FCC RF Test Report

APPLICANT	:	PEGATRON CORPORATION
EQUIPMENT	:	Tablet
BRAND NAME	:	TOSHIBA
MODEL NAME	:	TOSHIBA AT10-A、TOSHIBA AT15-A
FCC ID	:	VUIPDAPDAAT10-A
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DTS) Digital Transmission System

The product was received on Feb. 28, 2013 and completely tested on Apr. 09, 2013. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

SPORTON INTERNATIONAL INC.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR322823B	Rev. 01	Initial issue of report	Apr. 15, 2013

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	RSS-210 A8.2(a)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.1	-	RSS-Gen 4.6.1	99% Bandwidth	-	Pass	-
3.2	15.247(b)(1)	RSS-210 A8.1(b)	Peak Output Power	≤ 30dBm	Pass	-
3.3	15.247(e)	RSS-210 A8.2(b)	Power Spectral Density	≤ 8dBm	Pass	-
3.4	15.247(d)	RSS-210 A8.5	Conducted Band Edges and Spurious Emission	≤ 20dBc	Pass	-
3.5	15.247(d)	RSS-210 A8.5	Radiated Band Edges and Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 10.09 dB at 2483.500 MHz
3.6	15.207	RSS-210 Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 4.36 dB at 7.810 MHz
3.7	15.203 & 15.247(b)	RSS-210 A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

PEGATRON CORPORATION
No. 76, Ligong St., Beitou District, Taipei City 112

1.2 Manufacturer

Toshiba Corporation
1-1, Shibaura 1-chome, Minato-ku, Tokyo 105-8001, Japan

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Tablet
Brand Name	TOSHIBA
Model Name	TOSHIBA AT10-A、TOSHIBA AT15-A
FCC ID	VUIPDAPDAAT10-A
EUT supports Radios application	WLAN 11abgn / Bluetooth 2.1/3.0/4.0 / NFC
EUT Stage	Production Unit

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx/Rx Frequency Range	2402 MHz ~ 2480 MHz
Number of Channels	40
Carrier Frequency of Each Channel	40 Channel(37 hopping + 3 advertising channel)
Maximum Output Power to Antenna	3.02 dBm (0.0020 W)
99% Occupied Bandwidth	1.044MHz
Antenna Type	Chip Antenna type with gain 1.6999 dBi
Type of Modulation	Bluetooth 4.0 - LE : GFSK

1.5 Testing Site

Test Site	SPORTON INTERNATIONAL INC.			
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978			
Test Site No.	Sporton Site No.			FCC/IC Registration No.
	TH02-HY	CO01-HY	03CH07-HY	722060/4086B-1

The test site complies with ANSI C63.4 2003 requirement.

1.6 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v02
- ANSI C63.10-2009
- IC RSS-210 Issue 8
- IC RSS-Gen Issue 3
- NOTICE 2012-DRS0126

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. Per the section 2.2.3 of Notice of 2012-DRS0126, " Receivers Excluded from Industry Canada Requirements", only radiocommunication receivers operating in stand-alone mode within the band 30-960 MHz and scanner receivers are subject to Industry Canada requirements.

2 Test Configuration of Equipment Under Test

2.1 Descriptions of Test Mode

The RF output power was recorded in the following table:

Channel	Frequency	Bluetooth 4.0 – LE RF Output Power
		Data Rate / Modulation
		GFSK
		1Mbps
Ch00	2402MHz	2.56 dBm
Ch19	2440MHz	**3.02 dBm**
Ch39	2480MHz	2.73 dBm

a. The EUT has been associated with peripherals pursuant to ANSI C63.10-2009 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction (150 KHz to 30 MHz), radiation (9 KHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). Pre-scanned tests, X, Y, Z in three orthogonal panels to determine the final configuration (X plane as worst plane) from all possible combinations.

b. AC power line Conducted Emission was tested under maximum output power.

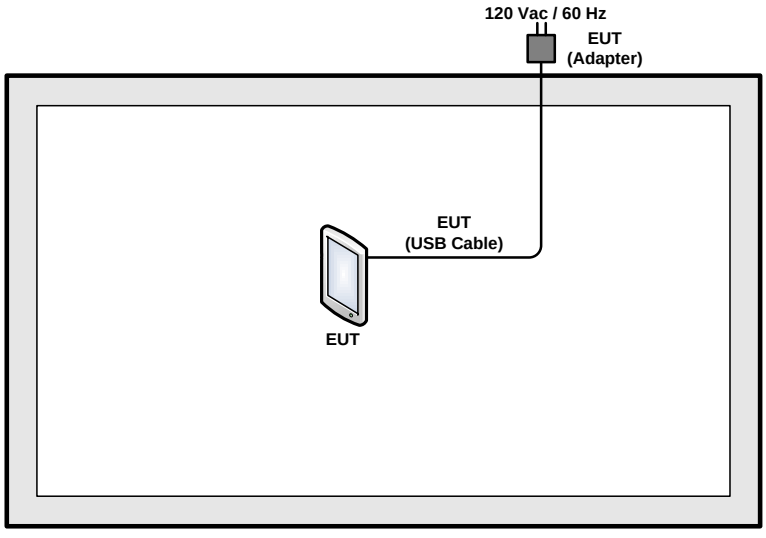
2.2 Test Mode

The following summary table is showing all test modes to demonstrate in compliance with the standard.

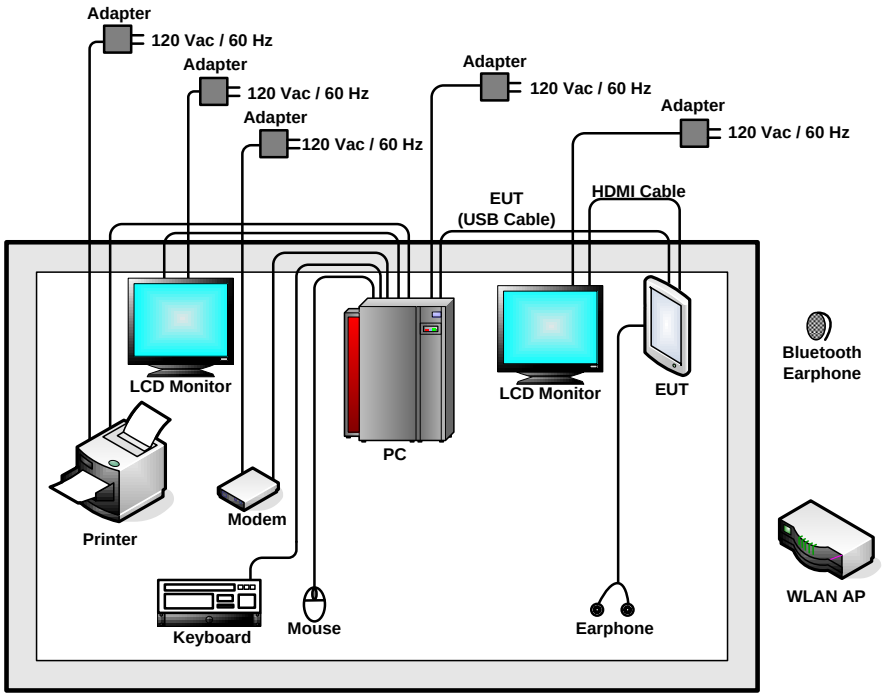
Summary table of Test Cases	
Test Item	**Data Rate / Modulation**
	Bluetooth 4.0 – LE / GFSK
Conducted TCs	Mode 1: Bluetooth Tx CH00_2402 MHz_1Mbps Mode 2: Bluetooth Tx CH19_2440 MHz_1Mbps Mode 3: Bluetooth Tx CH39_2480 MHz_1Mbps
Radiated TCs	Mode 1: Bluetooth Tx CH00_2402 MHz_1Mbps Mode 2: Bluetooth Tx CH19_2440 MHz_1Mbps Mode 3: Bluetooth Tx CH39_2480 MHz_1Mbps
AC Conducted Emission	Mode 1 :Bluetooth Link + WLAN Link + MP3 + SD Card + H Pattern + HDMI Cable + Earphone + USB Cable (Data Link with PC) + NFC On

2.3 Connection Diagram of Test System

<Bluetooth 4.0 – LE Tx Mode>



<AC Conducted Emission Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	D-Link	DNS-G120	N/A	N/A	Unshielded, 1.5 m
2.	Bluetooth Earphone	SONY	Z354	N/A	N/A	N/A
3.	PC	HP	DC7700	FCC DoC	N/A	Unshielded, 1.8 m
4.	LCD Monitor	DELL	U2410f	FCC DoC	Shielded, 1.5 m	Unshielded, 1.8 m
5.	(USB) Mouse	Microsoft	1113	FCC DoC	Shielded, 1.8 m	N/A
6.	(USB) Keyboard	Microsoft	1366	FCC DoC	Shielded, 2.0 m	N/A
7.	Printer	EPSON	LQ300+	FCC DoC	Shielded, 1.8 m	Unshielded, 1.8 m
8.	Mic + Earphone	Apple	MB770FE/A	N/A	Unshielded, 1.5m	N/A
9.	MicroSD Card	Transcend	8G	FCC DoC	N/A	N/A
10.	NFC Card	Metro Taipei	Easy Card	N/A	N/A	N/A
11.	Modem	ACCEX	DM1414	IFAXDM1414	Shielded, 1 m	Unshielded, 1.8 m

2.5 Description of RF Function Operation Test Setup

For Bluetooth function, programmed RF utility, “ADB shell” installed in the notebook make the EUT provides functions like channel selection and power level for continuous transmitting and receiving signals.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.
Offset = RF cable loss + attenuator factor.
Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Example :
Offset(dB) = RF cable loss(dB) + attenuator factor(dB).
= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

The minimum 6 dB bandwidth shall be at least 500 KHz.

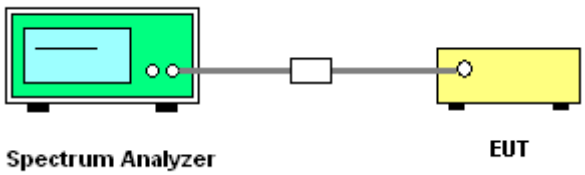
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v02.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 10 kHz. Set the Video bandwidth (VBW) = 30 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 KHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 10kHz and set the Video bandwidth (VBW) = 30kHz.
6. Measure and record the results in the test report.

3.1.4 Test Setup

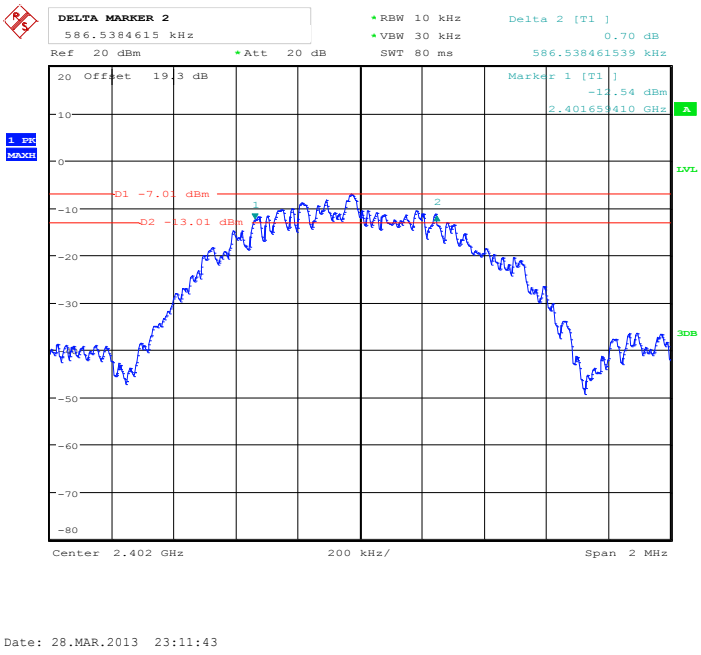


3.1.5 Test Result of 6dB Bandwidth

Test Mode :	Bluetooth 4.0 - LE	Temperature :	22~25℃
Test Engineer :	Reece Lee	Relative Humidity :	51~55%

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	6dB Bandwidth Min. Limit (MHz)	Pass/Fail
00	2402	0.587	0.5	Pass
19	2440	0.593	0.5	Pass
39	2480	0.590	0.5	Pass

6 dB Bandwidth Plot on Channel 00



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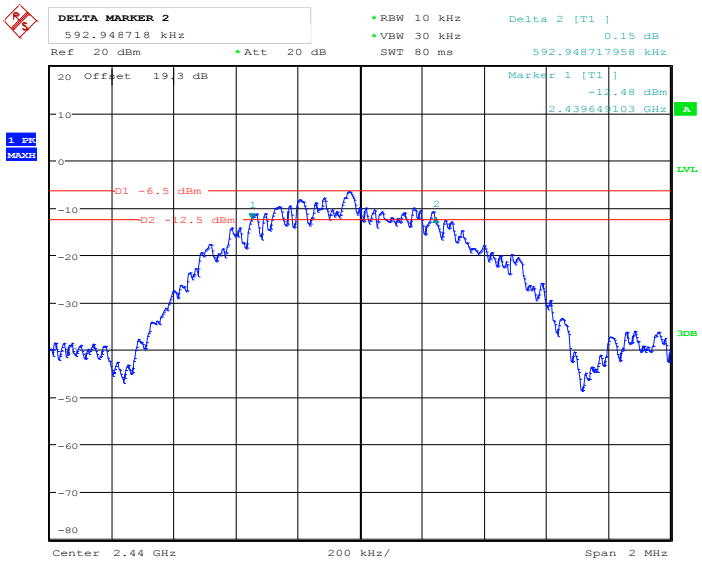
6 dB Bandwidth Plot on Channel 19



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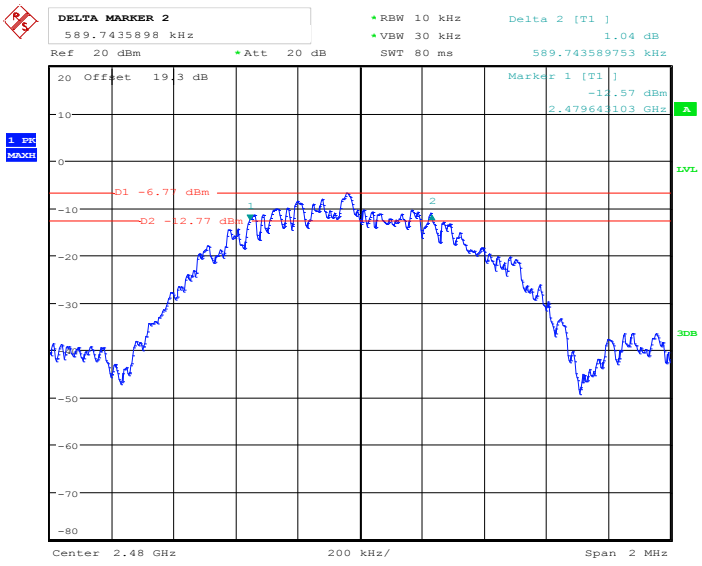
6 dB Bandwidth Plot on Channel 39



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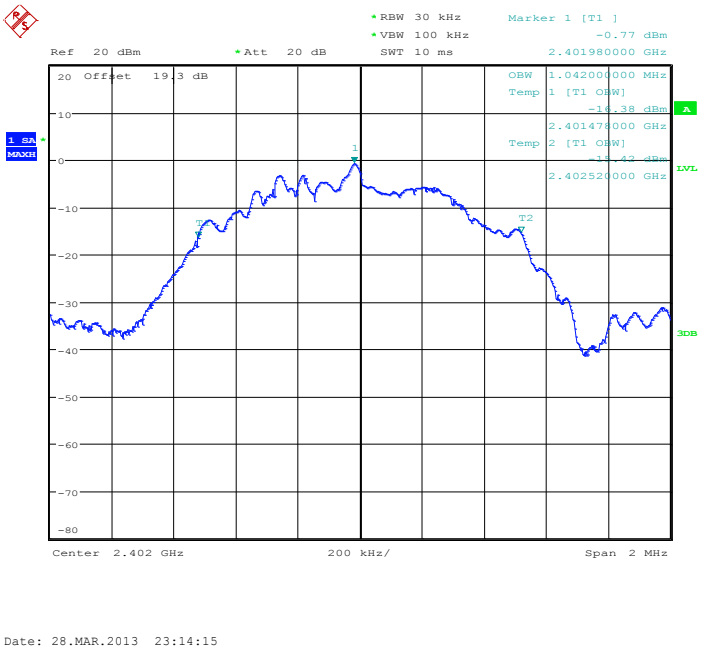
3.1.6 Test Result of 99% Occupied Bandwidth

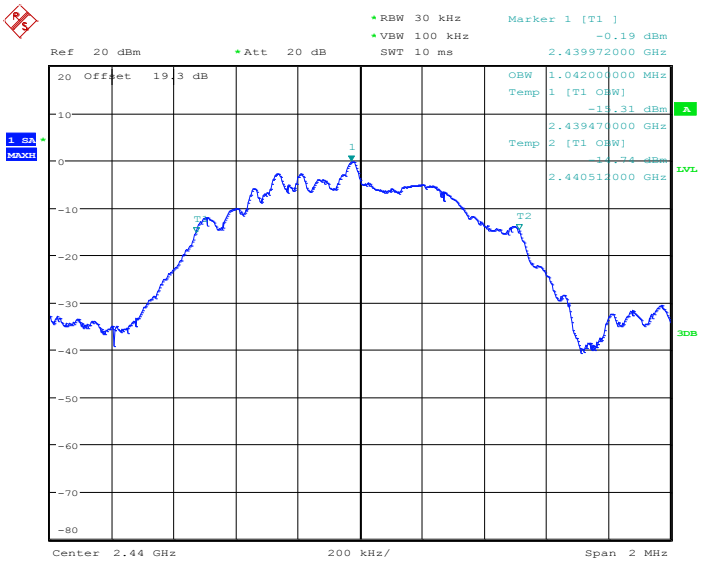
Test Mode :	Bluetooth 4.0 - LE	Temperature :	22~25℃
Test Engineer :	Reece Lee	Relative Humidity :	51~55%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	1.042
19	2440	1.042
39	2480	1.044

99% Bandwidth Plot on Channel 00



99% Occupied Bandwidth Plot on Channel 19



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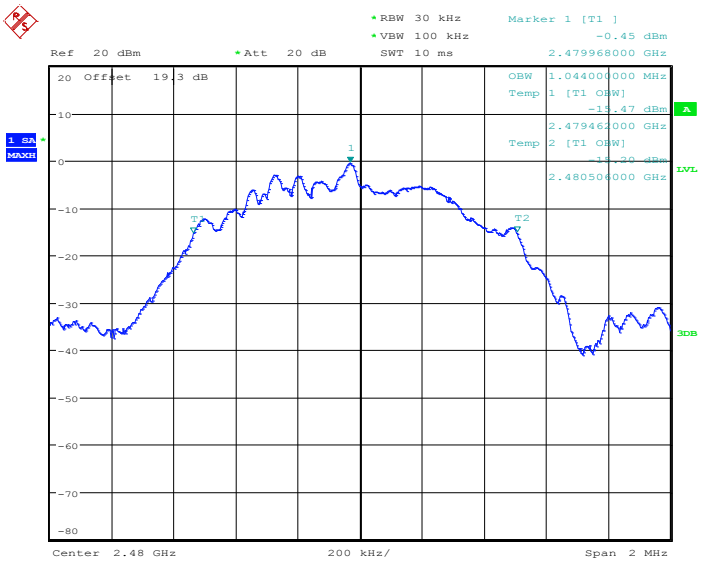
99% Occupied Bandwidth Plot on Channel 39



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3.2 Peak Output Power Measurement

3.2.1 Limit of Peak Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

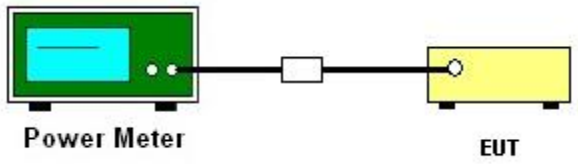
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v02.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

3.2.4 Test Setup



3.2.5 Test Result of Peak Output Power

Test Mode :	Bluetooth 4.0 - LE	Temperature :	22~25℃
Test Engineer :	Reece Lee	Relative Humidity :	51~55%

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	2.56	30.00	Pass
19	2440	3.02	30.00	Pass
39	2480	2.73	30.00	Pass

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3KHz band at any time interval of continuous transmission.

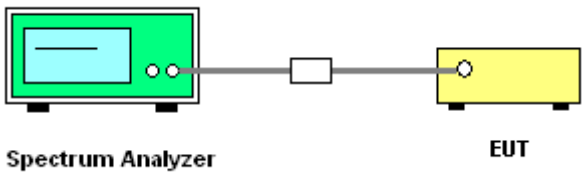
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. The testing follows Measurement Procedure 9.1 Option 1 of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v02
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.
7. The Measured power density (dBm)/ 100KHz is a reference level and used as 20dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Test Mode :	Bluetooth 4.0 - LE	Temperature :	22~25℃
Test Engineer :	Reece Lee	Relative Humidity :	51~55%

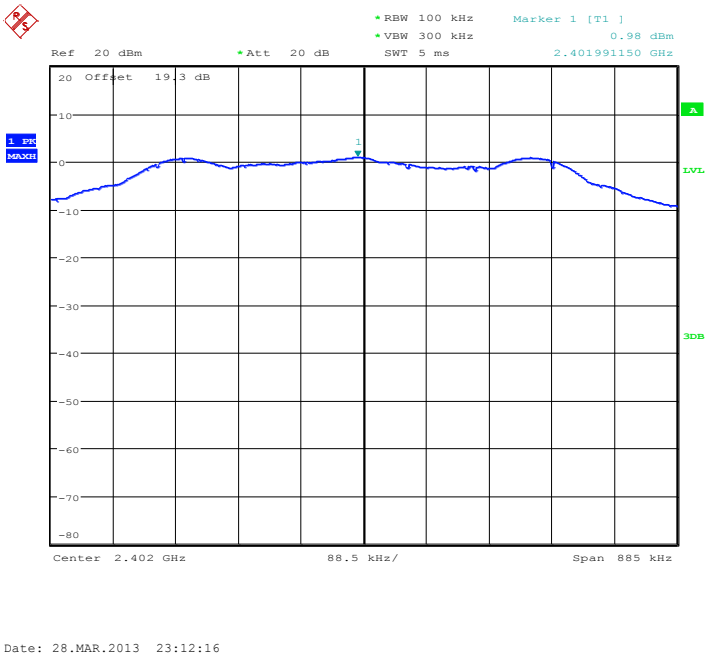
Channel	Frequency (MHz)	Power Density		Max. Limits (dBm/3kHz)	Pass/Fail
		PSD/100kHz (dBm)	PSD/3kHz (dBm)		
00	2402	0.98	-12.49	8	Pass
19	2440	1.57	-11.89	8	Pass
39	2480	1.30	-12.20	8	Pass

Note:

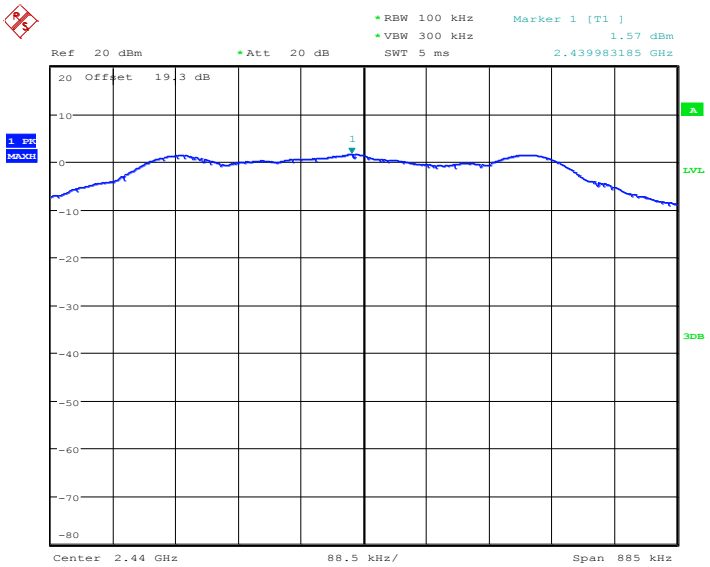
1. *Measured power density (dBm) has offset with cable loss.*
2. *The Measured power density (dBm)/ 100kHz is reference level and used as 20dBc down for Conducted Band Edges and Conducted Spurious Emission limit line.*

3.3.6 Test Result of Power Spectral Density Plots (100kHz)

PSD 100kHz Plot on Channel 00



PSD 100kHz Plot on Channel 19



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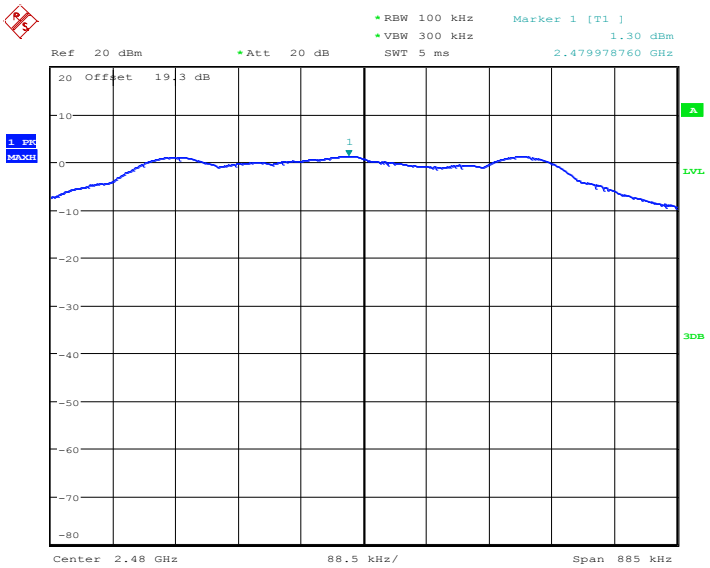
PSD 100kHz Plot on Channel 39



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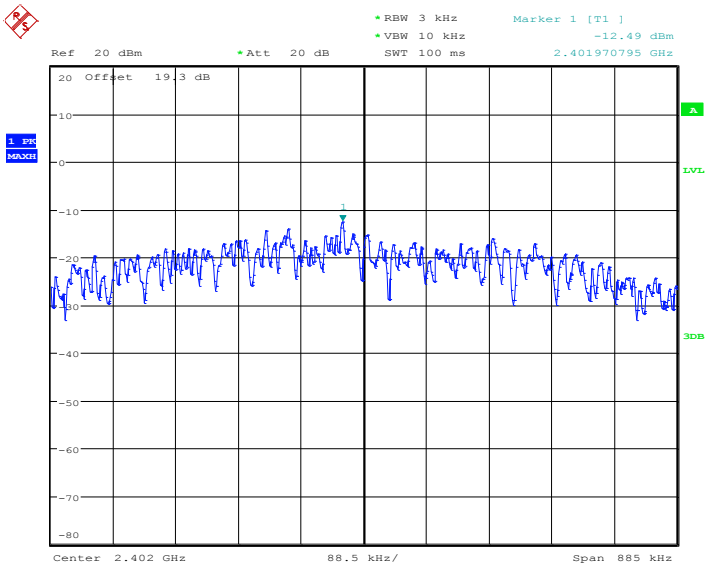
3.3.7 Test Result of Power Spectral Density Plots (3kHz)

PSD 3kHz Plot on Channel 00



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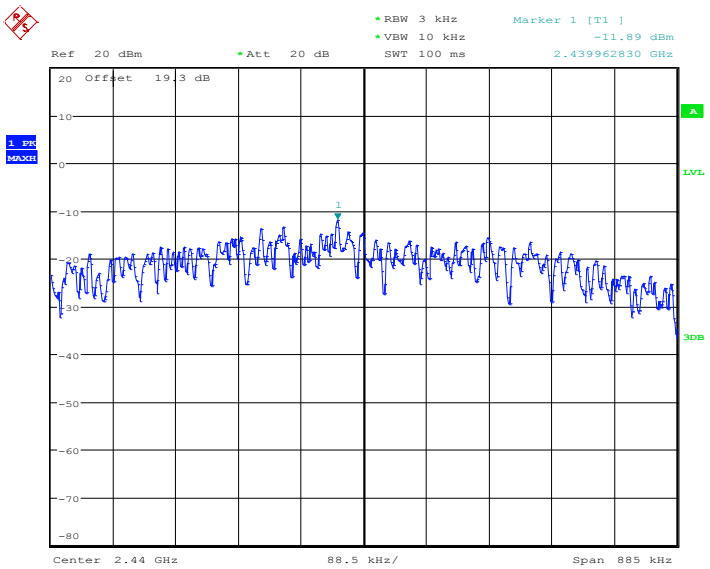
PSD 3kHz Plot on Channel 19



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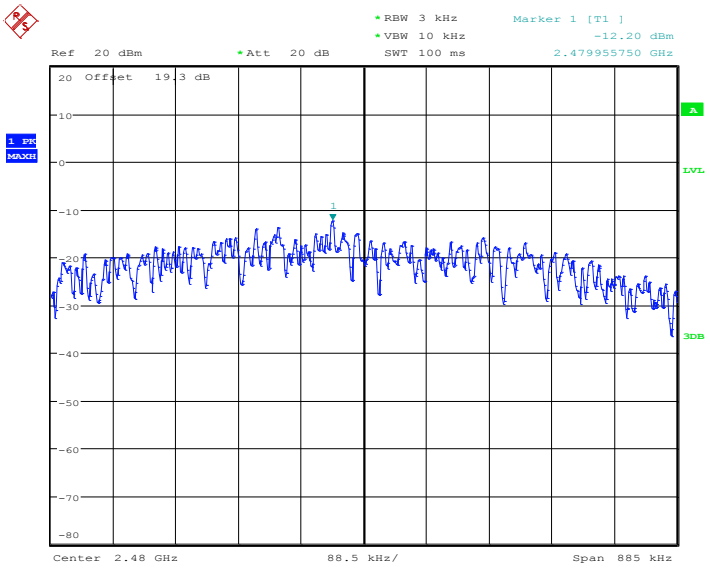
PSD 3kHz Plot on Channel 39



3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission

All harmonics/spurious must be at least 20 dB down from the highest emission level within the authorized band.

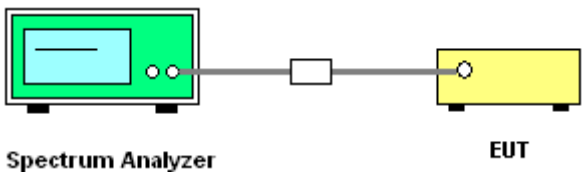
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedure

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v02.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 KHz, VBW=300 KHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

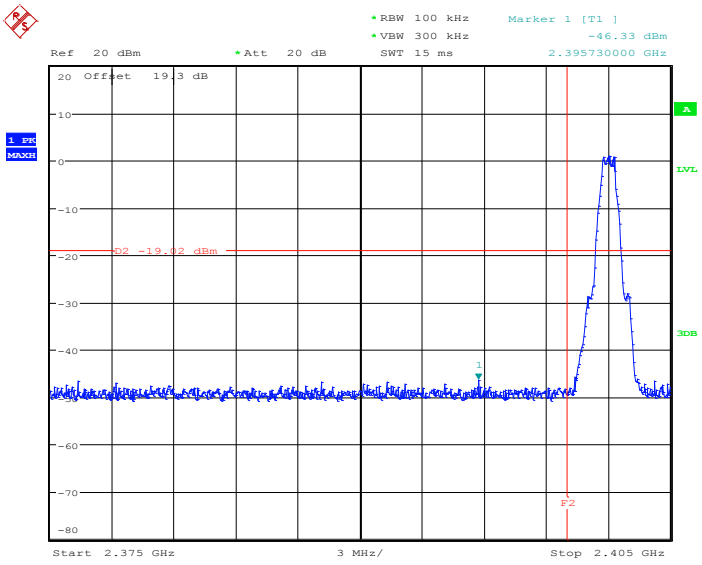
3.4.4 Test Setup



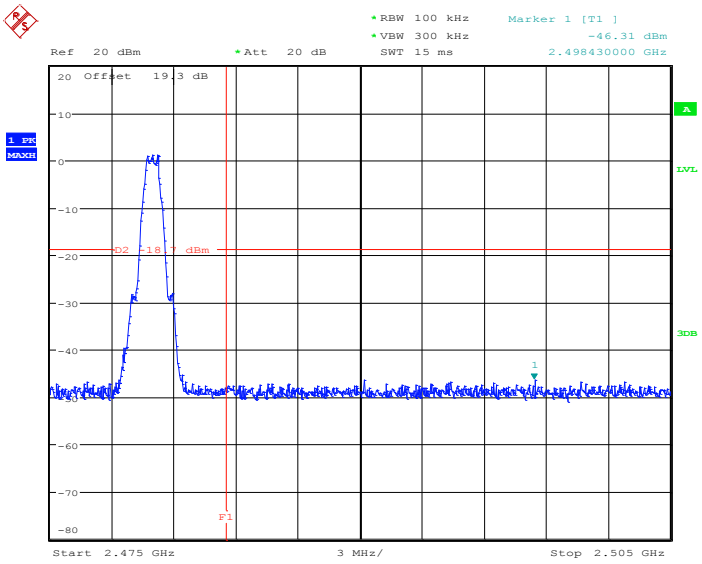
3.4.5 Test Result of Conducted Band Edges

Test Mode :	Bluetooth 4.0 - LE	Temperature :	22~25℃
Test Channel :	00 and 39	Relative Humidity :	51~55%
		Test Engineer :	Reece Lee

Low Band Edge Plot on Channel 00



High Band Edge Plot on Channel 39

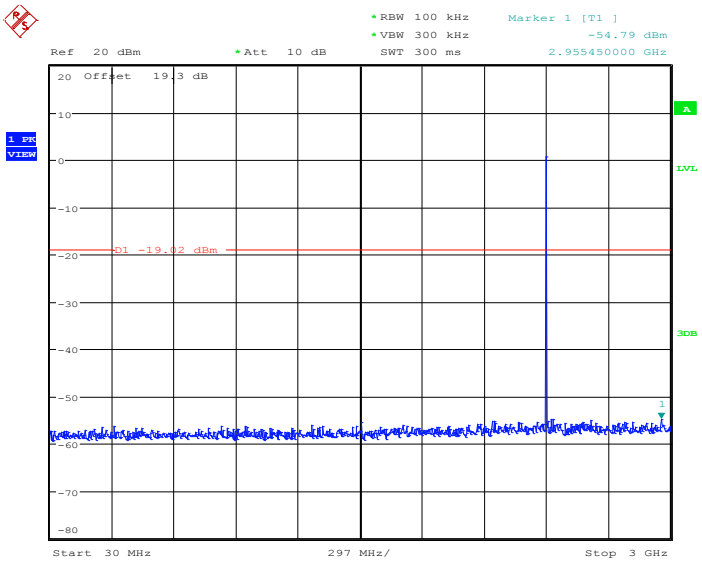


3.4.6 Test Result of Conducted Spurious Emission

Test Mode :	Bluetooth 4.0 - LE	Temperature :	22~25℃
Test Channel :	00	Relative Humidity :	51~55%
		Test Engineer :	Reece Lee

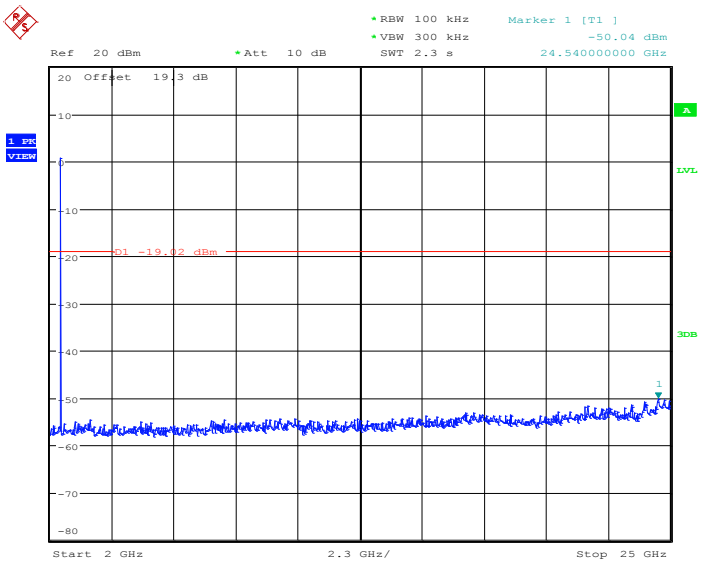
Conducted Spurious Emission Plot on Bluetooth LE 1Mbps

GFSK Channel 00



Conducted Spurious Emission Plot on Bluetooth LE 1Mbps

GFSK Channel 00



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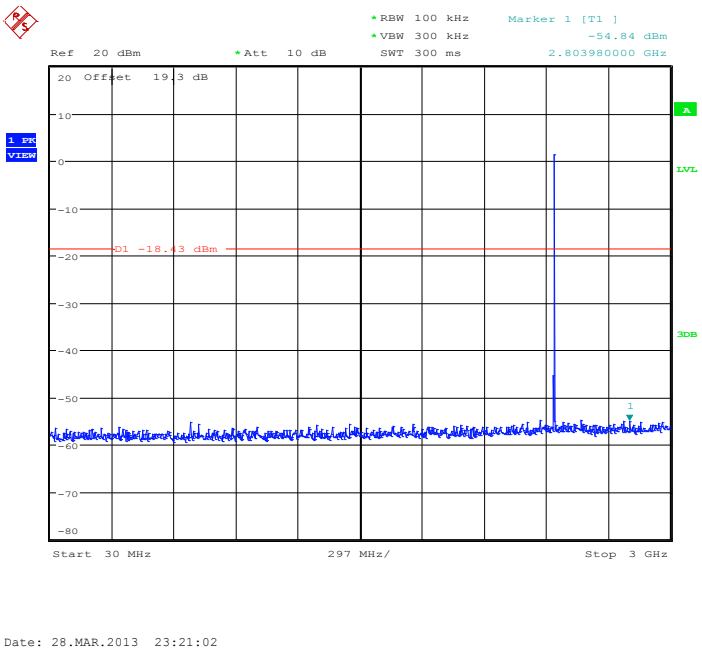
Test Mode :	Bluetooth 4.0 - LE	Temperature :	22~25℃
Test Channel :	19	Relative Humidity :	51~55%
		Test Engineer :	Reece Lee

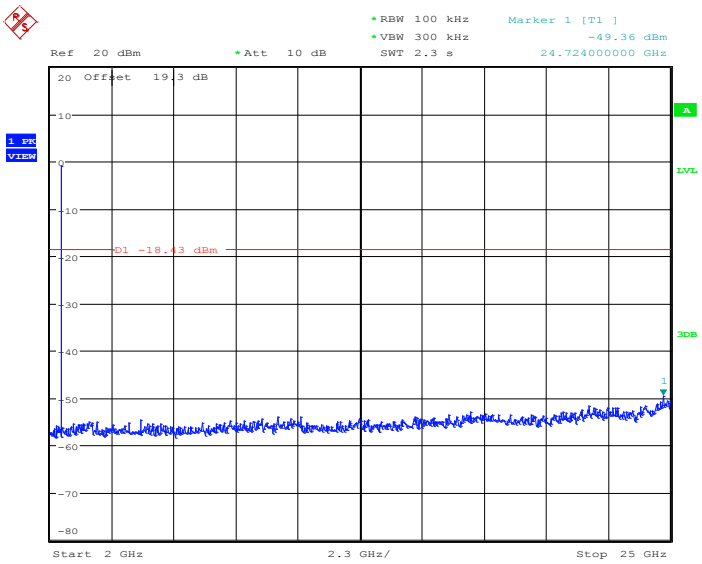
Conducted Spurious Emission Plot on Bluetooth LE 1Mbps

GFSK Channel 19



Conducted Spurious Emission Plot on Bluetooth LE 1Mbps

GFSK Channel 19



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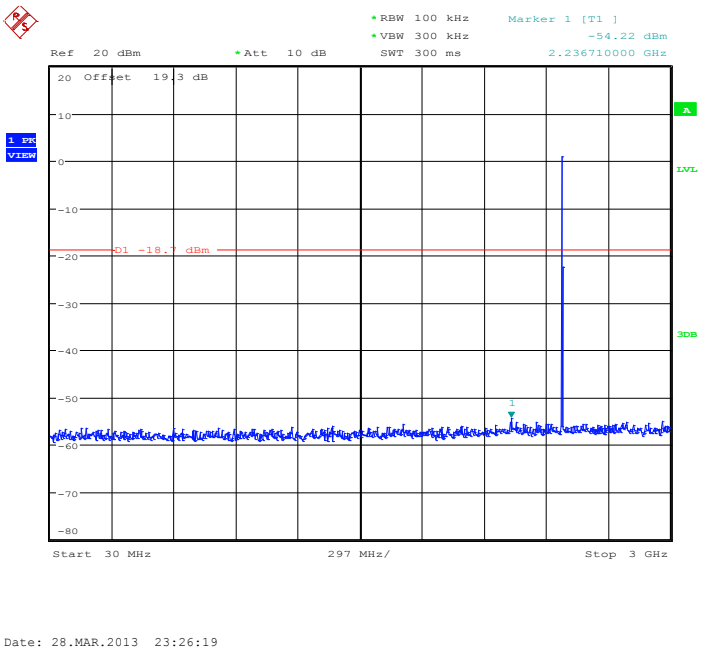
Test Mode :	Bluetooth 4.0 - LE	Temperature :	22~25℃
Test Channel :	39	Relative Humidity :	51~55%
		Test Engineer :	Reece Lee

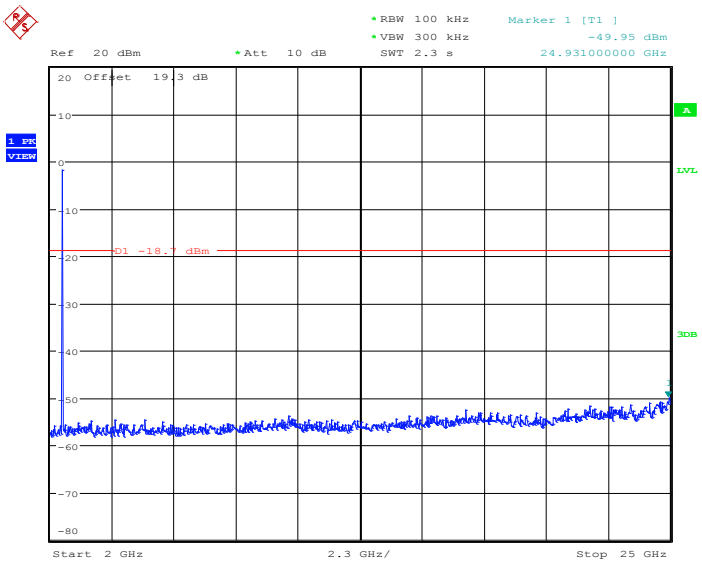
Conducted Spurious Emission Plot on Bluetooth LE 1Mbps

GFSK Channel 39



Conducted Spurious Emission Plot on Bluetooth LE 1Mbps

GFSK Channel 39



3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 KHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/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

3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The testing follows the guidelines in ANSI C63.10-2009.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 KHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Band	Duty Cycle(%)	T(μs)	1/T(kHz)	VBW Setting
Bluetooth 4.0 - LE	67.72	428.000	2.336	3kHz

Note: For average measurement with duty cycle < 98%, use reduced VBW measurement method 4.2.3.2.3 in ANSI C63.10.

Marker-Delta method：

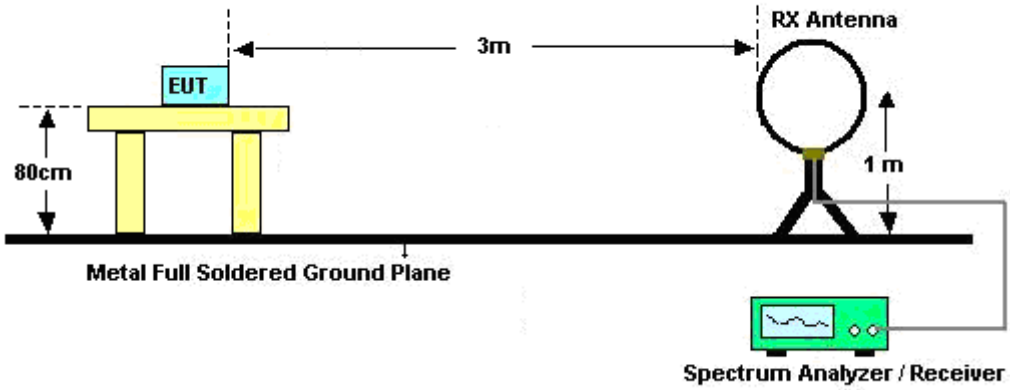
(1) Set RBW = 1 MHz, VBW = 3 MHz, peak detector.
Repeat the measurement with an average detector, use RBW = 1MHz
VBW = 10 Hz, when duty cycle is no less than 98 percent.
VBW ≥ 1/T, when duty cycle is less than 98 percent

(2) Set span = 10MHz, that encompasses both the peak of the fundamental emission and the band-edge emission under investigation. Set RBW = 100KHz, 1% of the total span. Set VBW = 100KHz >= RBW.

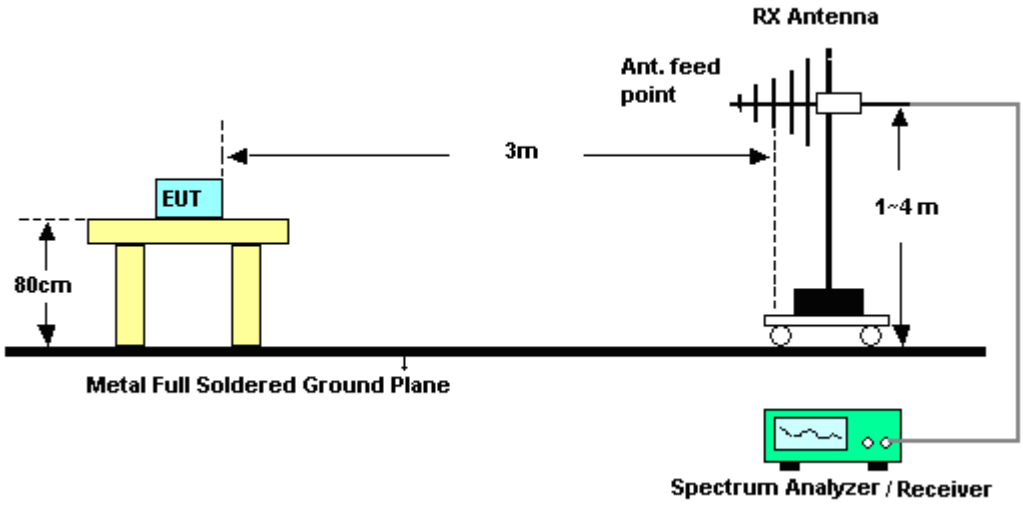
(3) Subtract the delta measured in step (2) from the field strengths measured in step (1). The resultant field strengths (peak/average) are then used to determine band-edge compliance as required by Section 15.205.

3.5.4 Test Setup

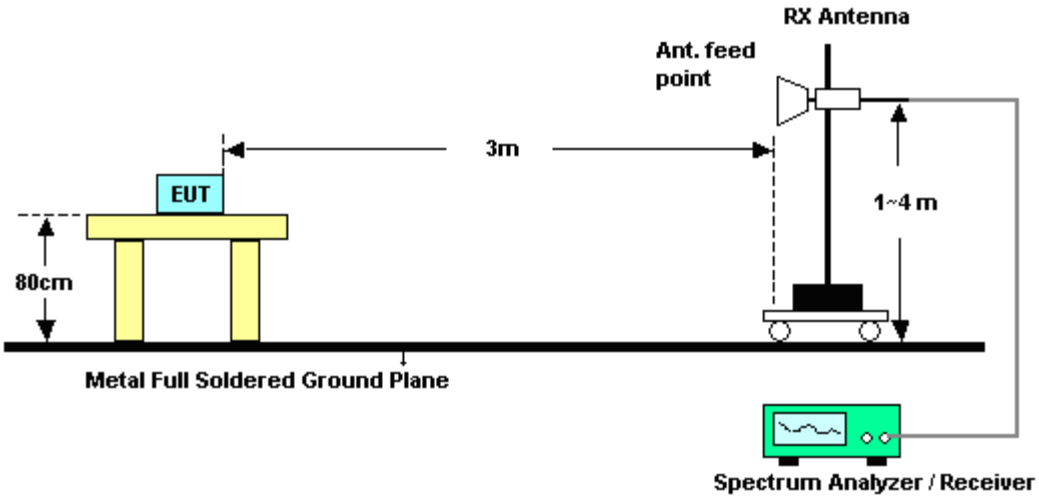
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.5.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 KHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

3.5.6 Test Result of Radiated Band Edges

Test Mode :	Mode 1	**Temperature :**	21~23°C
Test Channel :	00	**Relative Humidity :**	51~53%
		Test Engineer :	Kyle Jhuang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	**Level (dBµV /m)**	**Over Limit (dB)**	**Limit Line (dBµV /m)**	**Read Level (dBµV)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Ant Pos (cm)**	**Table Pos (deg)**	**Remark**
2362.92	49.97	-24.03	74	45.08	32.26	6.88	34.25	196	30	Peak
2389.56	38.11	-15.89	54	33.17	32.3	6.91	34.27	196	30	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	**Level (dBµV /m)**	**Over Limit (dB)**	**Limit Line (dBµV /m)**	**Read Level (dBµV)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Ant Pos (cm)**	**Table Pos (deg)**	**Remark**
2371.74	47.06	-26.94	74	42.17	32.28	6.88	34.27	170	237	Peak
2355.63	35.44	-18.56	54	30.59	32.26	6.84	34.25	170	237	Average

Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	39	Relative Humidity :	51~53%
		Test Engineer :	Kyle Jhuang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	67.35	-6.65	74	62.34	32.38	7.06	34.43	153	39	Peak
2483.5	64.62	*10.62	54	59.61	32.38	7.06	34.43	153	39	Average
2483.5	44.66	-29.34	74	-	-	-	-	-	-	Peak
2483.5	43.91	-10.09	54	-	-	-	-	-	-	Average

Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Measurement Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
Peak	106.24	61.58	44.66	74	-29.34	Pass
Average	105.49	61.58	43.91	54	-10.09	Pass

Note:

1. Measurement result = Maximum field strength – Delta result
2. *Delta-Marker Method is used for the 2483.5MHz average measurement as described in the test procedure of this report and the test result is under 10.09dB.

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	62.21	-11.79	74	57.2	32.38	7.06	34.43	195	254	Peak
2483.5	59.51	*5.51	54	54.5	32.38	7.06	34.43	195	254	Average
2483.5	44.10	-29.90	74	-	-	-	-	-	-	Peak
2483.5	43.36	*-10.64	54	-	-	-	-	-	-	Average

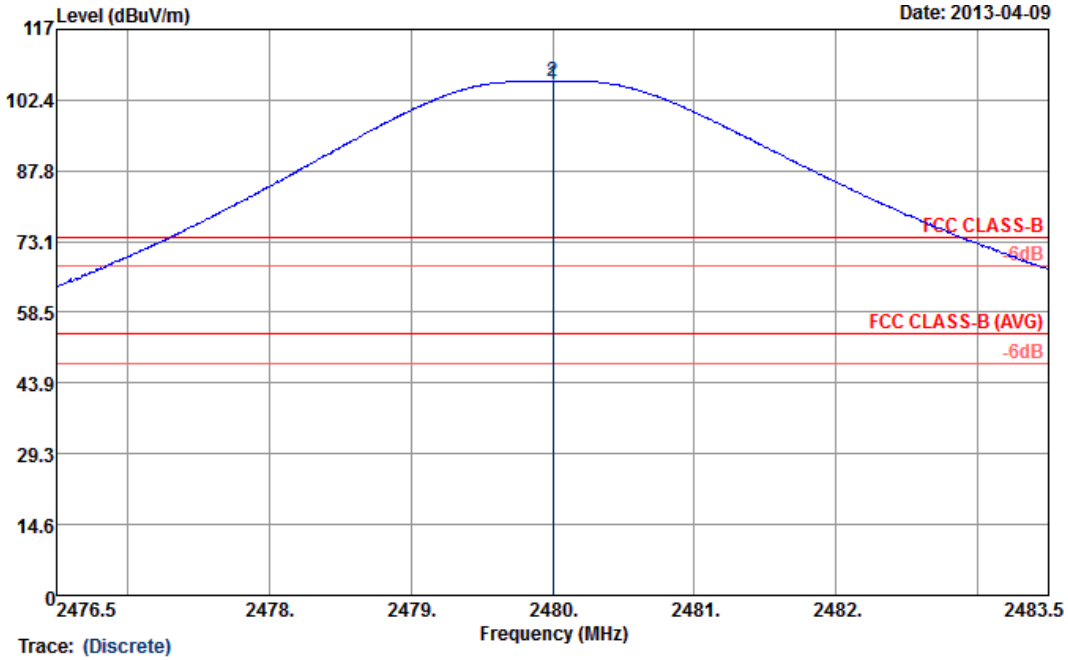
Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Measurement Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
Peak	101.15	57.05	44.10	74	-29.90	Pass
Average	100.41	57.05	43.36	54	-10.64	Pass

Note:

1. Measurement result = Maximum field strength – Delta result
2. *Delta-Marker Method is used for the 2483.5MHz average measurement as described in the test procedure of this report and the test result is under 10.64dB.

Test Mode :	Bluetooth 4.0 - LE	Temperature :	21~23°C
Test Channel :	39	Relative Humidity :	51~53%
Test Engineer :	Kyle Jhuang	Polarization :	Horizontal

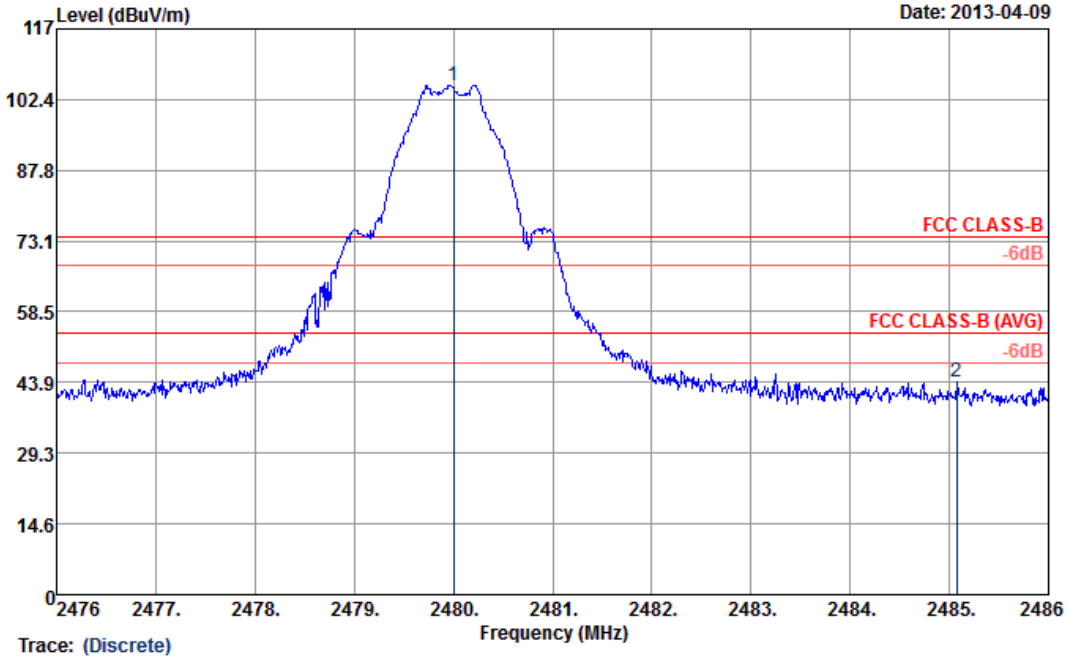


Trace: (Discrete)
Site : 03CH07-HY
Condition : FCC CLASS-B 3m HF-ANT_120823 HORIZONTAL
: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 *	2480.00	105.49	51.49	54.00	100.48	32.38	7.06	34.43	153	39	Average
2 *	2480.00	106.24	32.24	74.00	101.23	32.38	7.06	34.43	153	39	Peak

* Maximum field strength of the fundamental emission

Test Mode :	Bluetooth 4.0 - LE	**Temperature :**	21~23°C
Test Channel :	39	**Relative Humidity :**	51~53%
Test Engineer :	Kyle Jhuang	**Polarization :**	Horizontal

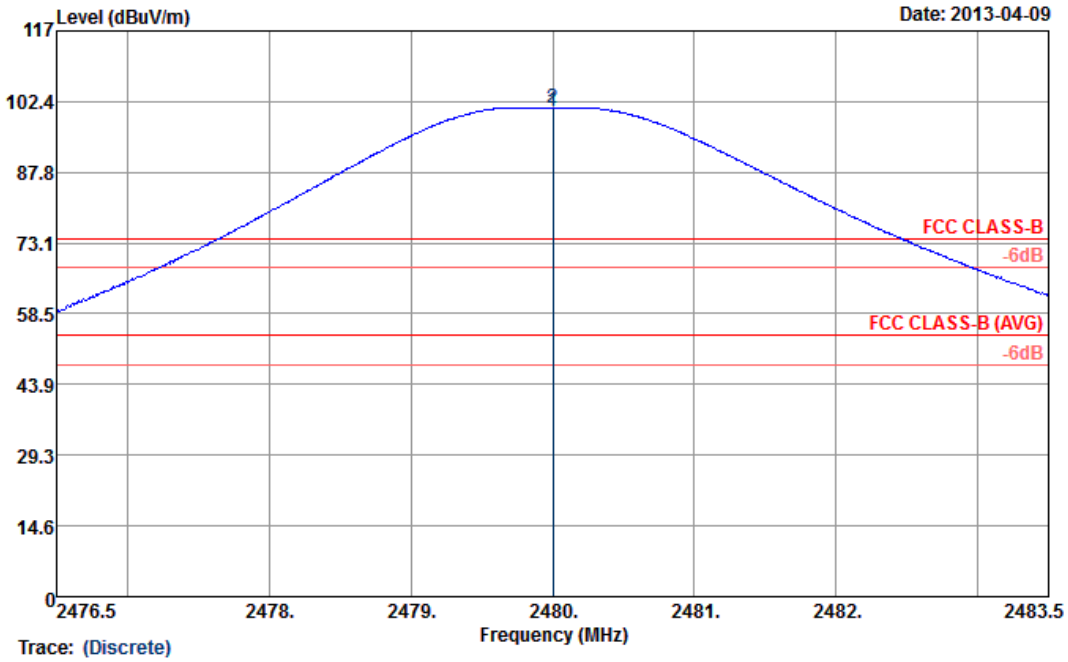


Trace: (Discrete)
Site : 03CH07-HY
Condition : FCC CLASS-B 3m HF-ANT_120823 HORIZONTAL
: RBW:100.000KHz VBW:300.000KHz SWT:Auto

		Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	*	2480.00	105.43	31.43	74.00	100.42	32.38	7.06	34.43	153	39	Peak
2		2485.07	43.85	-30.15	74.00	38.84	32.38	7.06	34.43	153	39	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 61.58 dB , single carrier Mode

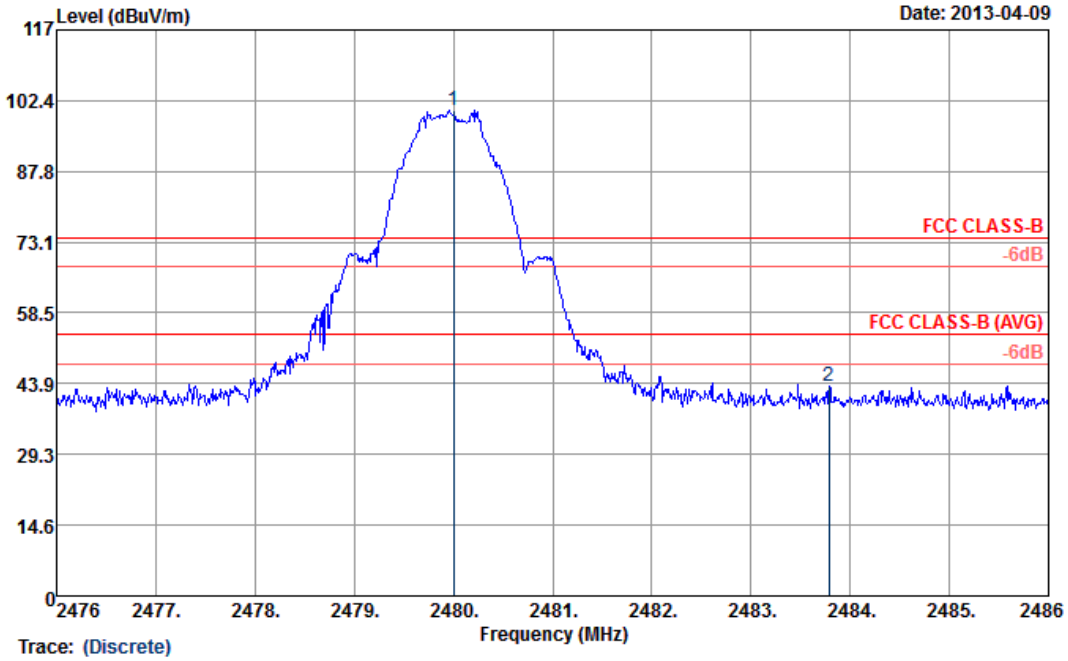
Test Mode :	Bluetooth 4.0 - LE	Temperature :	21~23°C
Test Channel :	39	Relative Humidity :	51~53%
Test Engineer :	Kyle Jhuang	Polarization :	Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 *	2480.00	100.41	46.41	54.00	95.40	32.38	7.06	34.43	195	254	Average
2 *	2480.00	101.15	27.15	74.00	96.14	32.38	7.06	34.43	195	254	Peak

* Maximum field strength of the fundamental emission

Test Mode :	Bluetooth 4.0 - LE	Temperature :	21~23°C
Test Channel :	39	Relative Humidity :	51~53%
Test Engineer :	Kyle Jhuang	Polarization :	Vertical



Trace: (Discrete)
Site : 03CH07-HY
Condition : FCC CLASS-B 3m HF-ANT_120823 VERTICAL
: RBW:100.000KHz VBW:300.000KHz SWT:Auto

		Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	*	2480.00	100.25	26.25	74.00	95.24	32.38	7.06	34.43	195	254	Peak
2		2483.79	43.20	-30.80	74.00	38.19	32.38	7.06	34.43	195	254	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 57.05 dB , single carrier Mode

3.5.7 Test Result of Radiated Emission (30 MHz ~ 10th Harmonic)

Test Mode :	Mode 1	**Temperature :**	21~23°C
Test Channel :	00	**Relative Humidity :**	51~53%
Test Engineer :	Kyle Jhuang	**Polarization :**	Horizontal
Remark :	1. 2404 MHz is fundamental signal which can be ignored. 2. 7206 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. For example, 107.54 dBμV/m - 20dB = 87.54 dBμV/m. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2404	106.73	-	-	101.82	32.3	6.91	34.3	196	30	Average
2404	107.54	-	-	102.63	32.3	6.91	34.3	196	30	Peak
4803	40.52	-33.48	74	55.26	33.98	8.75	57.47	100	0	Peak
7206	41.82	-45.72	87.54	53.41	35.56	10.81	57.96	100	0	Peak

Note: Other harmonics are lower than background noise.

Test Mode :	Mode 1	**Temperature :**	21~23°C
Test Channel :	00	**Relative Humidity :**	51~53%
Test Engineer :	Kyle Jhuang	**Polarization :**	Vertical
Remark :	1. 2404 MHz is fundamental signal which can be ignored. 2. 7206 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. 3. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2404	101.13	-	-	96.21	32.31	6.91	34.3	170	237	Average
2404	101.81	-	-	96.89	32.31	6.91	34.3	170	237	Peak
4803	40.86	-33.14	74	55.6	33.98	8.75	57.47	100	0	Peak
7206	41.58	-40.23	81.81	53.17	35.56	10.81	57.96	100	0	Peak

Note: Other harmonics are lower than background noise.

Test Mode :	Mode 2	Temperature :	21~23°C
Test Channel :	19	Relative Humidity :	51~53%
Test Engineer :	Kyle Jhuang	Polarization :	Horizontal
Remark :	1. 2440 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2440	106.89	-	-	101.9	32.35	6.99	34.35	159	32	Average
2440	107.69	-	-	102.7	32.35	6.99	34.35	159	32	Peak
4881	40.88	-33.12	74	55.56	33.95	8.85	57.48	100	0	Peak
7323	40.6	-33.4	74	52.2	35.53	10.91	58.04	100	0	Peak

Note: Other harmonics are lower than background noise.

Test Mode :	Mode 2	Temperature :	21~23°C
Test Channel :	19	Relative Humidity :	51~53%
Test Engineer :	Kyle Jhuang	Polarization :	Vertical
Remark :	1. 2440 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2440	101.92	-	-	96.93	32.35	6.99	34.35	163	256	Average
2440	102.7	-	-	97.71	32.35	6.99	34.35	163	256	Peak
4881	39.29	-34.71	74	56.27	33.95	8.85	59.78	100	0	Peak
7323	40.13	-33.87	74	53.15	35.53	10.91	59.46	100	0	Peak

Note: Other harmonics are lower than background noise.

Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	39	Relative Humidity :	51~53%
Test Engineer :	Kyle Jhuang	Polarization :	Horizontal
Remark :	1. 2481 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
138	25.74	-17.76	43.5	44.59	11.44	1.19	31.48	-	-	Peak
230.61	29.44	-16.56	46	47.91	11.25	1.49	31.21	-	-	Peak
257.61	33.36	-12.64	46	50.31	12.71	1.58	31.24	102	168	Peak
365.8	31.47	-14.53	46	45.7	15.08	2.07	31.38	-	-	Peak
420.4	28.68	-17.32	46	41.3	16.42	2.21	31.25	-	-	Peak
447	30.78	-15.22	46	42.64	16.99	2.29	31.14	-	-	Peak
2481	105.47	-	-	100.46	32.38	7.06	34.43	153	39	Average
2481	106.17	-	-	101.16	32.38	7.06	34.43	153	39	Peak
4959	41.47	-32.53	74	56.13	33.91	8.92	57.49	100	0	Peak
7440	40.68	-33.32	74	52.25	35.51	11.04	58.12	100	0	Peak

Note: Other harmonics are lower than background noise.

Test Mode :	Mode 3	Temperature :	21~23°C
Test Channel :	39	Relative Humidity :	51~53%
Test Engineer :	Kyle Jhuang	Polarization :	Vertical
Remark :	1. 2480 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
51.06	28.24	-11.76	40	51.26	7.9	0.71	31.63	-	-	Peak
64.29	29.22	-10.78	40	54.02	6.18	0.79	31.77	104	227	Peak
230.61	26.24	-19.76	46	44.71	11.25	1.49	31.21	-	-	Peak
365.8	26.45	-19.55	46	40.68	15.08	2.07	31.38	-	-	Peak
407.8	24.81	-21.19	46	37.89	16.16	2.17	31.41	-	-	Peak
612.2	24	-22	46	31.87	19.89	2.73	30.49	-	-	Peak
2480	100.19	-	-	95.18	32.38	7.06	34.43	195	254	Average
2480	100.95	-	-	95.94	32.38	7.06	34.43	195	254	Peak
4959	41.18	-32.82	74	55.84	33.91	8.92	57.49	100	0	Peak
7440	40.56	-33.44	74	52.13	35.51	11.04	58.12	100	0	Peak

Note: Other harmonics are lower than background noise.

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

For equipment 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.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	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.

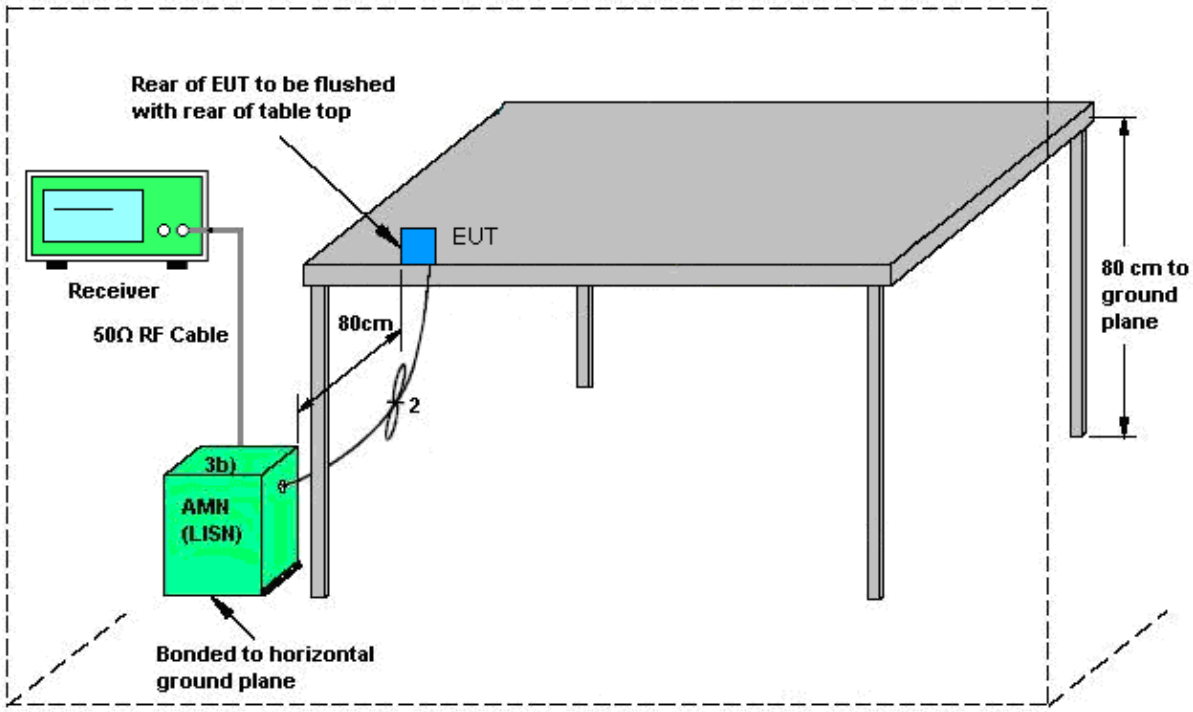
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

1. The testing follows the guidelines in ANSI C63.10-2009.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

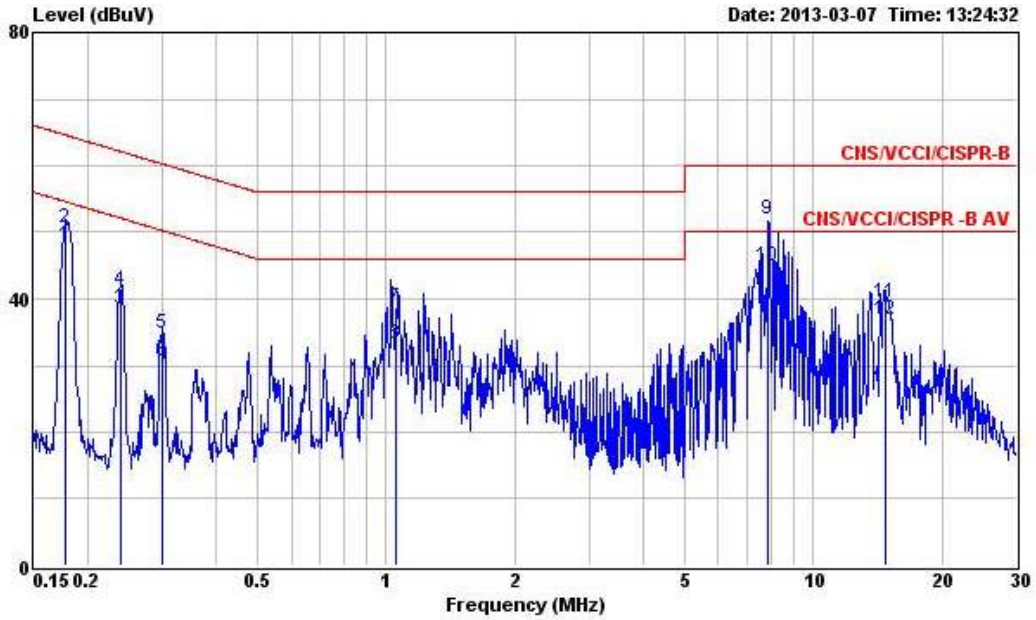
3.6.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.6.5 Test Result of AC Conducted Emission

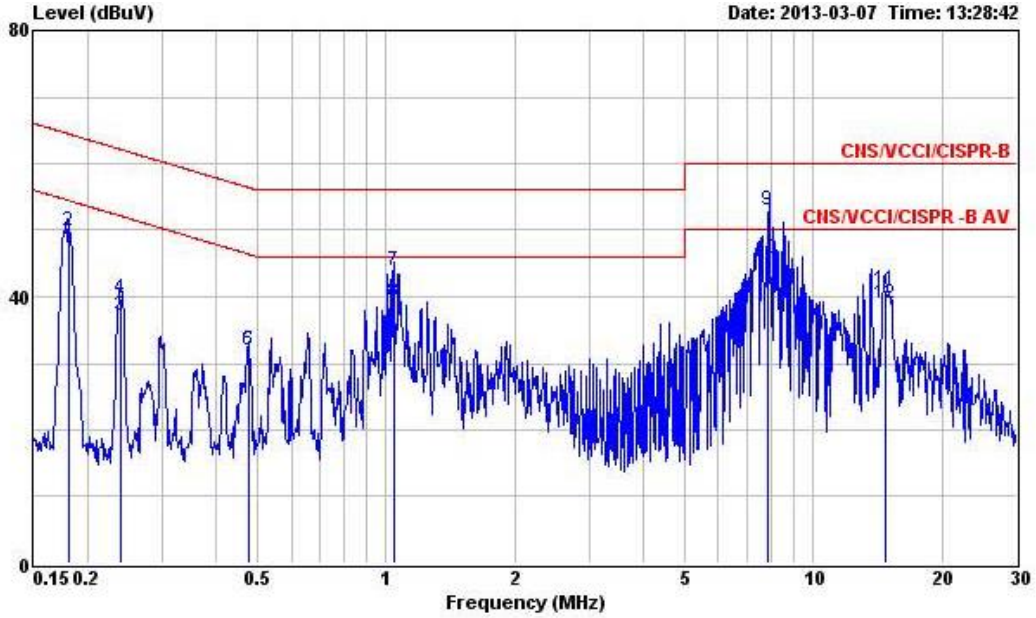
Test Mode :	Mode 1	Temperature :	24~25℃
Test Engineer :	David Du	Relative Humidity :	47~48%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Bluetooth Link + WLAN Link + MP3 + SD Card + H Pattern + HDMI Cable + Earphone + USB Cable (Data Link with PC) + NFC On		



Site : CO01-HY
Condition : CNS/VCCI/CISPR-B LISN 2001/004-121228 LINE

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.178	48.09	-6.49	54.58	47.71	0.14	0.24	Average
2	0.178	50.74	-13.84	64.58	50.36	0.14	0.24	QP
3	0.239	38.46	-13.67	52.13	38.15	0.14	0.17	Average
4	0.239	41.24	-20.89	62.13	40.93	0.14	0.17	QP
5	0.299	34.84	-25.43	60.27	34.55	0.15	0.14	QP
6	0.299	30.77	-19.50	50.27	30.48	0.15	0.14	Average
7	1.050	38.83	-17.17	56.00	38.56	0.17	0.10	QP
8	1.050	33.19	-12.81	46.00	32.92	0.17	0.10	Average
9	7.810	51.96	-8.04	60.00	51.50	0.29	0.17	QP
10	7.810	44.98	-5.02	50.00	44.52	0.29	0.17	Average
11	14.727	39.48	-20.52	60.00	39.00	0.37	0.11	QP
12	14.727	36.84	-13.16	50.00	36.36	0.37	0.11	Average

Test Mode :	Mode 1	Temperature :	24~25℃
Test Engineer :	David Du	Relative Humidity :	47~48%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Link + WLAN Link + MP3 + SD Card + H Pattern + HDMI Cable + Earphone + USB Cable (Data Link with PC) + NFC On		



Site : CO01-HY
Condition : CNS/VCCI/CISPR-B LISN 2001/004-121228 NEUTRAL

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.181	47.17	-7.27	54.44	46.84	0.10	0.23	Average
2	0.181	49.78	-14.66	64.44	49.45	0.10	0.23	QP
3	0.239	37.19	-14.94	52.13	36.91	0.11	0.17	Average
4	0.239	39.78	-22.35	62.13	39.50	0.11	0.17	QP
5	0.476	32.02	-24.39	56.41	31.80	0.12	0.10	QP
6	0.476	31.83	-14.58	46.41	31.61	0.12	0.10	Average
7	1.040	43.87	-12.13	56.00	43.63	0.14	0.10	QP
8	1.040	39.30	-6.70	46.00	39.06	0.14	0.10	Average
9	7.810	52.96	-7.04	60.00	52.51	0.28	0.17	QP
10	7.810	45.64	-4.36	50.00	45.19	0.28	0.17	Average
11	14.728	41.06	-18.94	60.00	40.56	0.39	0.11	QP
12	14.728	38.99	-11.01	50.00	38.49	0.39	0.11	Average

3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

3.7.2 Antenna Connected Construction

Non-standard connector used.

3.7.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 06, 2012	Mar. 09, 2013 ~ Mar. 28, 2013	Jun. 05, 2013	Conducted (TH02-HY)
Power Meter	Agilent	E4416A	GB41292344	300MHz~40GHz	Feb. 05, 2013	Mar. 09, 2013 ~ Mar. 28, 2013	Feb. 04, 2014	Conducted (TH02-HY)
Power Sensor	Agilent	E9327A	US40441548	300MHz~40GHz	Feb. 05, 2013	Mar. 09, 2013 ~ Mar. 28, 2013	Feb. 04, 2014	Conducted (TH02-HY)
EMC Receiver	R&S	ESCS 30	100132	9kHz ~ 2.75GHz	Nov. 14, 2012	Mar. 07, 2013	Nov. 13, 2013	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001/004	9kHz – 30MHz	Dec. 28, 2012	Mar. 07, 2013	Dec. 27, 2013	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	2001/009	9kHz ~ 30MHz	Jan. 08, 2013	Mar. 07, 2013	Jan. 07, 2014	Conduction (CO01-HY)
EMI Filter	LINDGREN	LRE-2060	1004	< 450Hz	N/A	Mar. 07, 2013	N/A	Conduction (CO01-HY)
EMI Filter	LINDGREN	N6006	201052	0~60Hz	N/A	Mar. 07, 2013	N/A	Conduction (CO01-HY)
RF Cable-CON	HUBER + SUHNER	RG213/U	07611832010001	9kHz ~ 30MHz	Mar. 01, 2013	Mar. 07, 2013	Feb. 28, 2014	Conduction (CO01-HY)
Bilog Antenna	Schaffner	CBL6111C	2726	30MHz ~ 1GHz	Oct. 06, 2012	Apr. 09, 2013	Oct. 05, 2013	Radiation (03CH07-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101067	9KHz ~ 30GHz	Nov. 30, 2012	Apr. 09, 2013	Nov. 29, 2013	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 22, 2012	Apr. 09, 2013	Aug. 21, 2013	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Dec. 01, 2012	Apr. 09, 2013	Nov. 30, 2013	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	159088	1GHz ~ 18GHz	Feb. 27, 2013	Apr. 09, 2013	Feb. 26, 2014	Radiation (03CH07-HY)
Preamplifier	COM -POWER	PA-103A	161241	10-1000MHz. 32dB.GAIN	Feb. 26, 2013	Apr. 09, 2013	Feb. 25, 2014	Radiation (03CH07-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Sep. 03, 2012	Apr. 09, 2013	Sep. 02, 2013	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9KHz ~ 30MHz	Jul. 03, 2012	Apr. 09, 2013	Jul. 02, 2013	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz ~ 40GHz	Sep. 28, 2012	Apr. 09, 2013	Sep. 27, 2013	Radiation (03CH07-HY)

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.26**

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.54**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.72**

Appendix A. Photographs of EUT

Please refer to Sporton report number EP322823 as below.