Supply : AC120V,60Hz

Job No : CJ07-064127E
 Temp./Humi. : 25 /43%
 Condition : Operated BT&WLAN (CH:06 , 2441MHz)
 Remark : Charging (Angle 1) Rate:54Mbps

Memo : RBW:30M ~ 1GHz(120kHz)

LIMIT : FCC 15.209 3m



No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	298.552	32.3	-0.8	31.5	46.0	14.5	Hori.	111	282	BC	
2	34.293	47.5	-11.9	35.6	40.0	4.4	Vert.	100	286	BC	
3	43.247	35.9	-13.8	22.1	40.0	17.9	Vert.	100	195	BC	
4	59.915	36.6	-15.2	21.4	40.0	18.6	Vert.	100	177	BC	
5	114.444	37.4	-13.5	23.9	43.5	19.6	Vert.	100	170	BC	

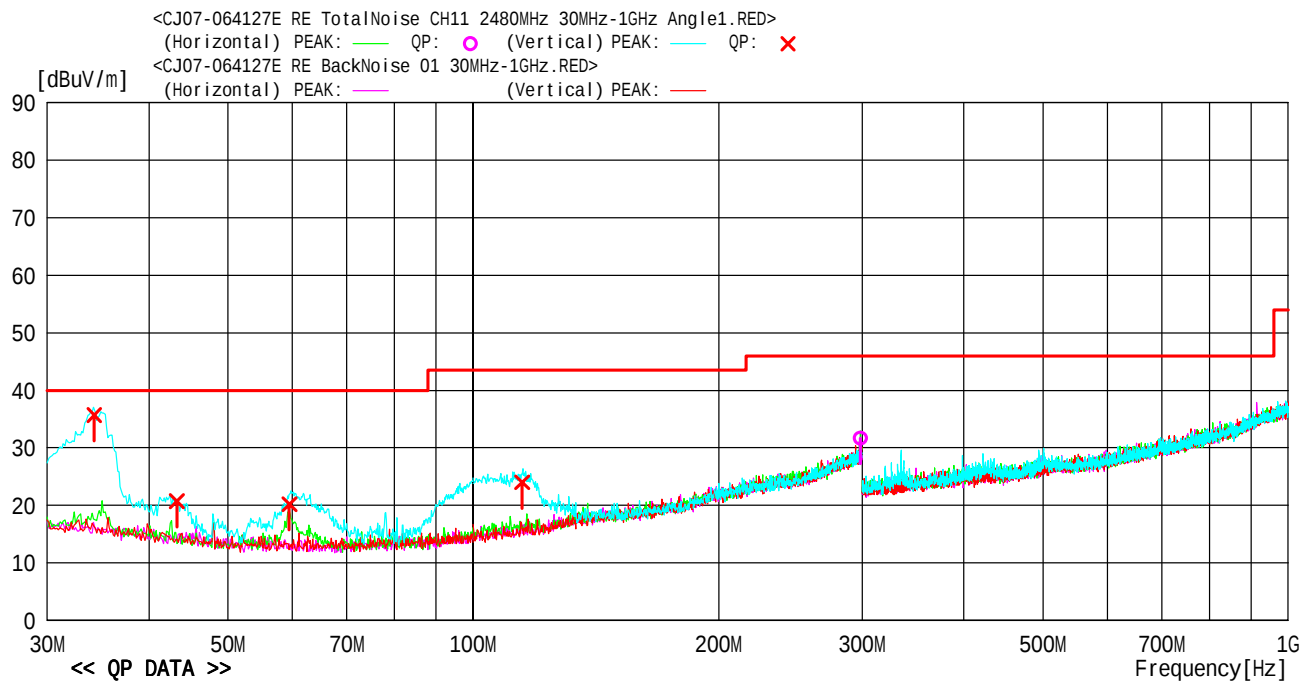
30MHz to 1GHz, Channel 11 (Angle1)

Model Name : GTX-100
 Serial No. : WBG0701075
 Operator : M.Yamanaka
 Power Supply : AC120V,60Hz

Job No : CJ07-064127E
 Temp./Humi. : 25 /43%
 Condition : Operated BT&WLAN (CH:11 , 2480MHz)
 Remark : Charging (Angle 1) Rate:54Mbps

Memo : RBW:30M ~ 1GHz(120kHz)

LIMIT : FCC 15.209 3m



No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	298.612	32.5	-0.8	31.7	46.0	14.3	Hori.	100	275	BC	
2	34.263	47.6	-11.9	35.7	40.0	4.3	Vert.	100	326	BC	
3	43.292	34.5	-13.8	20.7	40.0	19.3	Vert.	100	271	BC	
4	59.463	35.4	-15.2	20.2	40.0	19.8	Vert.	100	195	BC	
5	114.805	37.5	-13.5	24.0	43.5	19.5	Vert.	100	202	BC	

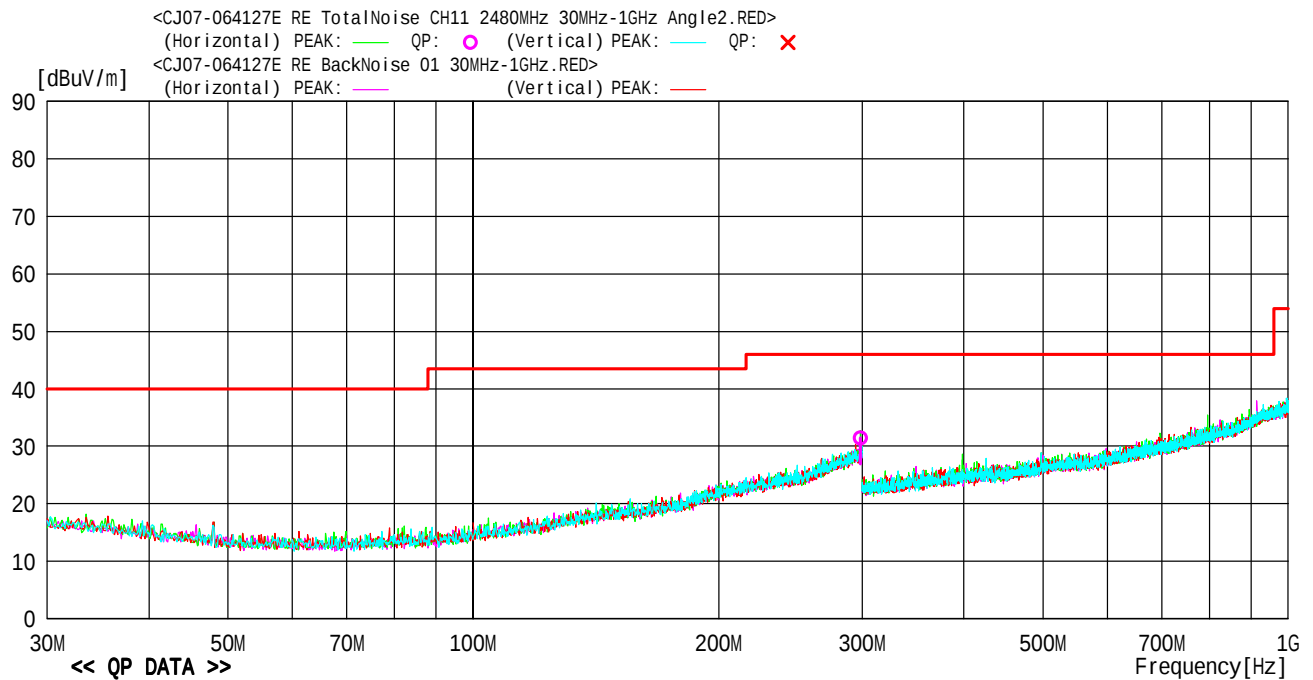
30MHz to 1GHz, Channel 11 (Angle2)

Model Name : GTX-100
 Serial No. : WBG0701075
 Operator : M.Yamanaka
 Power Supply : DC 3.7V

Job No : CJ07-064127E
 Temp./Humi. : 25 /43%
 Condition : Operated BT&WLAN (CH:11 , 2480MHz)
 Remark : Angle 2 Rate:54Mbps

Memo : RBW:30M ~ 1GHz(120kHz)

LIMIT : FCC 15.209 3m



No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	298.501	32.2	-0.8	31.4	46.0	14.6	Hori.	111	243	BC	

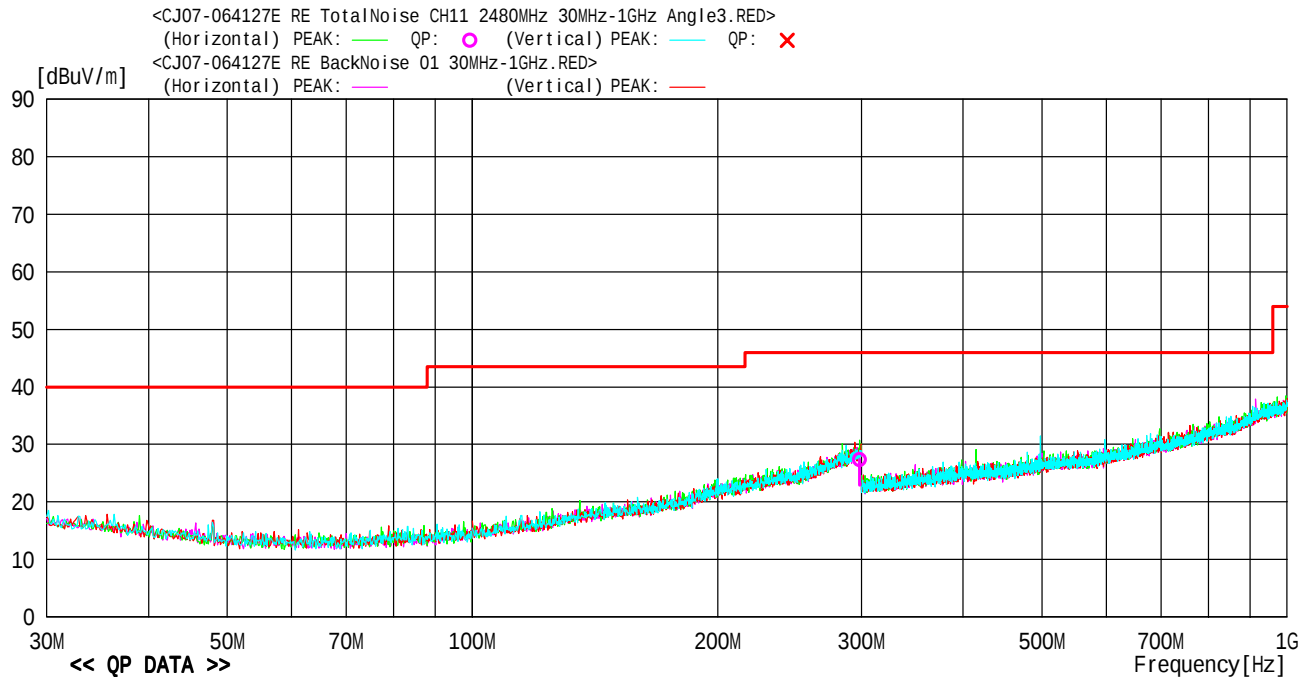
30MHz to 1GHz, Channel 11 (Angle3)

Model Name : GTX-100
 Serial No. : WBG0701075
 Operator : M. Yamanaka
 Power Supply : DC 3.7V

Job No : CJ07-064127E
 Temp./Humi. : 25 /43%
 Condition : Operated BT&WLAN (CH:11 , 2480MHz)
 Remark : Angle 3 Rate:54Mbps

Memo : RBW:30M ~ 1GHz(120kHz)

LIMIT : FCC 15.209 3m



No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	298.452	28.2	-0.8	27.4	46.0	18.6	Hori.	113	269	BC	

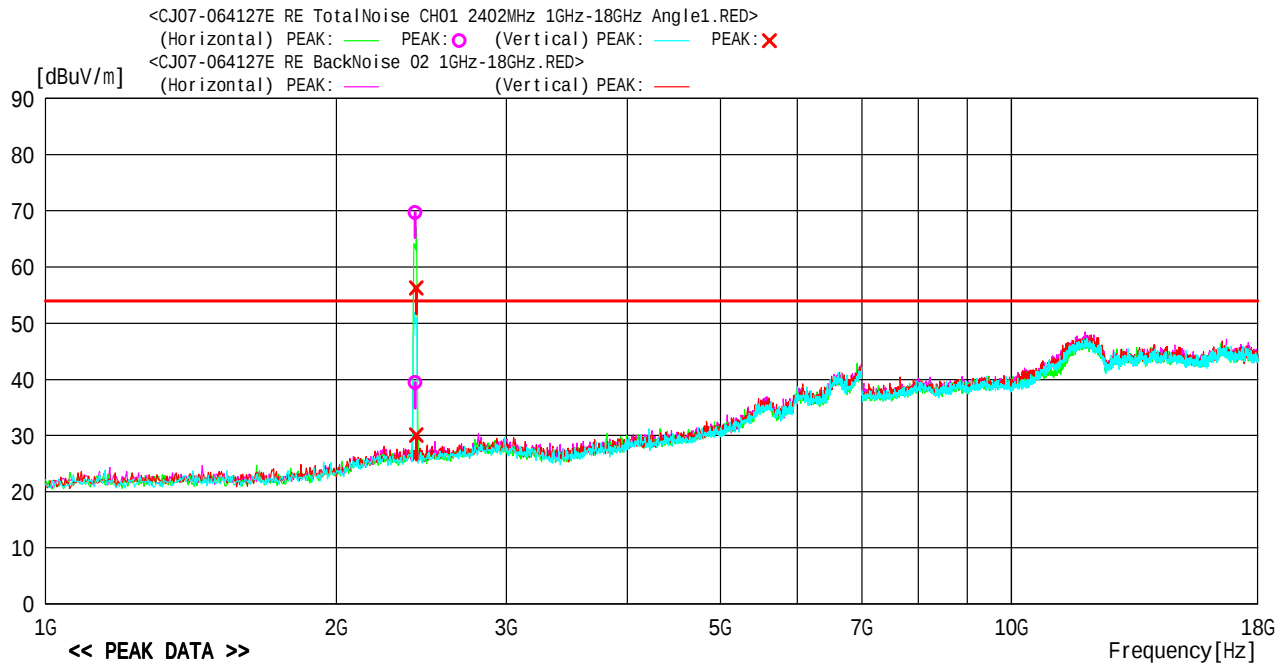
1GHz to 18GHz, Channel 1 (Angle1)

Model Name : GTX-100
 Serial No. : WBG0701075
 Operator : M.Yamanaka
 Power Supply : AC120V,60Hz

Job No : CJ07-064127E
 Temp./Humi. : 26 /42%
 Condition : Operated BT&WLAN (CH:01 , 2402MHz)
 Remark : Charging (Angle 1) Rate:54Mbps

Memo : RBW:1GHz ~ (1MHz)

LIMIT : FCC 15.209 3m



No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	2413.909	72.3	-2.6	69.7	54.0	-15.7	Hori.	100	175	HRN	PK
2	2413.909	42.0	-2.6	39.4	54.0	14.6	Hori.	100	175	HRN	AV
3	2419.503	32.6	-2.5	30.1	54.0	23.9	Vert.	100	146	HRN	AV
4	2419.503	58.7	-2.5	56.2	54.0	-2.2	Vert.	100	146	HRN	PK

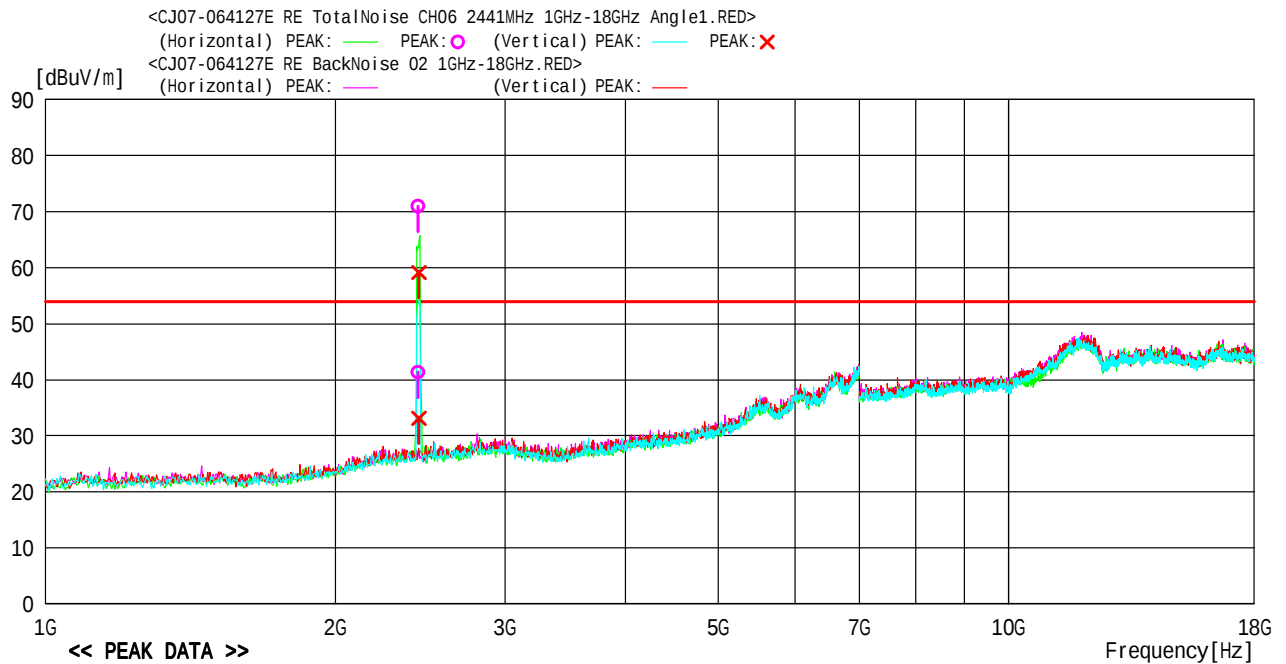
1GHz to 18GHz, Channel 6 (Angle1)

Model Name : GTX-100
 Serial No. : WBG0701075
 Operator : M.Yamanaka
 Power Supply : AC120V,60Hz

Job No : CJ07-064127E
 Temp./Humi. : 26 /42%
 Condition : Operated BT&WLAN (CH:06 , 2441MHz)
 Remark : Charging (Angle 1) Rate:54Mbps

Memo : RBW:1GHz ~ (1MHz)

LIMIT : FCC 15.209 3m



No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pol.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	2438.286	73.3	-2.4	70.9	54.0	-16.9	Hori.	100	181	HRN	PK
2	2438.286	43.7	-2.4	41.3	54.0	12.7	Hori.	100	181	HRN	AV
3	2441.817	61.5	-2.4	59.1	54.0	-5.1	Vert.	100	144	HRN	PK
4	2441.817	35.5	-2.4	33.1	54.0	20.9	Vert.	100	144	HRN	AV

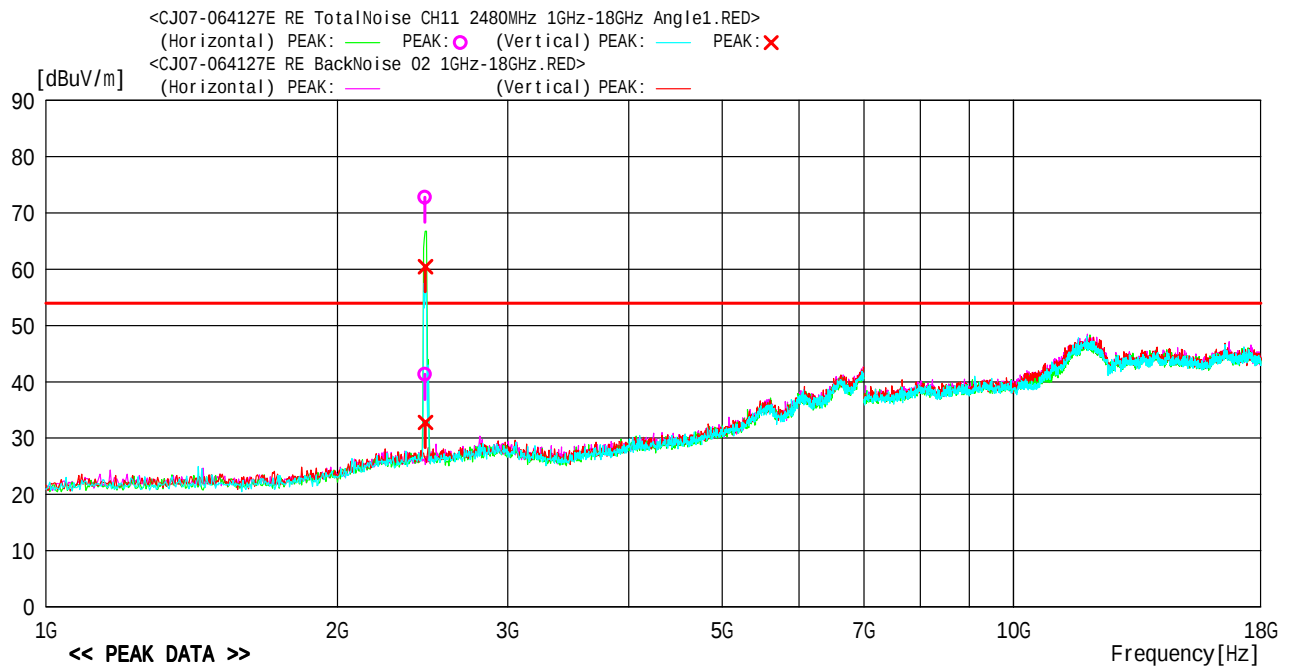
1GHz to 18GHz, Channel 11 (Angle1)

Model Name : GTX-100
 Serial No. : WBG0701075
 Operator : M.Yamanaka
 Power Supply : AC120V,60Hz

Job No : CJ07-064127E
 Temp./Humi. : 26 /42%
 Condition : Operated BT&WLAN (CH:11 , 2480MHz)
 Remark : Charging (Angle 1) Rate:54Mbps

Memo : RBW:1GHz ~ (1MHz)

LIMIT : FCC 15.209 3m



No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	2462.479	75.2	-2.4	72.8	54.0	-18.8	Hori.	100	178	HRN	PK
2	2462.479	43.7	-2.4	41.3	54.0	12.7	Hori.	100	178	HRN	AV
3	2466.581	62.9	-2.4	60.5	54.0	-6.5	Vert.	100	124	HRN	PK
4	2466.581	35.2	-2.4	32.8	54.0	21.2	Vert.	100	124	HRN	AV

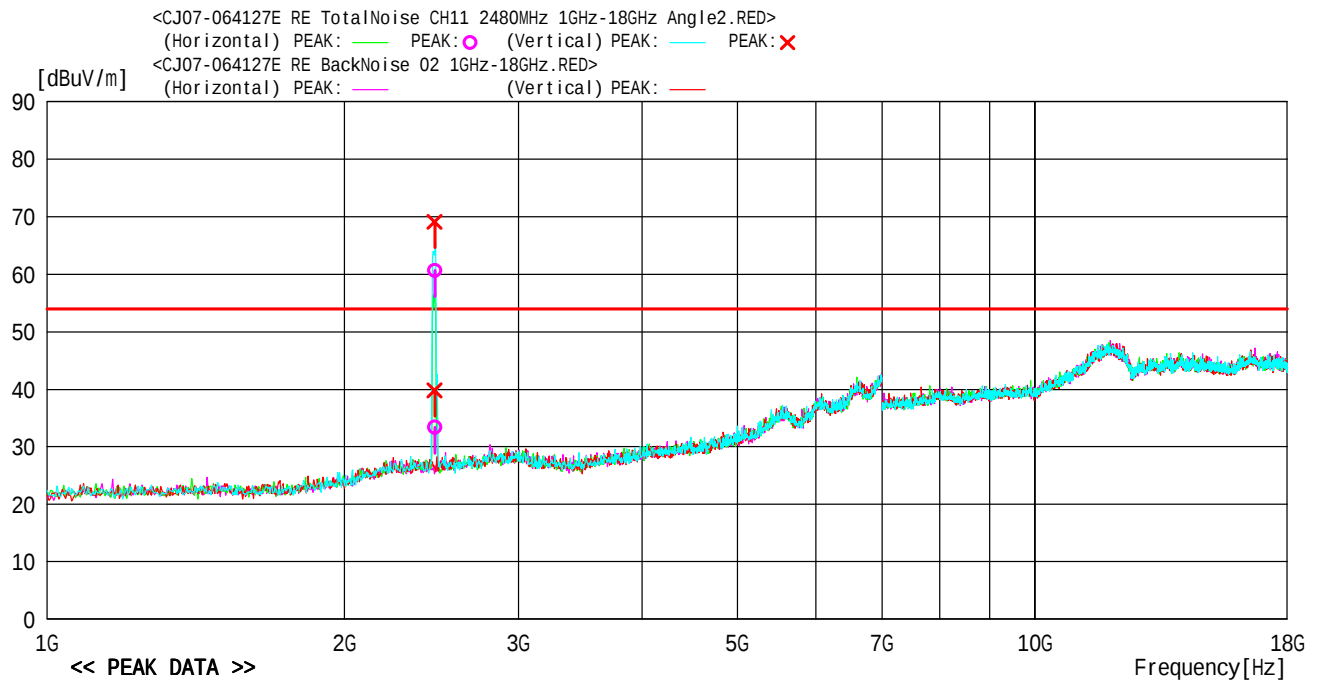
1GHz to 18GHz, Channel 11 (Angle2)

Model Name : GTX-100
 Serial No. : WBG0701075
 Operator : M.Yamanaka
 Power Supply : DC 3.7V

Job No : CJ07-064127E
 Temp./Humi. : 24 /42%
 Condition : Operated BT&WLAN (CH:11 , 2480MHz)
 Remark : Angle 2 Rate:54Mbps

Memo : RBW:1GHz ~ (1MHz)

LIMIT : FCC 15.209 3m



No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pol.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	2469.483	63.0	-2.4	60.6	54.0	-6.6	Hori.	100	331	HRN	PK
2	2469.483	35.7	-2.4	33.3	54.0	20.7	Hori.	100	331	HRN	AV
3	2468.230	71.4	-2.4	69.0	54.0	-15.0	Vert.	100	279	HRN	PK
4	2468.230	42.2	-2.4	39.8	54.0	14.2	Vert.	100	279	HRN	AV

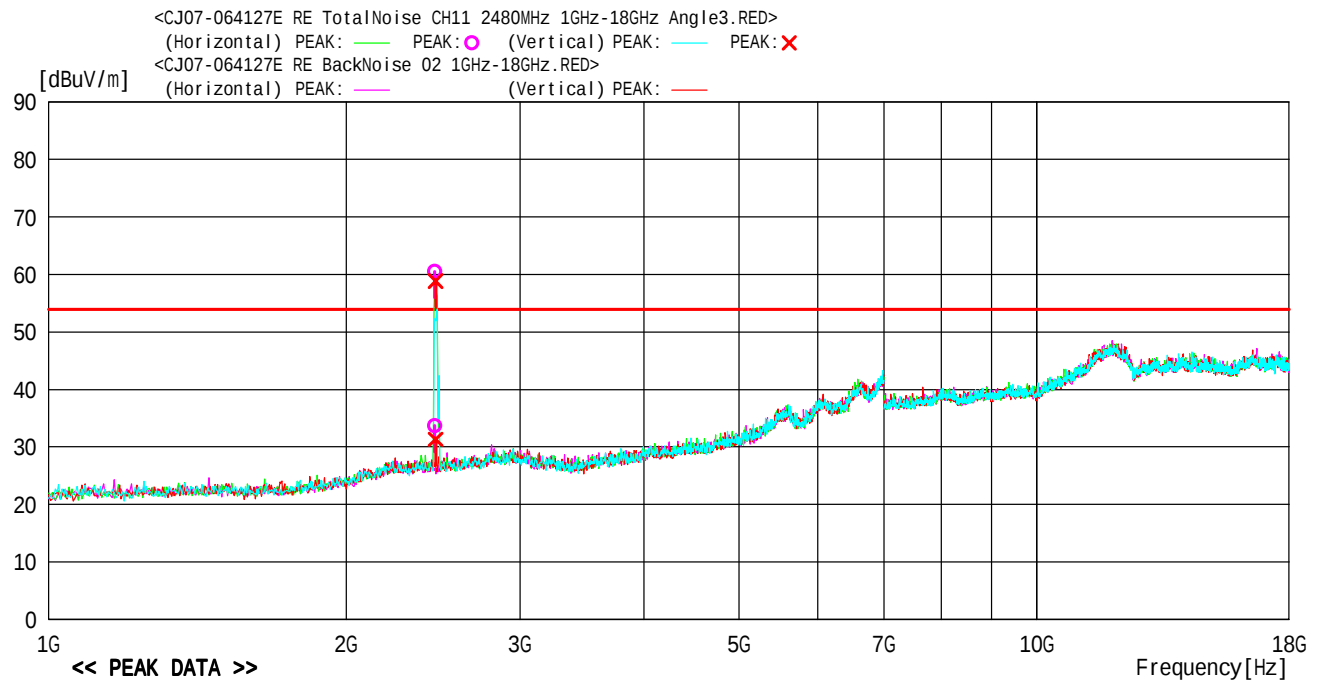
1GHz to 18GHz, Channel 11 (Angle3)

Model Name : GTX-100
 Serial No. : WBG0701075
 Operator : M.Yamanaka
 Power Supply : DC 3.7V

Job No : CJ07-064127E
 Temp./Humi. : 24 /42%
 Condition : Operated BT&WLAN (CH:11 , 2480MHz)
 Remark : Angle 3 Rate:54Mbps

Memo : RBW:1GHz ~ (1MHz)

LIMIT : FCC 15.209 3m



No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	2459.498	62.9	-2.4	60.5	54.0	-6.5	Hori.	100	239	HRN	PK
2	2459.498	36.0	-2.4	33.6	54.0	20.4	Hori.	100	239	HRN	AV
3	2465.073	61.2	-2.4	58.8	54.0	-4.8	Vert.	100	79	HRN	PK
4	2465.073	33.7	-2.4	31.3	54.0	22.7	Vert.	100	79	HRN	AV

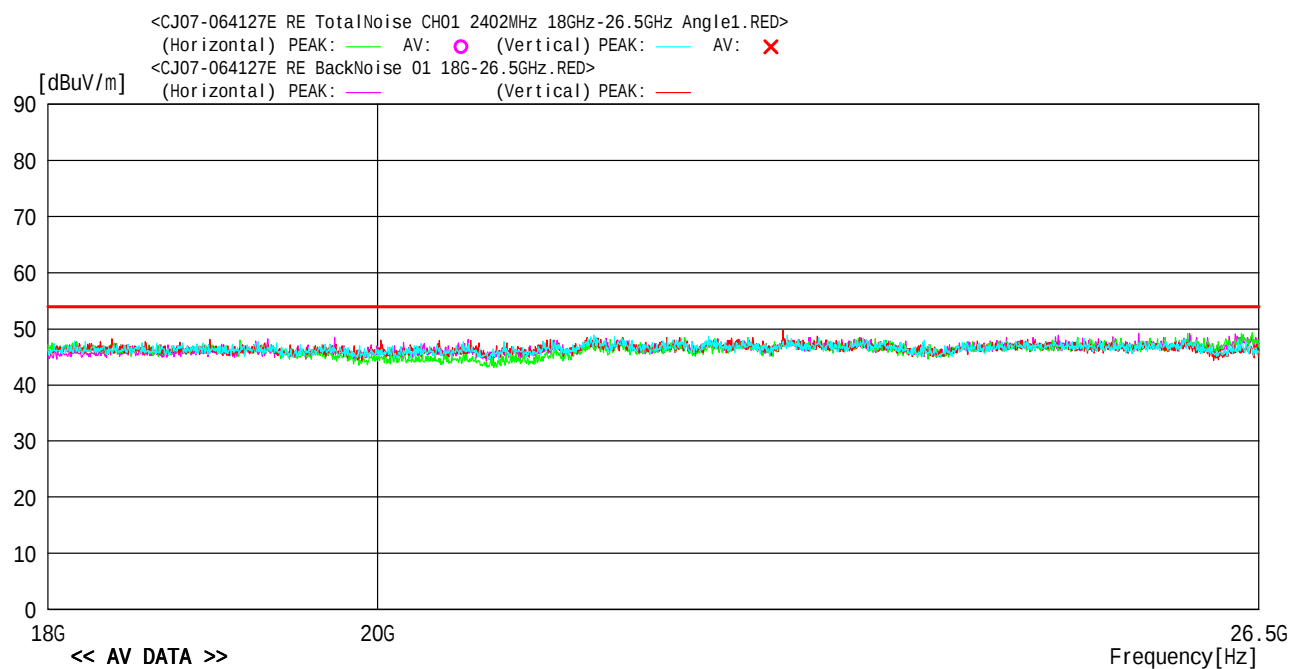
18GHz to 26.5GHz, Channel 1 (Angle1)

Model Name : GTX-100
 Serial No. : WBG0701075
 Operator : M.Yamanaka
 Power Supply : AC120V,60Hz

Job No : CJ07-064127E
 Temp/Humi : 25 /44%
 Condition : Operated BT&WLAN (CH:01 , 2402MHz)
 Remark : Charging (Angle 1) Rate:54Mbps

Memo : RBW:1MHz(1G ~)

LIMIT : FCC Subpart C 15.209 (3m) 1G-26.5GHz(AV)



No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pol.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	

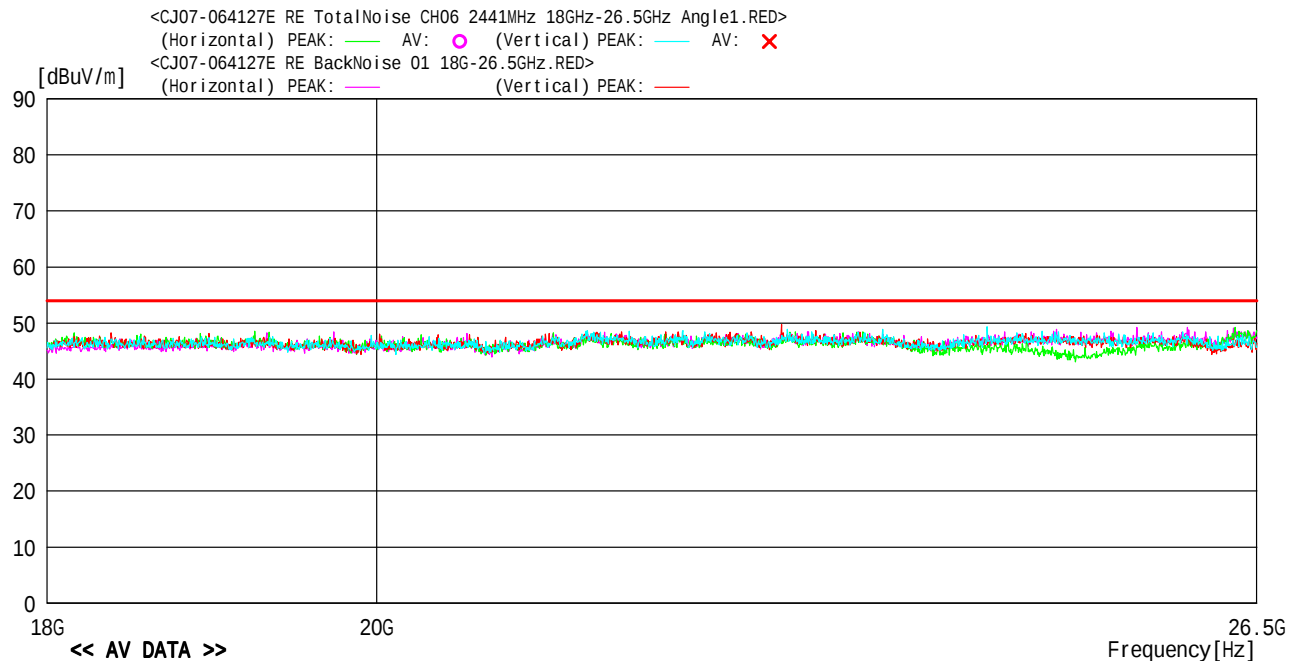
18GHz to 26.5GHz, Channel 6 (Angle1)

Model Name : GTX-100
 Serial No. : WBG0701075
 Operator : M.Yamanaka
 Power Supply : AC120V,60Hz

Job No : CJ07-064127E
 Temp/Humi : 25 /44%
 Condition : Operated BT&WLAN (CH:06 , 2441MHz)
 Remark : Charging (Angle 1) Rate:54Mbps

Memo : RBW:1MHz(1G ~)

LIMIT : FCC Subpart C 15.209 (3m) 1G-26.5GHz(AV)



No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	

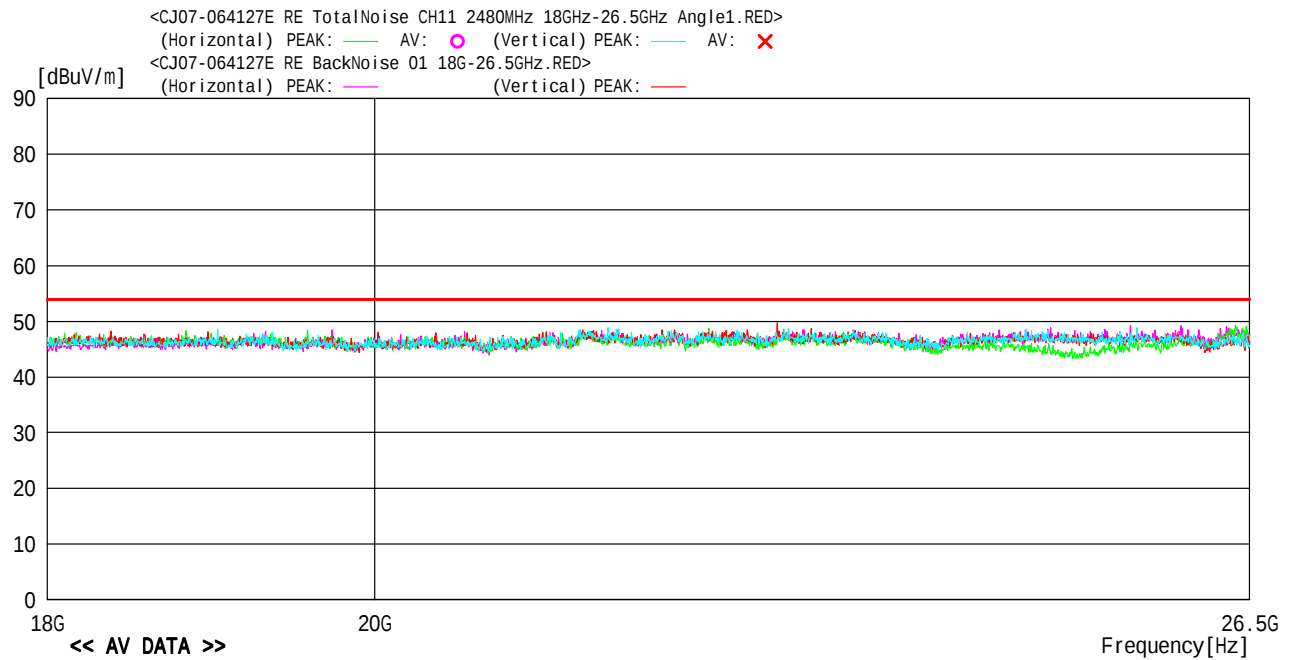
18GHz to 26.5GHz, Channel 11 (Angle1)

Model Name : GTX-100
 Serial No. : WBG0701075
 Operator : M.Yamanaka
 Power Supply : AC120V,60Hz

Job No : CJ07-064127E
 Temp/Humi : 25 /44%
 Condition : Operated BT&WLAN (CH:11 , 2480MHz)
 Remark : Charging (Angle 1) Rate:54Mbps

Memo : RBW:1MHz(1G ~)

LIMIT : FCC Subpart C 15.209 (3m) 1G-26.5GHz(AV)



No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	

-TEPT0-DV/Ver 1.80.0020

* No significant emissions were found.

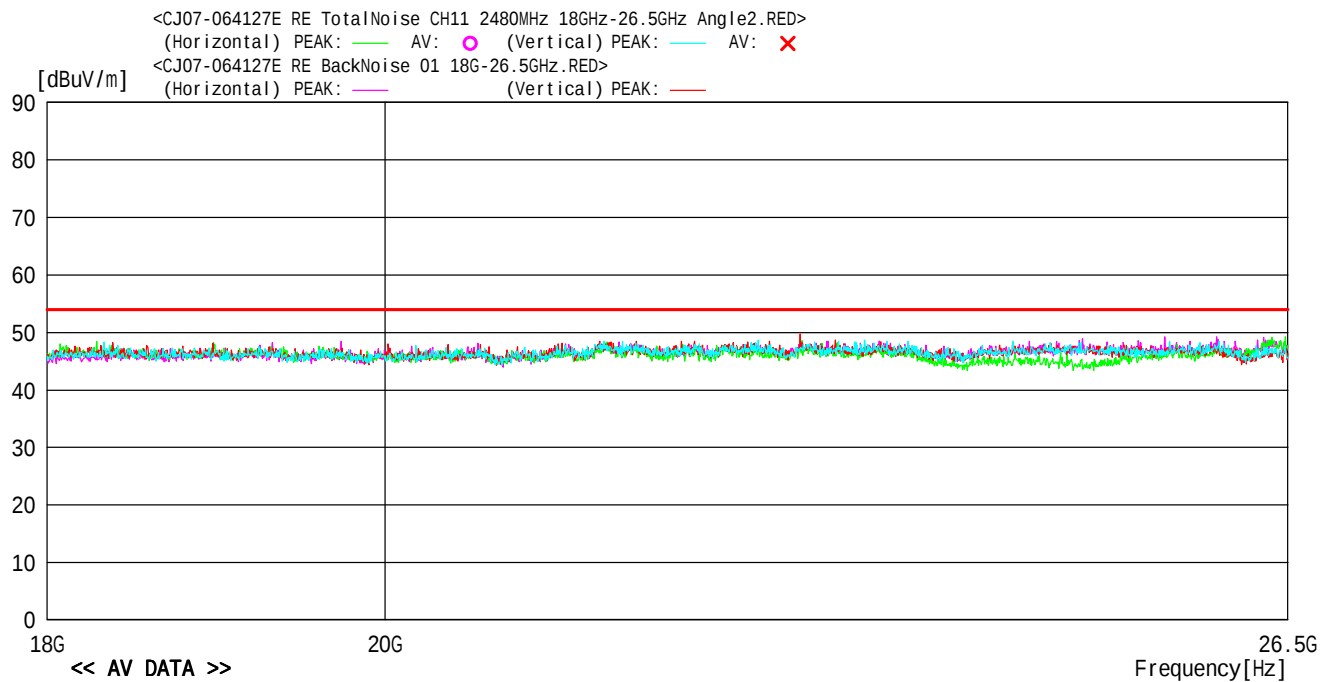
18GHz to 26.5GHz, Channel 11 (Angle2)

Model Name : GTX-100
Serial No. : WBG0701075
Operator : M.Yamanaka
Power Supply : DC 3.7V

Job No : CJ07-064127E
Temp/Humi : 25 /44%
Condition : Operated BT&WLAN (CH:11 , 2480MHz)
Remark : Angle 2 Rate:54Mbps

Memo : RBW:1MHz(1G ~)

LIMIT : FCC Subpart C 15.209 (3m) 1G-26.5GHz(AV)

[illegible]

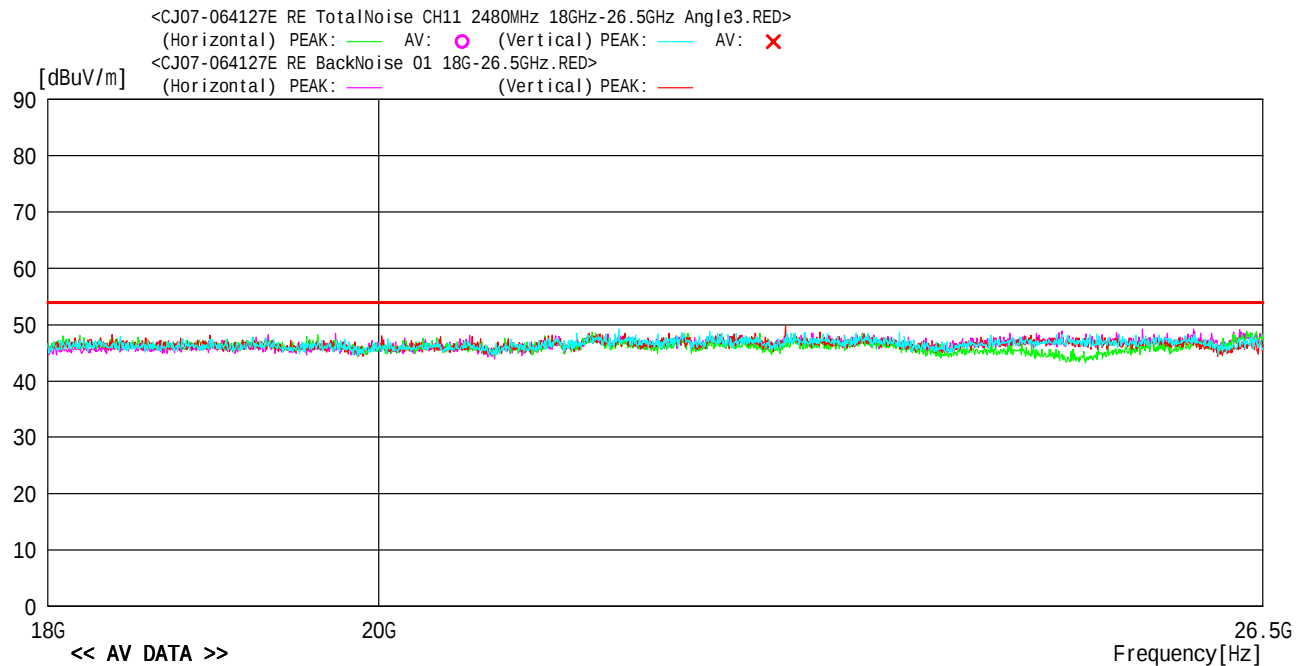
18GHz to 26.5GHz, Channel 11 (Angle3)

Model Name : GTX-100
 Serial No. : WBG0701075
 Operator : M.Yamanaka
 Power Supply : DC 3.7V

Job No : CJ07-064127E
 Temp/Humi : 25 /44%
 Condition : Operated BT&WLAN (CH:11 , 2480MHz)
 Remark : Angle 3 Rate:54Mbps

Memo : RBW:1MHz(1G ~)

LIMIT : FCC Subpart C 15.209 (3m) 1G-26.5GHz(AV)



No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	

5.6 15. 247(a)(1) Number of Channels and Time of Occupancy

5.6.1 Setting Remarks

- EUT directly connects to the spectrum analyzer via calibrated coaxial cable and a suitable attenuator.
- The Number of Channels is determined by using Max-hold of the spectrum shape of spectrum analyzer.
- Time of Occupancy is determined by using the marker-data function of spectrum analyzer.
- The spectrum analyzer is set-up as following to measure Number of Channels;

✓	Frequency Span	: 79 MHz
✓	Resolution bandwidth	: 1 MHz
✓	Video bandwidth	: 3 MHz
✓	Sweep Time	: Auto
✓	Detector function	: Peak
✓	Trace Mode	: Max Hold

- The spectrum analyzer is set-up as following to measure Time of Occupancy;

✓	Frequency Span	: 0 Hz
✓	Resolution bandwidth	: 30 kHz
✓	Video bandwidth	: 30 kHz
✓	Detector function	: Peak
✓	Trace Mode	: Max Hold

- See test configuration figure 4.3.

5.6.2 Minimum Standard

This frequency hopping system must employ minimum of 15 hopping channels.

The maximum permissible time of occupancy is 400 ms within the minimum time period required to hop through all channels.

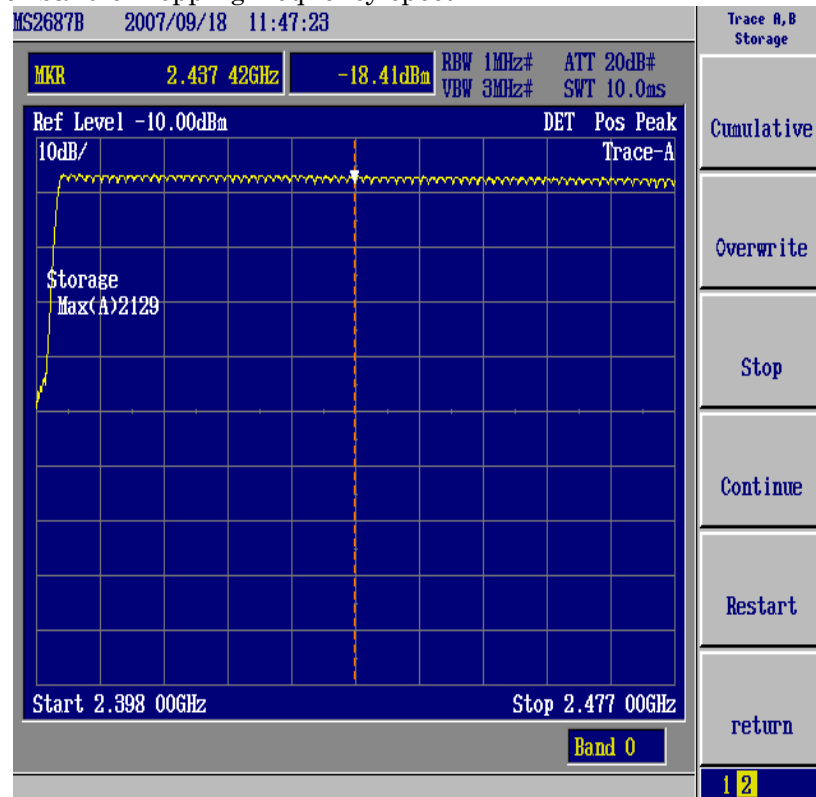
5.6.3 Result

EUT complies with the requirement.

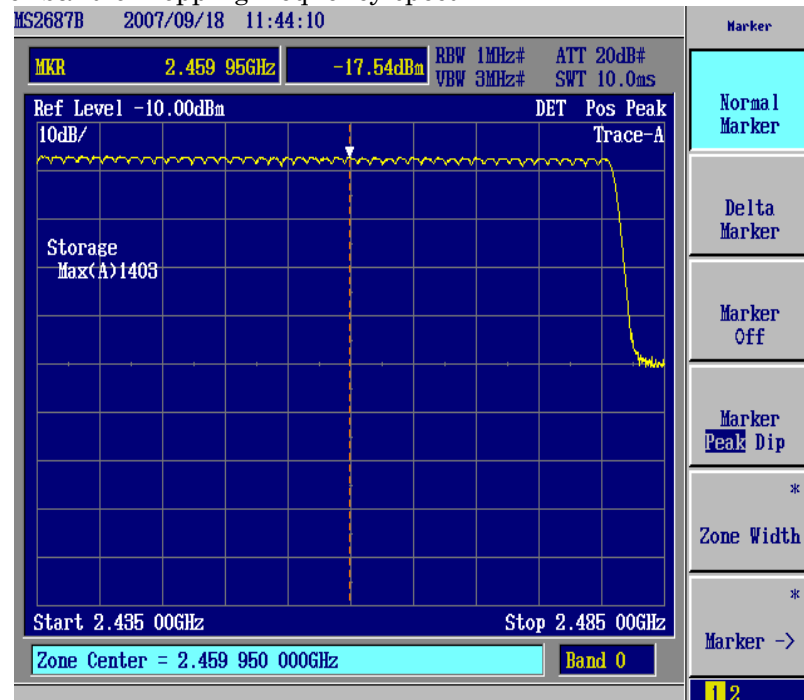
Uncertainty of measurement result: 1 usec
Temperature, Humidity : 26 °C, 50%

5.6.4 Measured Data

Lower band of hopping frequency spectrum



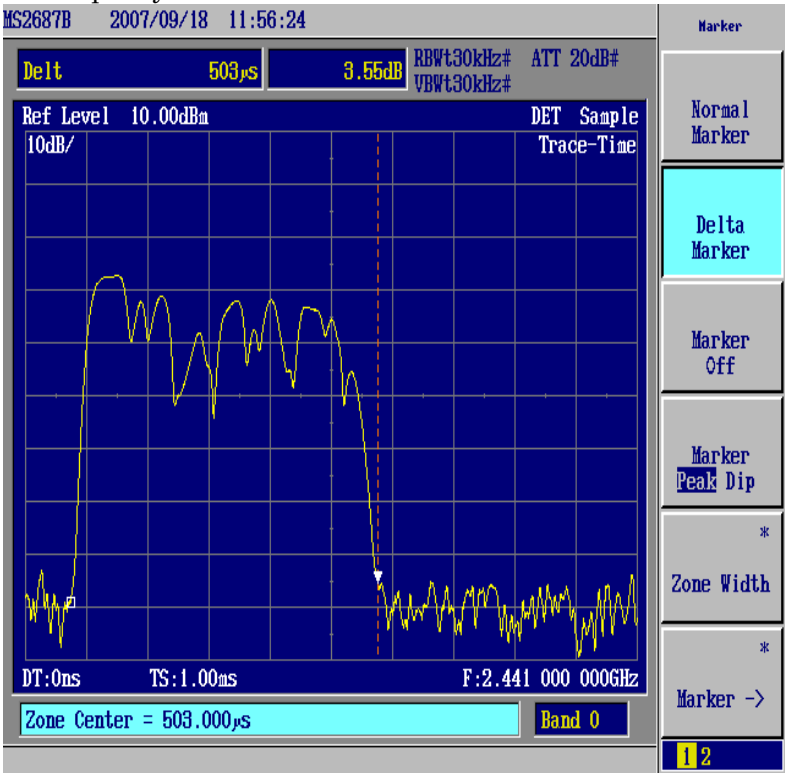
Higher band of hopping frequency spectrum



Number of observed channels

79

Time of Occupancy



Channel Hopping Rte: 1600 hops / sec
 Number of channels: 79
 Dwell time: 10.503 msec
 Time of occupancy: $(1600 / 79) * 79 * 0.4 * 0.503 * 10^{-3} = 0.32192 \text{ sec}$

5.7 15. 247(c) Band Edge Measurement**5.7.1 Setting Remarks**

- EUT directly connects to the spectrum analyzer via calibrated coaxial cable and 10 dB attenuator.
- The emission at the band edge is measured by using the marker function of spectrum analyzer.
- The peak of the in-band emission is measured by using the marker to peak function of spectrum analyzer.
- This measurement is repeated in both side of the spectrum.
- The spectrum analyzer is set-up as following;
 - ✓ Resolution bandwidth : Equal or less than 1% of frequency span
 - ✓ Video bandwidth : > RBW
 - ✓ Sweep : Auto
 - ✓ Detector function : Peak
 - ✓ Trace Mode : Max Hold
- Where bandedge spectrum is too rough to find precise edge point, larger RBW i.e. 1MHz, 3MHz shall be applied as severer condition.
- See test configuration figure 4.3.

5.7.2 Minimum Standard

In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits. Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:

Frequency of Emission (MHz)	Limit of the band edge spurious emission (dB μ V)	
Below 2,390.0	Peak	Average
Above 2,483.5	74	54

5.7.3 Result

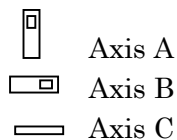
EUT complies with the requirement.

Uncertainty of measurement result: ± 2.6 dB

Temperature, Humidity : 27 °C, 40%

5.7.4 Measured Data

The band edge emissions are calculated as following;



(軸、BLUETOOTH)

Lower frequency 2,390 MHz (FH)

Vertical

	Level (dBuV/m)
P _{max}	82.00
P _{av}	71.67
P _{dev}	30.06

Higher frequency 2,483.5 MHz (FH) Vertical

	Level (dBuV/m)
P _{max}	79.36
P _{av}	62.81
P _{dev}	18.02

	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
E _{be}	51.94	74.00	22.06
E _{av}	41.61	54.00	12.39

	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
E _{be}	61.34	74.00	12.66
E _{av}	44.79	54.00	9.21

P_{max} : Maximum peak power of the fundamental.

P_{dev} : The amplitude delta between the peak power and the band edge emission.

E_{be} : Band edge emission.

E_{av} : Average of the band edge emission.

(☐ 軸、BLUETOOTH)

Lower frequency 2,390 MHz (FH)

Vertical

	Level (dBuV/m)
P _{max}	74.86
P _{av}	58.50
P _{dev}	22.09

Higher frequency 2,483.5 MHz (FH) Vertical

	Level (dBuV/m)
P _{max}	75.70
P _{av}	65.33
P _{dev}	26.04

	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
E _{be}	52.77	74.00	21.23
E _{av}	36.41	54.00	17.59

	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
E _{be}	49.66	74.00	24.34
E _{av}	39.29	54.00	14.71

P_{max} : Maximum peak power of the fundamental.P_{dev} : The amplitude delta between the peak power and the band edge emission.E_{be} : Band edge emission.E_{av} : Average of the band edge emission.

(軸、BLUETOOTH)

Lower frequency 2,390 MHz (FH)

Vertical

	Level (dBuV/m)
$P_{\max}$	71.06
P_{av}	54.70
P_{dev}	18.78

Higher frequency 2,483.5 MHz (FH) Vertical

	Level (dBuV/m)
$P_{\max}$	68.90
P_{av}	52.37
P_{dev}	18.34

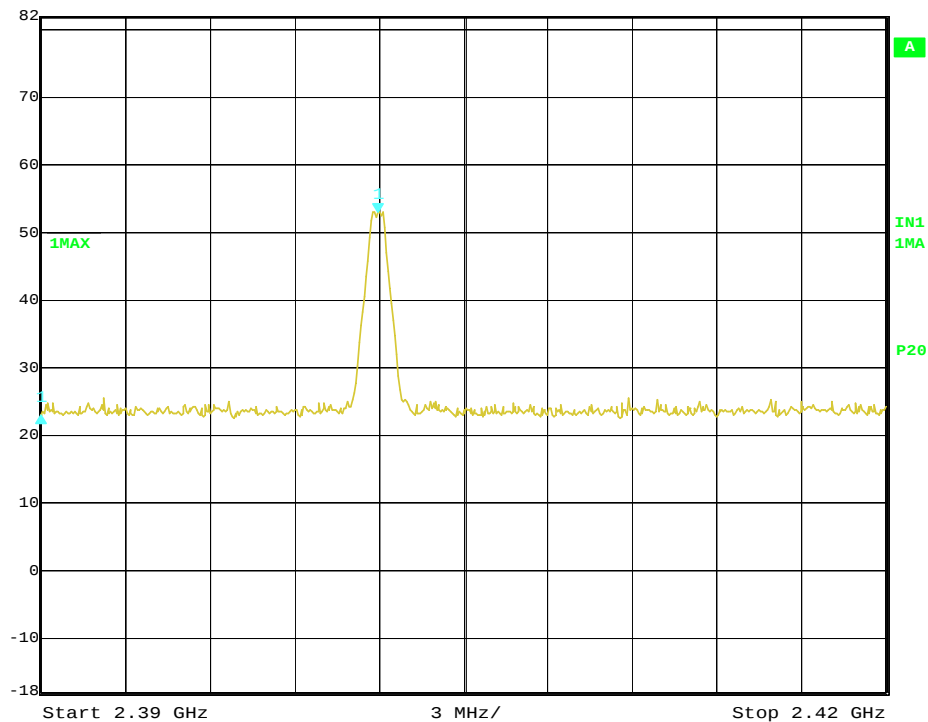
	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
E_{be}	52.28	74.00	21.72
E_{av}	35.92	54.00	18.08

	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
E_{be}	50.56	74.00	23.44
E_{av}	34.03	54.00	19.97

 $P_{\max}$: Maximum peak power of the fundamental. P_{dev} : The amplitude delta between the peak power and the band edge emission. E_{be} : Band edge emission. E_{av} : Average of the band edge emission.

Lower frequency of the band edge 2,390.0 MHz, FHSS, Axis A

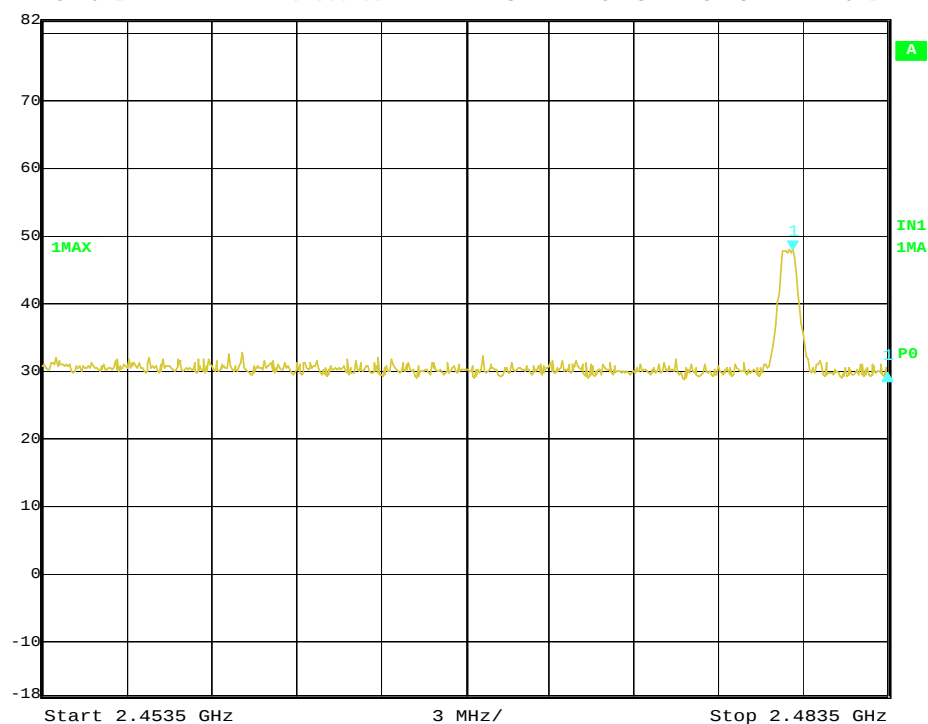
 Delta 1 [T1] RBW 300 kHz RF Att 10 dB
Ref Lvl -30.06 dB VBW 300 kHz
82 dBV -11.96392786 MHz SWT 5 ms Unit dBV



Date: 13.SEP.2007 13:33:35

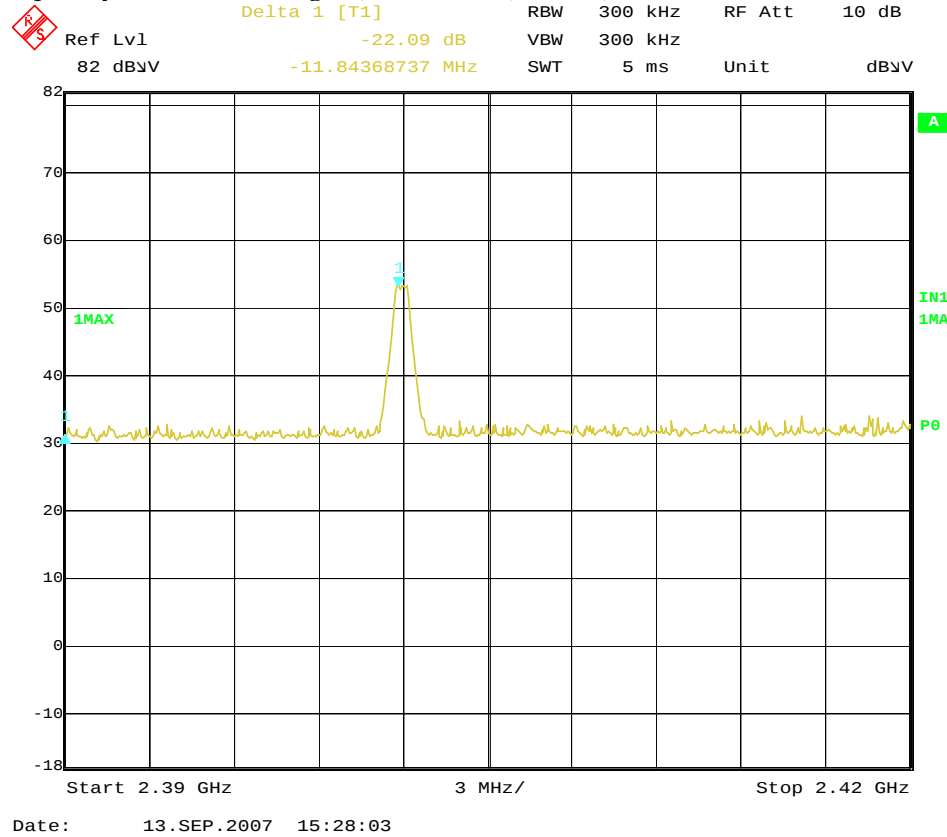
Higher frequency of the band edge 2,483.5 MHz, FHSS, Axis A

 Delta 1 [T1] RBW 300 kHz RF Att 10 dB
Ref Lvl -18.02 dB VBW 300 kHz
82 dBV 3.36673347 MHz SWT 5 ms Unit dBV

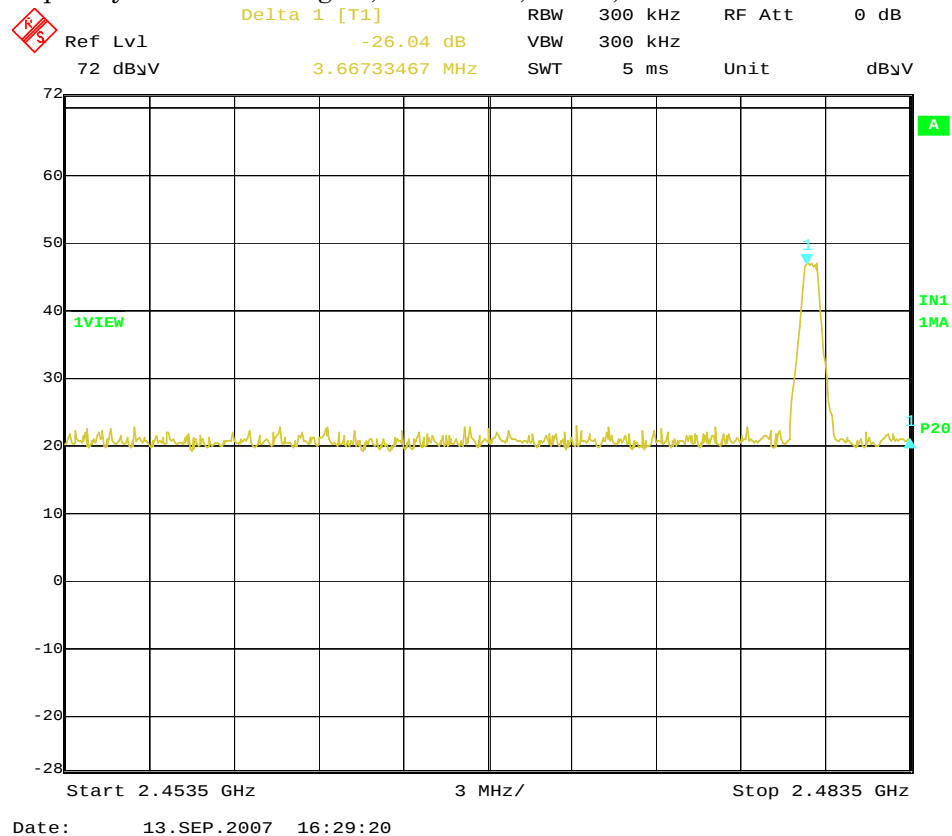


Date: 13.SEP.2007 13:54:28

Lower frequency of the band edge 2,390.0 MHz, FHSS, Axis B

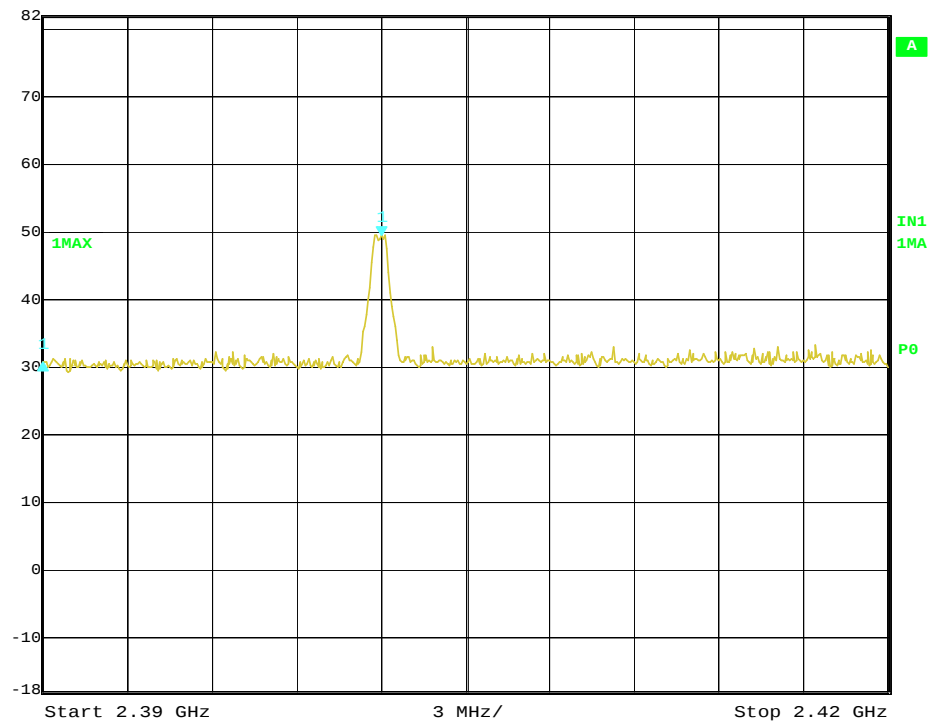


Higher frequency of the band edge 2,483.5 MHz, FHSS, Axis B



Lower frequency of the band edge 2,390.0 MHz, FHSS, Axis C

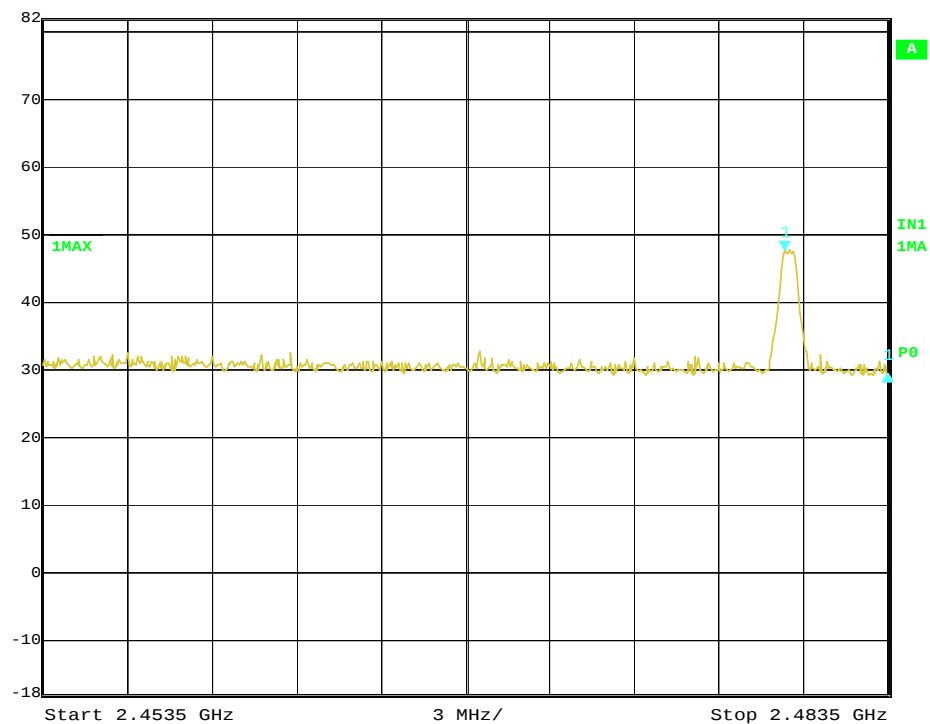
 Ref Lvl 82 dBV Delta 1 [T1] -18.78 dB RBW 300 kHz RF Att 10 dB
-12.02404810 MHz VBW 300 kHz Unit dBV
SWT 5 ms



Date: 13.SEP.2007 15:17:29

Higher frequency of the band edge 2,483.5 MHz, FHSS, Axis C

 Ref Lvl 82 dBV Delta 1 [T1] -18.34 dB RBW 300 kHz RF Att 10 dB
3.66733467 MHz VBW 300 kHz Unit dBV
SWT 5 ms



Date: 13.SEP.2007 14:39:11

6. Photos

6.1 Setup Photo (Conducted Emission)

Front View

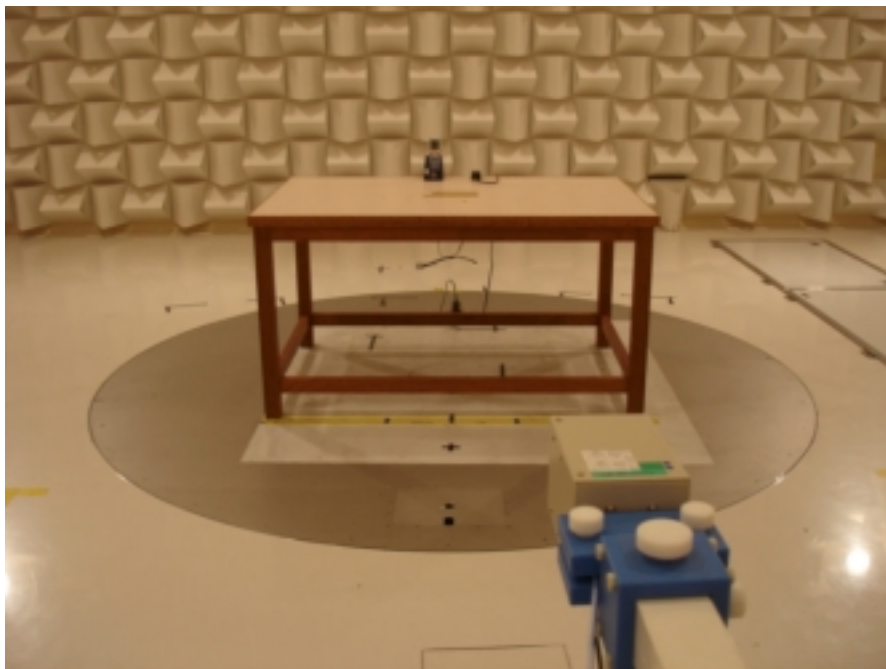


Side View



6.2 Setup Photo (Radiated Emission)

Front View (Axis A)

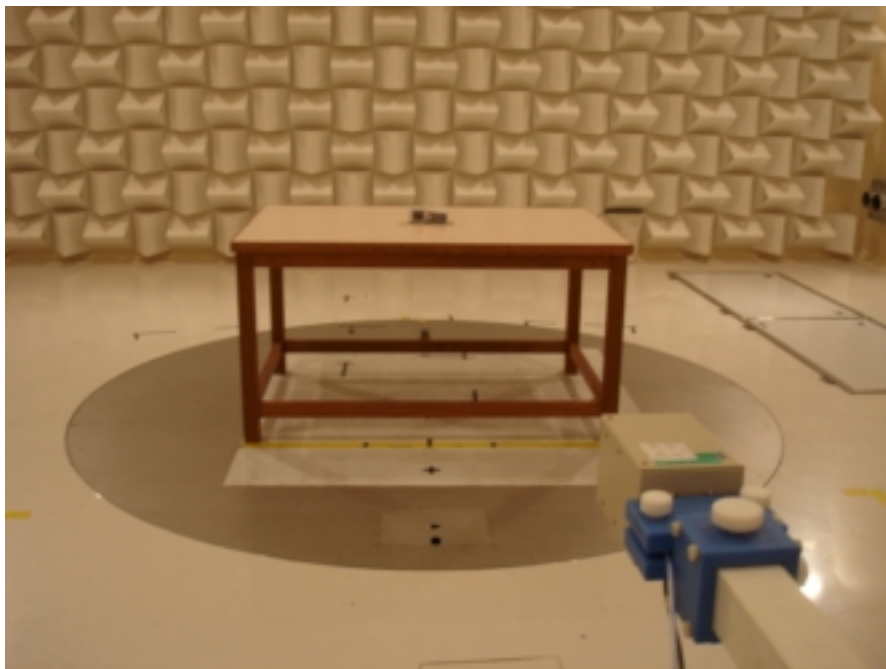


Rear View (Axis A)



6.2 Setup Photo (Radiated Emission)

Front View (Axis B)

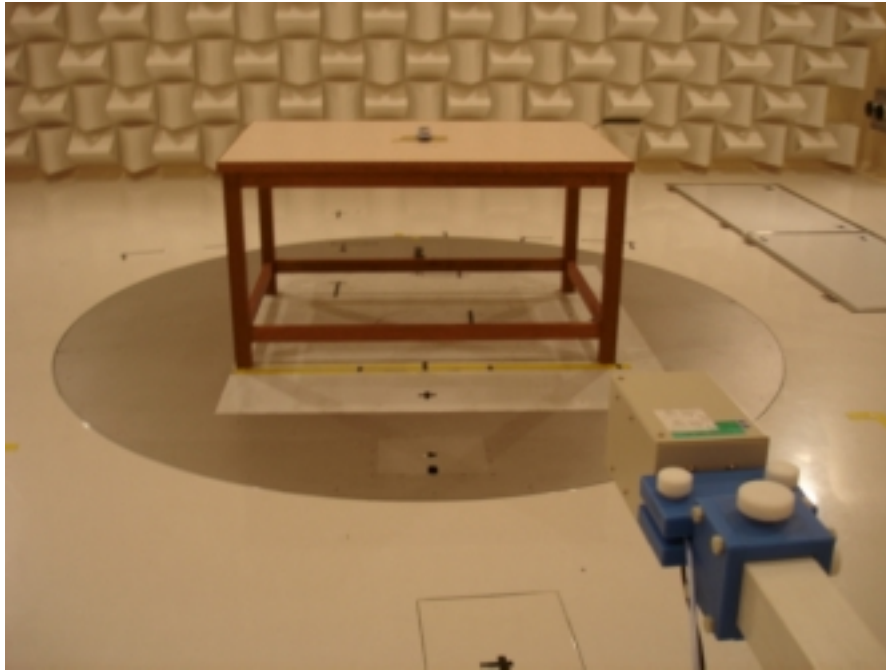


Rear View (Axis B)

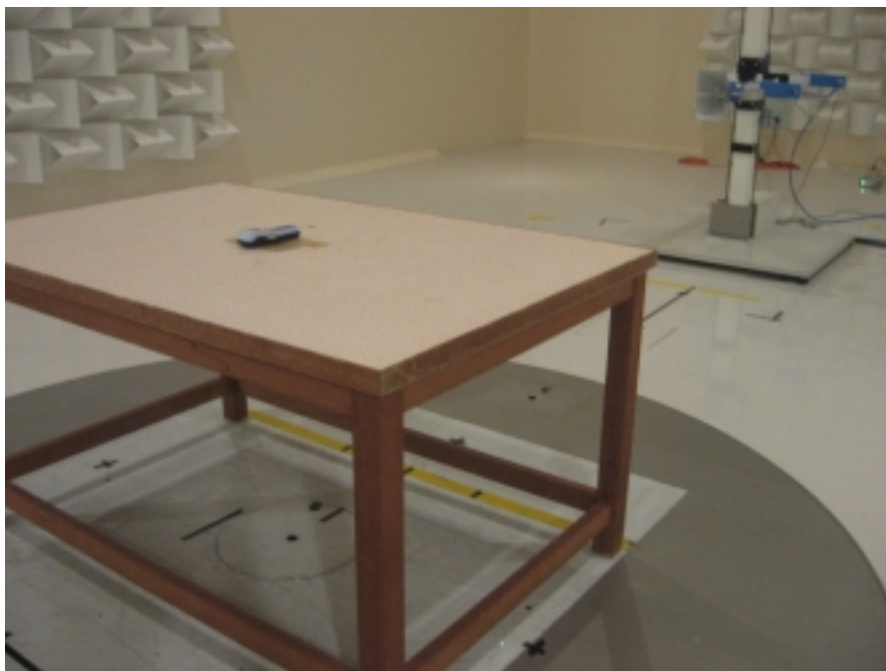


6.2 Setup Photo (Radiated Emission)

Front View (Axis C)



Rear View (Axis C)



7. List of Test Measurement Instruments**7.1 Conducted Emission**

Instruments	Manufacturer	Model / Type	Serial No.	Calibration Date Next Calibration
Spectrum Analyzer	ADVANTEST CORPORATION	R3132	140501174	July, 2007 July, 2008
EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	100335	May, 2007 May, 2008
Artificial-Mains Network	KYORITSU CORPORATION	KNW-341C (for EUT)	8-1659-1	September, 2006 September, 2007
Artificial-Mains Network	KYORITSU CORPORATION	KNW-244C (for Peripheral)	8-1657-1	September, 2006 September, 2007
Transient Limiter	AGILENT TECHNOLOGIES	11947A	3107A0374 5	July, 2007 July, 2008
RF Selector	Techno Science Japan Corp.	RFM-E221	3148	---
Spectrum Analyzer	ADVANTEST CORPORATION	R3132	140501174	July, 2007 July, 2008

7.2 Radiated Emission Measurement

Instruments	Manufacturer	Model / Type	Serial No.	Calibration Date Next Calibration
Programmable AC/DC Power Source	NF Corporation	ES18000W	425779	---
EMI Test Receiver	ROHDE & SCHWARZ	ESIB40	100211	April, 2007 April, 2008
Biconical Antenna (30 to 300MHz)	SCHWARZBECK	VHBB9124(Balun) BBA9106(Elements)	311	September, 2006 September, 2007
Log.-Periodic Antenna (300 MHz to 1 GHz)	SCHWARZBECK	UHALP 9108 A	645	September, 2006 September, 2007
Horn Antenna	SCHWARZBECK	BBHA 9120 D	446	September, 2006 September, 2007
Horn Antenna	ETS LINDGREN	3160-08	00033778	September, 2006 September, 2007
Horn Antenna	ETS LINDGREN	3160-09	00034723	September, 2006 September, 2007

7.3 Conducted Radio Measurement

Instruments	Manufacturer	Model / Type	Serial No.	Calibration Date Next Calibration
REGULATED DC Power Source	KIKUSUI	PAN60-6A	JK002503	---
Spectrum Analyzer	Anritsu	MS2687B	620016270 6	April, 2007 April, 2008
Signal Generator	Agilent Technology	E8254A	US411401 86	June, 2007 June, 2008
DIGITAL OSCILLOSCOPE	YOKOGAWA	DL1720E	91F445216	June, 2007 June, 2008
Diode Detector	Agilent Technology	423B	MY422418 36	March, 2007 March, 2008