

**ESTECH Co., Ltd.**Rm 1015, World Venture Center II,
426-5 Gasan-dong, Guncheon-gu,
Seoul, 158-803, Korea**Electromagnetic
Interference
Test Report****Test Report for IC & FCC**IC : 1693B-61A
FCC ID : HD56110GP

Report Number		ESTF151308-002		
Applicant	Company name	HONEYWELL INTERNATIONAL INC		
	Address	9680 OLD BAILES RD FORT MILL SC 29707 UNITED STATES		
	Telephone	1 31555 46387		
Product	Product name	Mobile Computer		
	Model No.	Dolphin 6110	Manufacturer	HONEYWELL INTERNATIONAL INC
	Serial No.	NONE	Country of origin	CHINA
Test date	2013-07-03 ~ 2013-08-03		Date of issue	3-Aug-13
Testing location	ESTECH Co., Ltd. 97-1, Hooeok-ri, Majang-myeon, Icheon-si, Gyeonggi-do, Korea			
Standard	FCC PART 15 Subpart C (15.247):2010 , ANSI C 63.4(2009) , DA 00-705 , IC RSS-210 Issue8 :2010			
Measurement facility registration number		915135	IC Number	4475B-2
Tested by	Engineer S.D.Hong (Signature)			
Reviewed by	Engineering Manager J.M.Yang (Signature)			
Abbreviation	OK, Pass = Passed, Fail = Failed, N/A = not applicable			
* Note - The EUT worst data is 1D Scanner. - This test report is not permitted to copy partly without our permission - This test result is dependent on only equipment to be used - This test result based on a single evaluation of one sample of the above mentioned				

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1. Laboratory Information

1.1 General

This EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards and is tested in accordance with the measurement procedures as indicated in this report.

ESTECH Lab attests to accuracy of test data. All measurement reported herein were performed by ESTECH Co., Ltd.

ESTECH Lab assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

1.2 Test Lab.

Corporation Name : ESTECH Co., Ltd.

Head Office : Rm 1015, World Venture Center II, 426-5, Gasan-dong, Geumcheon-gu, Seoul, Korea

EMC/Telecom/Safety Test Lab : 97-1, Hooeok-ri, Majang-myeon, Icheon-si, Gyeonggi-do, Korea

1.3 Official Qualification(s)

KCC : Granted Accreditation from Ministry of Information & Communication for EMC, Safety and Telecommunication

KOLAS : Accredited Lab By Korea Laboratory Accreditation Schema base on CENELEC requirements

FCC : Conformity Assessment Body(CAB) with registration number 659627 under APEC TEL MRA between the RRA and the FCC

VCCI : Granted Accreditation from Voluntary Control Council for Interference from ITE

2. Description of EUT

2.1 Summary of Equipment Under Test (Bluetooth)

Modulation Type	: GFSK(FHSS) , 8DPSK
Transfer Rate	: 3 Mbps
Number of Channel	: 79 ch
Channel Spacing	: 1 MHz
PEAK Output Power	: GFSK : 2.3593 mW 8DPSK : 2.3681 mW
Rating	: INPUT : (100 – 240)V _{a.c} , (50 / 60)Hz , 0.4 A DC OUTPUT : 5.0 V _{d.c} , 2.0 A
Receipt Date	: 3-Jul-13
X-tal list(s) or Frequencies generated	: The highest operating frequency is 2480 MHz(Bluetooth) XTAL : 32.768 kHz , OSC : 26 MHz , Bluetooth : 2.4 GHz

2.2 General descriptions of EUT

Operating System	Microsoft Windows Embedded Handheld 6.5
Development Environment	Honeywell SDK for Windows Embedded Handheld 6.5
Application Software	Honeywell Power Tools and Demos
Processor	TI OMAP3715 800MHz
Memory	512 MB RAM X 512 MB Flash
Expansion Memory	User accessible Micro SD memory card slot with SDIO support. Please check current price guide for available qualified card options.
Display	240x320, 262,144 Color Transmissive TFT
Backlight	LED
Engine	56XX 2D imager engine with laser aimer or N4313-TTL 1D laser engine
Keypad	28-key shifted alpha numeric with backlit keys
Voice communication	Voice-over-IP and Push-to-Talk ready
Audio	Built-in microphone and speaker, stereo headset jack
Communication Interface	High speed USB 2.0 (480 Mbps) from cradle (or I/O cable); RS232 (115 Kbps) from cradle.
Battery	2200mAh - Li-Ion battery 3.7V 3300mAh - Li-Ion battery 3.7V (includes extended battery door)
Expected Hours of Operation	2200mAh battery pack: 10 hours (with scan every 2 seconds) Battery life varies with application and use case.
Charging	5V/2A input through bottom access or USB/Serial connector
Expected Charge Time	2200mAh - 6 hours for a fully depleted battery 3300mAh - 9 hours for a fully depleted battery
Charging Peripherals	AC wall adapter and Charger (KSAS0100500200D5)/Communication Cable HomeBase—single-bay terminal charge/communicate eBase—single-bay terminal charge/communicate (via Ethernet connection) Quad Charger—four-slot battery pack charger (DSA-0421S-03 1)
WPAN (standard)	Bluetooth Class II (10 m) v2.1 Enhanced Data Rate (EDR) with on-board antenna. BQB certified
WLAN	Dual Mode 802.11a/b/g/n (11 Mbps/54 Mbps) with internal antenna

2.2 General descriptions of EUT

WLAN Security	OPEN, WEP, 802.1x, WPA-PSK/EAP, WPA2-PSK/EAP, EAP-LEAP, EAP-TLS, EAP-TTLS, EAP-PEAP, EAP-FAST, CCKM
Operating Temperature	14° to 122°F (-10° to 50°C)
Charging Temperature	32° to 113°F (0° to 45°C)
Storage Temperature	-4° to 158°F (-20° to 70°C)
Humidity	95% humidity, non-condensing
Construction	High impact resistant PC/ABS housings Magnesium alloy internal chassis with component shock mounts
Drop	4 ft. (1.2m) multiple drops to concrete, all axis, across operating temperature range
Tumble	500 3.3 ft (1.0m) tumbles (1000 drops)
ESD	Air: ± 15k Vdc Direct: ± 8k Vdc
Environmental Sealing	IP54 rating
Dimensions	175 mm long x 66 mm wide x 26.8 mm deep (6.8" x 2.60" x 1.06")
Weight	250 g (8.8 oz) including standard battery pack
Scanner / Decode Capabilities	56XX 2D Imager with Adaptus Technology and Laser Aimer. Decodes all standard 1D, 2D, Postal, and OCR codes. N4313-TTL 1D laser scanner. Decodes all standard 1D codes.

3. Test Standards

Test Standard : FCC PART 15 Subpart C (15.247) : 2010 & IC RSS-210 Issue8 : 2010

This Standard sets out the regulations under which an intentional, unintentional, or incidental radiator may be operated without an individual license. It also contains the technical specifications, administrative requirements and other conditions relating to the marketing of Part 15 devices.

Test Method : ANSI C 63.4 (2009) & DA 00-705

This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and may be applied to any such equipment unless otherwise specified by individual equipment requirements. These methods cover measurement of certain devices that deliberately radiate energy, such as intentional emitters, but does not cover licensed transmitters. This standard is not intended for certification/approval of avionic equipment or for industrial, scientific, and medical (ISM) equipment. These methods apply to the measurement of individual units or systems comprised of multiple units.

Summary of Test Results

Applied Standard : 47 CFR Part 15 Subpart C & RSS-210 Part I and II					remark
FCC Standard	IC Standard	Test Type	Result	Remark	Limit
15.207	RSS-Gen 7.2.2	AC Power Conducted Emission	Pass	Meet the requirement	
15.205 & 15.209	A8.5	Intentional Radiated Emission	Pass	Meet the requirement	
15.247(a)(1)	A8.1(b), A8.1(a) RSS-Gen 4.6.1	Carrier Frequency Separation & 20 Bandwidth, 99% Bandwidth	Pass	Meet the requirement	>25 kHz
15.247(b)	A8.4(2)	Maximum Peak output power	Pass	Meet the requirement	30dBm(1W)
15.247(a)(1)(ii)	A8.1(d)	Number of Hopping Frequency	Pass	Meet the requirement	>75
15.247(c)	A8.5	Transmitter Radiated Emission	Pass	Meet the requirement	
15.247(a)(1)(iii)	A8.1(d)	Time of Occupancy (Dwell Time)	Pass	Meet the requirement	<400ms
15.247(d)	A8.5	Band Edge Measurement	Pass	Meet the requirement	
15.107	RSS-Gen 7.2.2	Receiver conducted Emission	Pass	Meet the requirement	
15.109	RSS-Gen 7.2.3.2	Receiver radiated emission	Pass	Meet the requirement	

4. Measurement Condition

4.1 EUT Operation

a. Channel

Ch.	Frequency	Ch.	Frequency
0	2402 MHz	40	2442 MHz
1	2403 MHz	41	2443 MHz
2	2404 MHz	42	2444 MHz
3	2405 MHz	43	2445 MHz
4	2406 MHz	...	...
...	...	78	2480 MHz
39	2441 MHz		

b. Measurement Channel :Low(2402 MHz), Middle(2441 MHz),High(2480 MHz)

c. Test Mode : 8DPSK, GFSK(worst case)

d. Test rate :3 Mbps

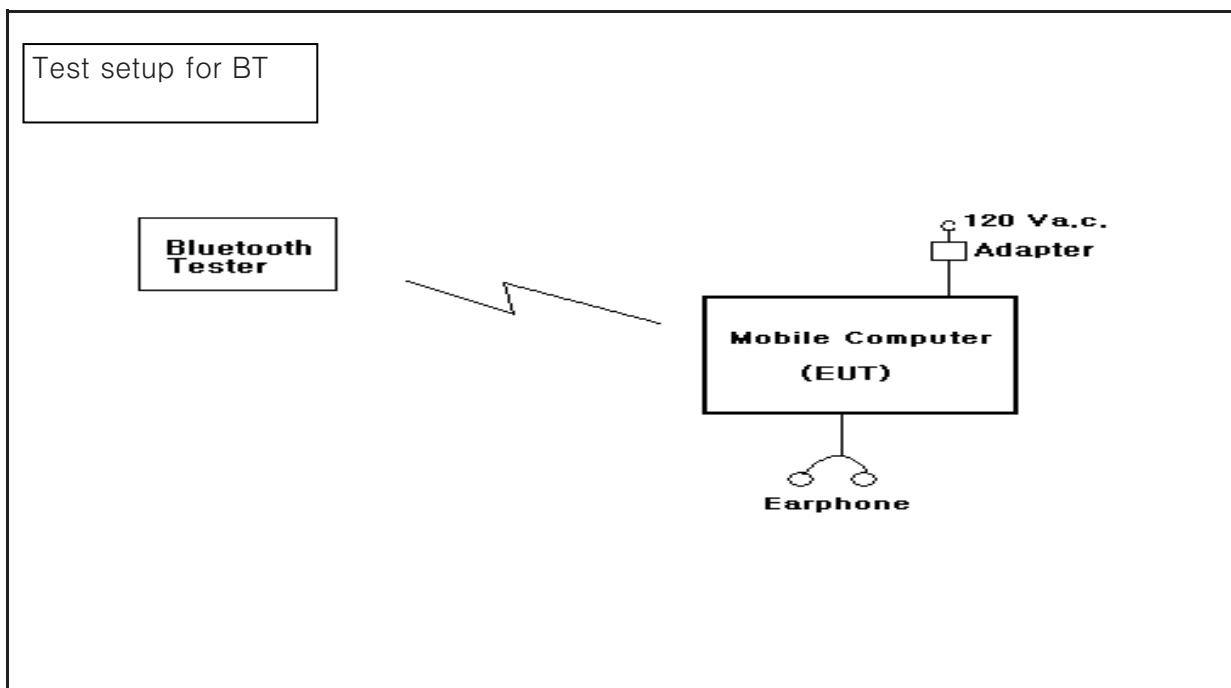
4.2 EUT Operation.

- * The EUT was in the following operation mode during all testing
- * The operational conditions of the EUT was determined by the manufacturer according to the typical use of the EUT with respect to the expected highest level of emission
- * Execute a RF test program to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- *. Test Mode: Mobile Computer 1D scanner : battery 2200 mAh + 3300 mAh
 Mobile Computer 2D scanner : battery 2200 mAh + 3300 mAh

The worst data were recorded 1D scanner the results after testing each of the 1D scanner and 2D scanner.

- *. Transmit mode and receive mode was each test.
- *. Highest frequency of the EUT is above 1 GHz, the measurement shall be made up to 10th the highest frequency or 40 GHz. But the EUT wasn't Detected from 3th any other spurious and harmonic emissions.

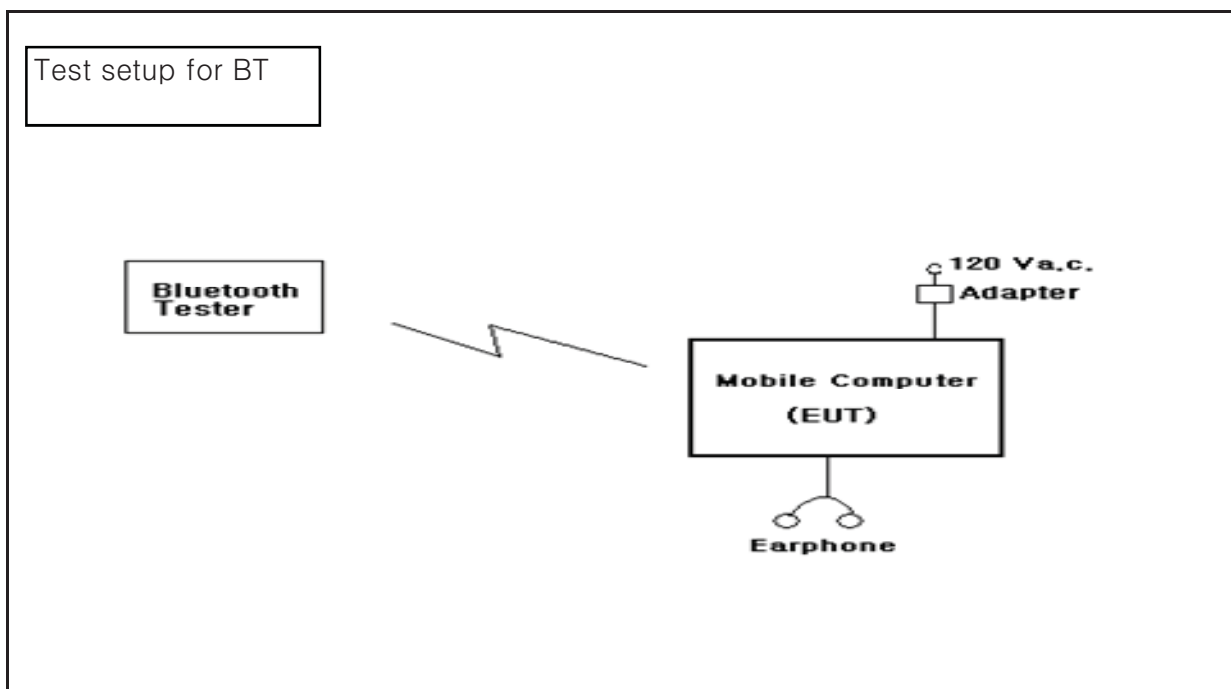
4.3 Configuration and Peripherals



4.2 EUT Operation.

- * The EUT was in the following operation mode during all testing
- * The operational conditions of the EUT was determined by the manufacturer according to the typical use of the EUT with respect to the expected highest level of emission
- * Execute a RF test program to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- *. Test Mode: Handy terminal 1D Scanner : battery 2200 mAh , 3300 mAh
- *. Transmit mode and receive mode was each test.
- *. Highest frequency of the EUT is above 1 GHz, the measurement shall be made up to 10th the highest frequency or 40 GHz. But the EUT wasn't Detected from 3th any other spurious and harmonic emissions.

4.3 Configuration and Peripherals



4.4 EUT and Support equipment

Equipment Name	Model Name	S/N	Manufacturer	Remark (FCC ID)
Mobile Computer	Dolphin 6110	NONE	HONEYWELL INTERNATIONAL INC	EUT
Adapter	KSAS0100500200D5	NONE	Kuantech(Beihai)Co., Ltd.	
Bluetooth Tester	TC-3000A	3000A570224	TESCOM	
Earphone	NONE	NONE	SAMSUNG	

4.5 Cable Connecting

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
Mobile Computer	Wireless(BT)	Bluetooth Tester	Wireless(BT)	–	–	
Mobile Computer	Power	Adapter	–	2.0	Unshielded	
Mobile Computer	Head Phone	Earphone	–	1.0	Unshielded	

5. Carrier Frequency Separation

5.1 Test procedure

According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

5.2 Test instruments and measurement setup

The spectrum analyzer is set to as following.

- . RBW= 30KHz
- . VBW= 300KHz
- . Span= 3MHz
- . Sweep= suitable duration based on the EUT specification.

20dB Bandwidth Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	E4440A	US41421291	2013-09-11
Bluetooth Tester	TC-3000A	3000A570224	2013-12-26
Dual Directional Coupler	772D	3736A22424	2014-01-27
-Spectrum Analyzer <=> EUT	Loss: 21.0dB	-	

5.3 Measurement results

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	FHSS	ENVIRONMENTAL CONDITION	26 °C, 43 % R.H .
INPUT POWER	5Vdc		

CHANNEL	Channel Frequency (MHz)	Bandwidth at 99% (kHz)	Bandwidth at 20dB below(kHz)	Channel Separation (kHz)	Limit (kHz)	PASS/FAIL
0	2402	837	940	1000	627	PASS
39	2441	858	951	1000	634	PASS
78	2480	866	951	1000	634	PASS

(8DPSK)

CHANNEL	Channel Frequency (MHz)	Bandwidth at 99% (MHz)	Bandwidth at 20dB below(kHz)	Channel Separation (kHz)	Limit (kHz)	PASS/FAIL
0	2402	1.213	1349	1000	899	PASS
39	2441	1.198	1341	1000	894	PASS
78	2480	1.205	1364	1000	909	PASS



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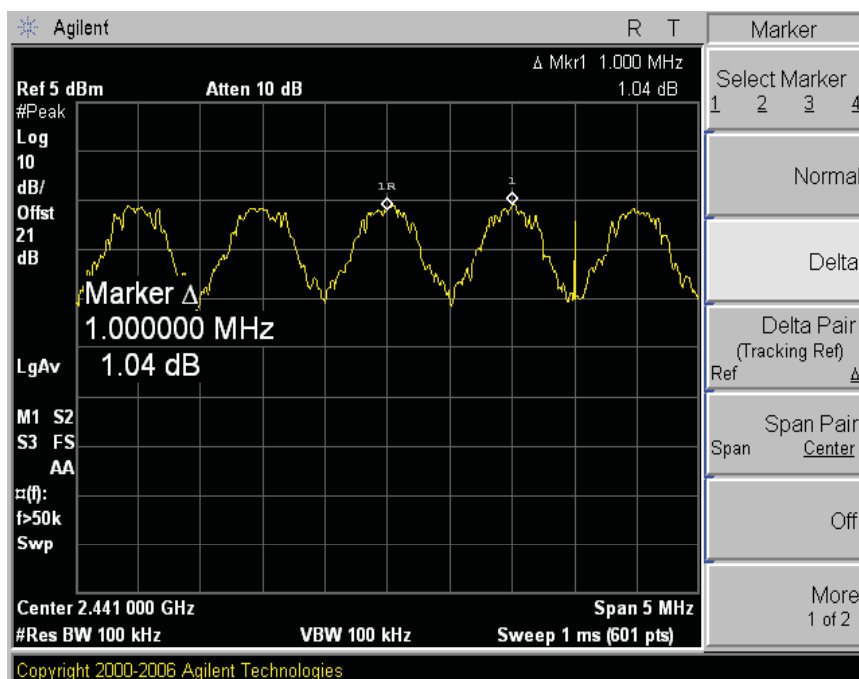
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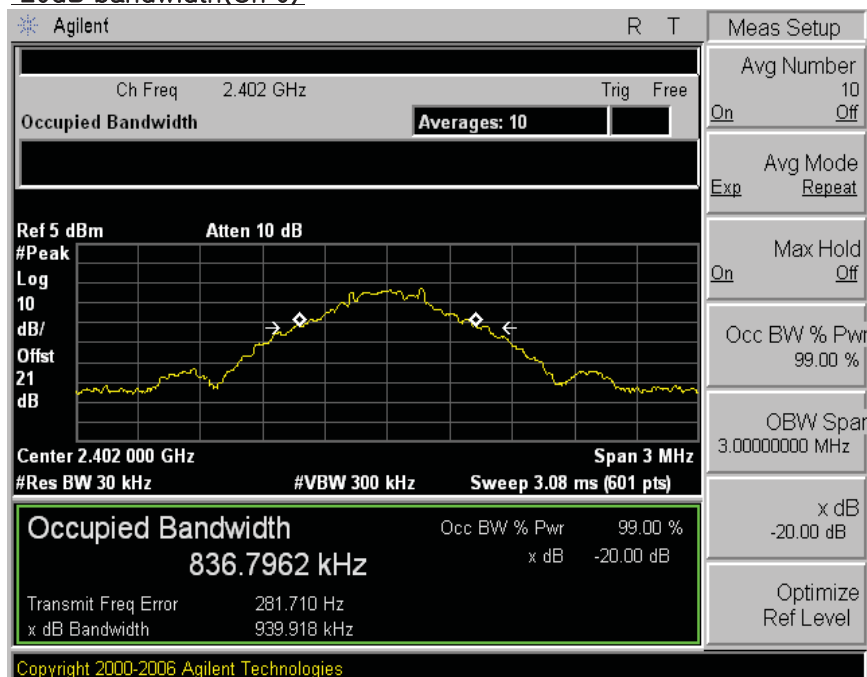
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5.4 Trace data (GFSK)

Channel Separation



20dB bandwidth(Ch 0)





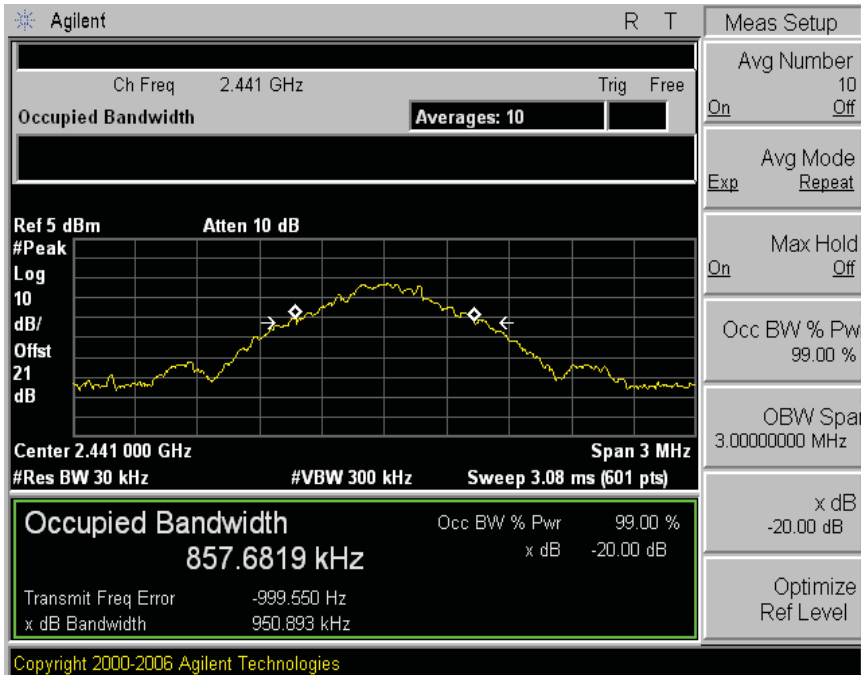
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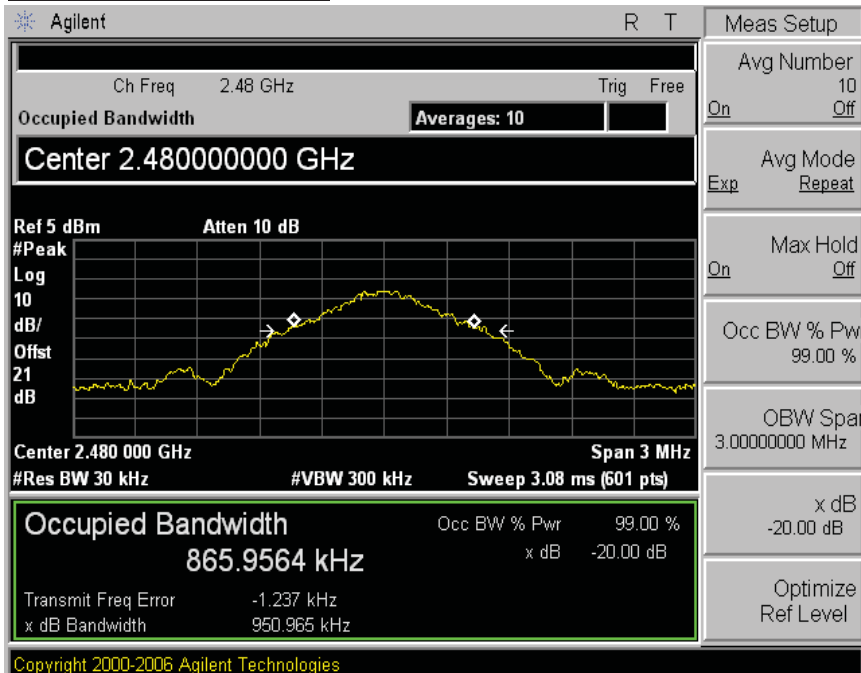


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20dB bandwidth(CH 39)



20dB bandwidth(CH 78)





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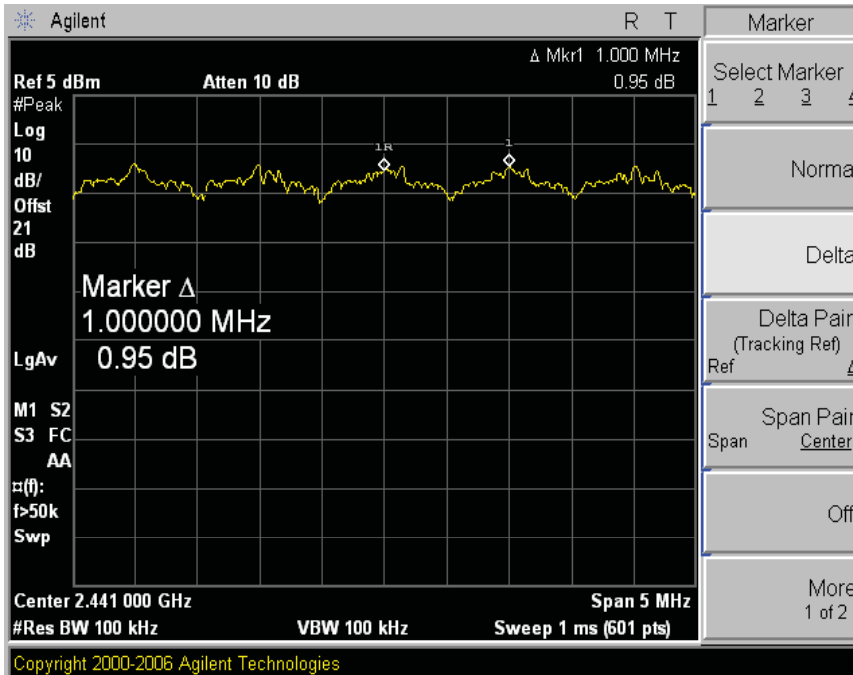
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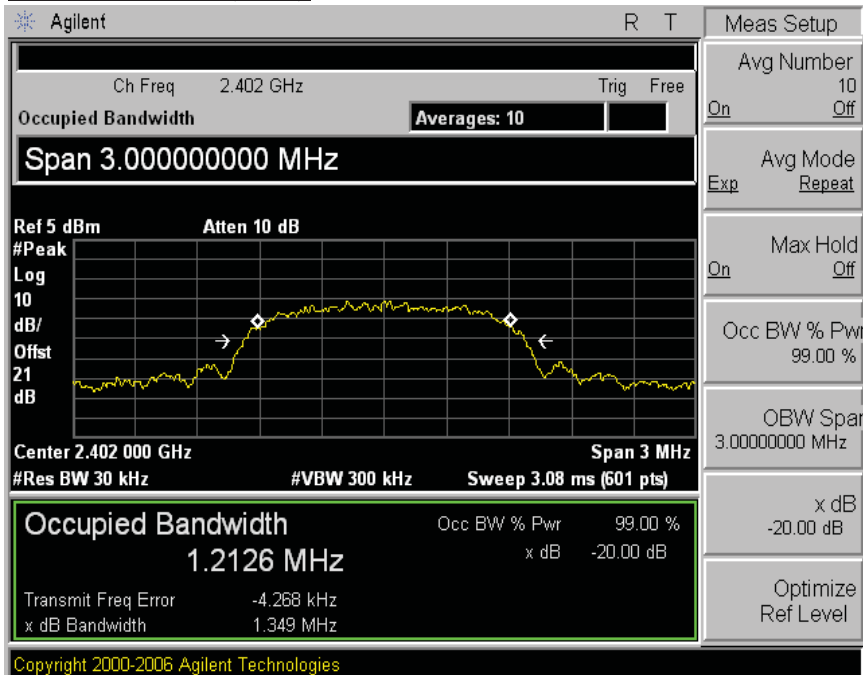
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(8DPSK)

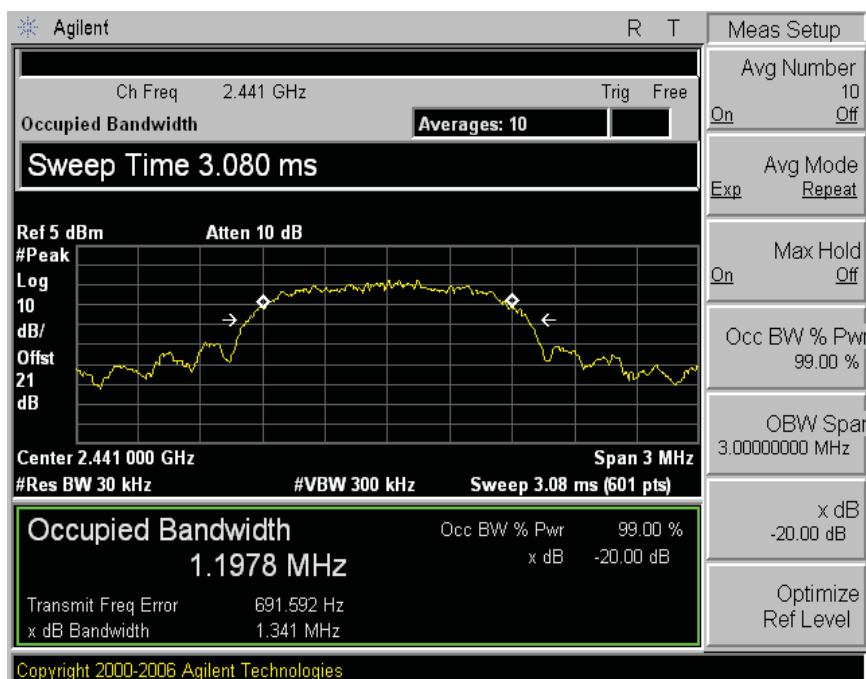
Channel Separation



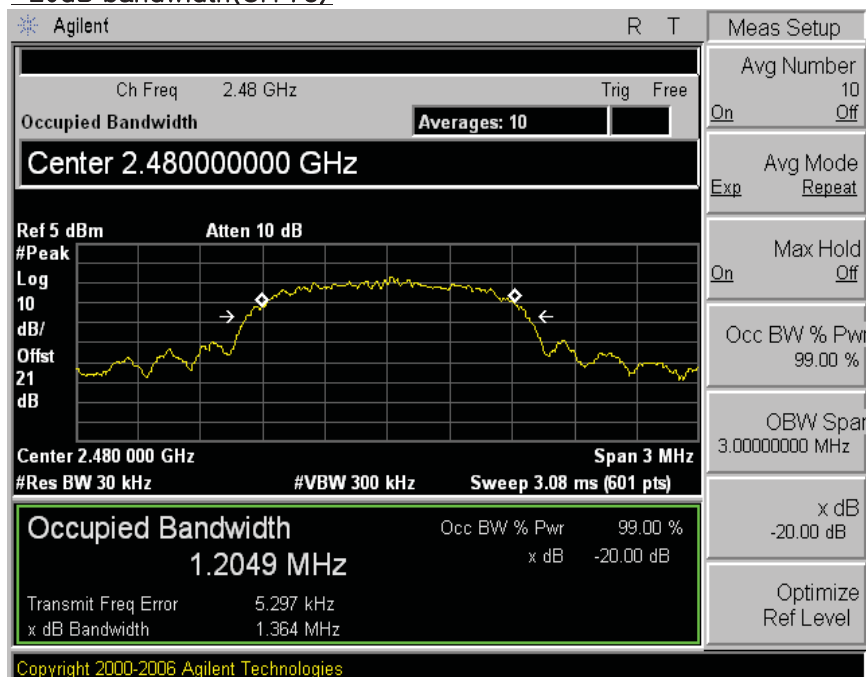
20dB bandwidth(Ch 0)



20dB bandwidth(CH 39)



20dB bandwidth(CH 78)



6. MAXIMUM PEAK OUTPUT POWER

6.1 Test procedure

The transmitter antenna terminal is connected to the input of a Power Sensor. Measurement is made while EUT is operating in transmission mode at the appropriate center frequency. The maximum peak output power measurement is 30dBm.

Description	Model	Serial Number	Cal. Due Date
Power Meter	NRVS	849622/045	2014-02-27
Power Sensor	NRV-251	325948/013	2014-02-27
Bluetooth Tester	TC-3000A	3000A570224	2013-12-26
Dual Directional Coupler	772D	3736A22424	2014-01-27
-Spectrum Analyzer <=> EUT	Loss: 21.0dB	-	

6.2 Measurement results

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	GFSK,8DPSK DH5	ENVIRONMENTAL CONDITION	24 °C, 43 % R.H.
INPUT POWER	5Vdc		

GFSK

CHANNEL	Channel Frequency (MHz)	Peak Power Output(dBm)		Limit[mW]	PASS/ FAIL
		(dBm)	(mW)		
0	2402	2.97	1.9808	125	PASS
39	2441	3.73	2.3597	125	PASS
78	2480	0.80	1.2012	125	PASS

8DPSK

CHANNEL	Channel Frequency (MHz)	Peak Power Output(dBm)		Limit[mW]	PASS/ FAIL
		(dBm)	(mW)		
0	2402	2.97	1.9823	125	PASS
39	2441	3.74	2.3681	125	PASS
78	2480	0.79	1.2005	125	PASS

Note : 8DPSK mode is max power in three different modulations.

7. Number of Hopping Frequency

7.1 Test procedure

According to §15.247(a)(1)(ii), Frequency hopping systems operating in the 2400MHz–2483.5MHz bands shall use at least 75 hopping frequencies.

7.2 Test instruments and measurement setup

The spectrum analyzer is set to as following.

- . RBW= 100KHz
- . VBW= 100KHz
- . Span= the frequency band of operation
- . Sweep= suitable duration based on the EUT specification.

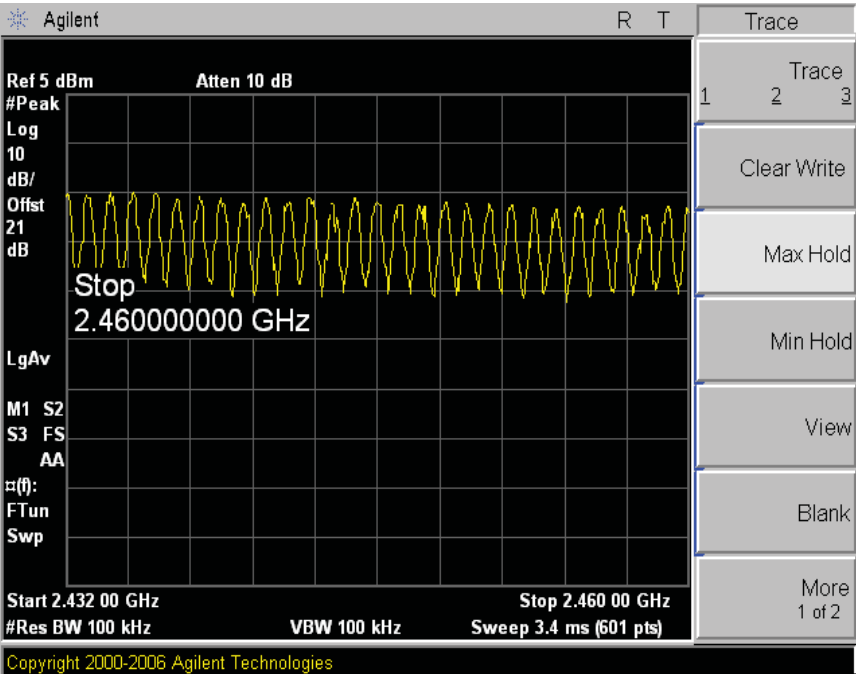
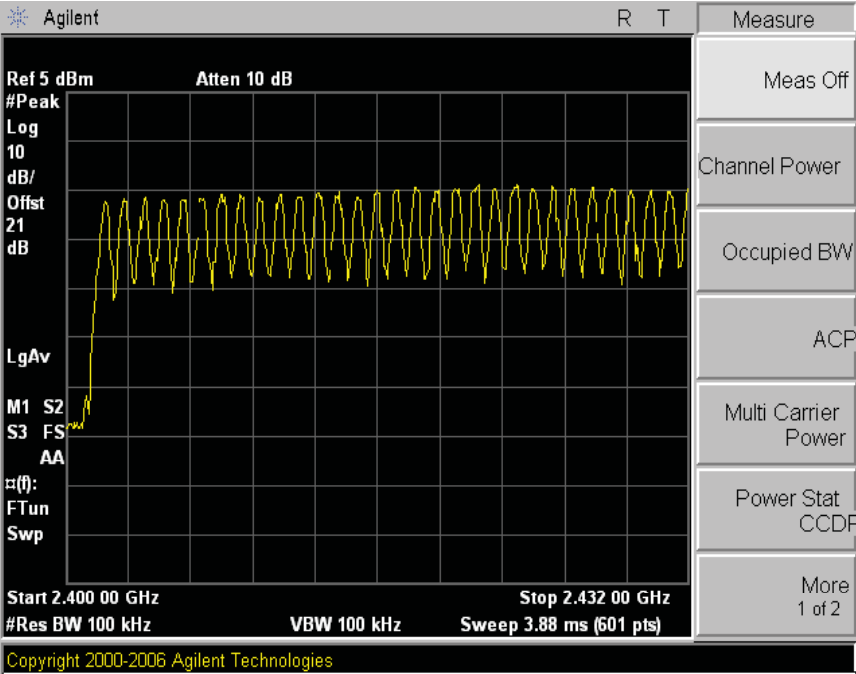
The Number of Hopping Frequency Test Instruments

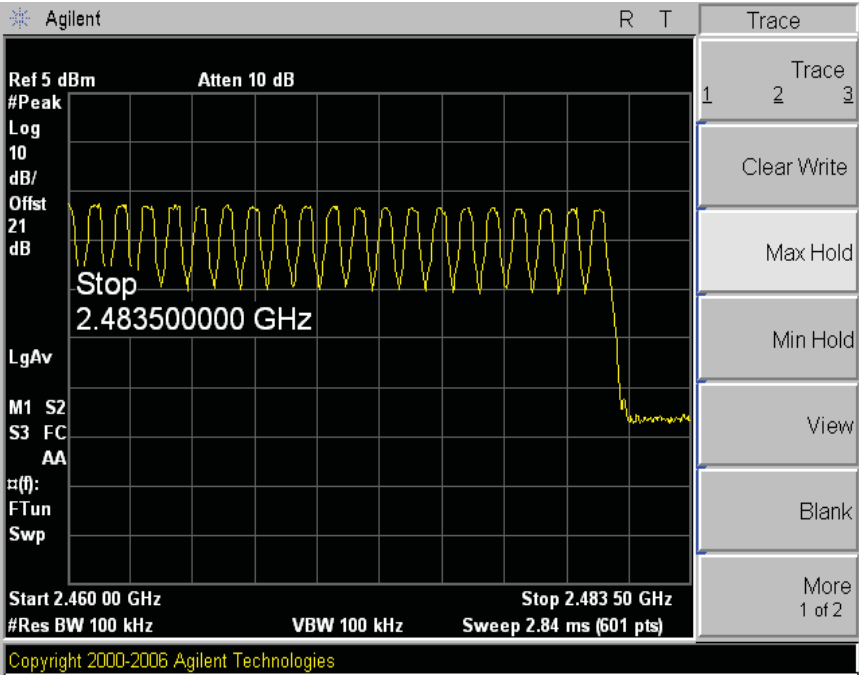
Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	E4440A	US41421291	2013-09-11
Bluetooth Tester	TC-3000A	3000A570224	2013-12-26
Dual Directional Coupler	772D	3736A22424	2014-01-27
-Spectrum Analyzer <=> EUT	Loss: 22.0dB		

7.3 Measurement results

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	FHSS	ENVIRONMENTAL CONDITION	26 °C, 43 % R.H.
INPUT POWER	5Vdc		
Number of CH	Limit (Number of CH)	PASS/FAIL	
79	>75	PASS	

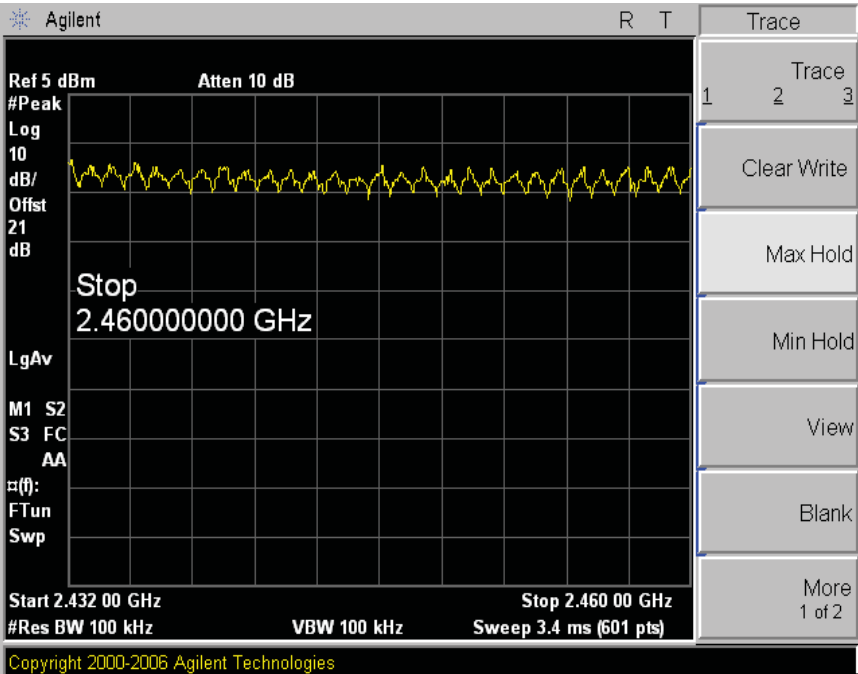
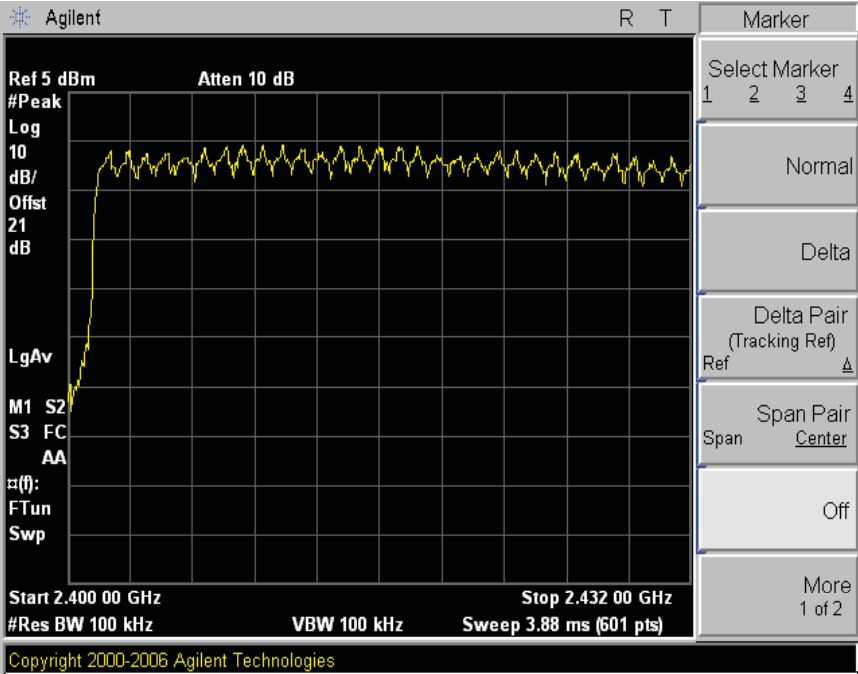
7.4 Trace data(GFSK)





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7.4 Trace data(8DPSK)



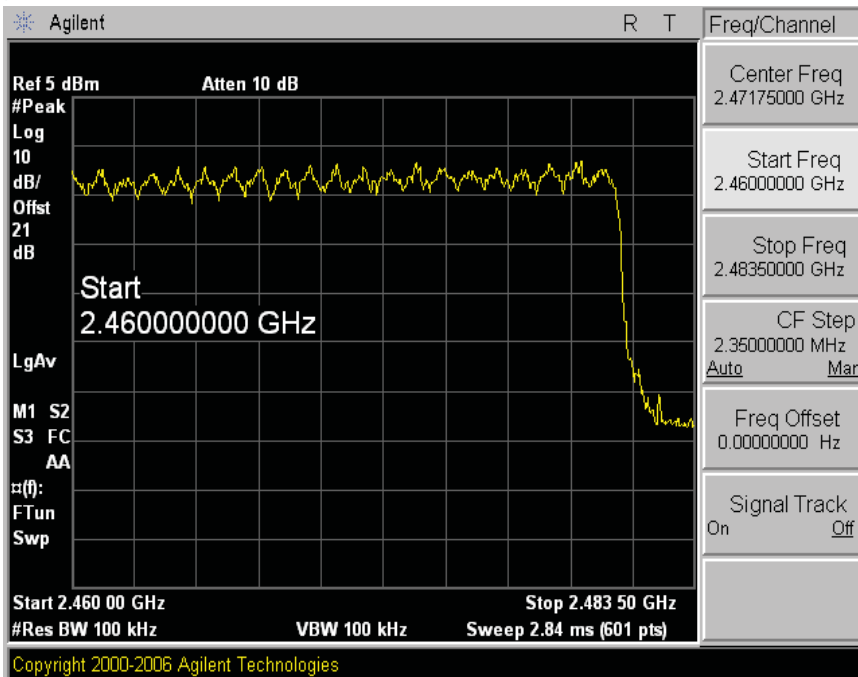


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8. Time of Occupancy (Dwell Time)

8.1 Test procedure

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz–2483.5 MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

8.2 Test instruments and measurement setup

The spectrum analyzer is set to as following.

- . RBW= 1MHz
- . VBW≥RBW
- . Span= zero span, centered on a hopping channel
- . Sweep = as necessary to capture the entire dwell time per hopping channel
- . Detector function = Peak
- . Trace = Max hold

The Time of Occupancy Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	E4440A	US41421291	2013-09-11
Bluetooth Tester	TC-3000A	3000A570224	2013-12-26
Dual Directional Coupler	772D	3736A22424	2014-01-27
-Spectrum Analyzer <=> EUT	Loss:21.0dB	—	

8.3 Measurement results

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	FHSS	ENVIRONMENTAL CONDITION	26 °C, 43 % R.H.
INPUT POWER	5Vdc		

A. DH1 Mode

One period for each particular channel : $0.411 \text{ ms} \times 320.1 = 131.56 \text{ ms}$

Channel	Pulse Time(ms)	Limit(ms)	PASS/FAIL
39	131.56	400	PASS

Calculation: The Bluetooth system hops at a rate of 1600 times per second. This means there are 1600 timeslots in one second, the DH1 data rate operates on a one-slot transmission and one-slot receiving basis. Thus there are $1600/(1+1)=800$ transmissions per second. In one period for each particular channel there are $10.13 \times 31.6 = 320.1$ times of transmissions.

B. DH3 Mode

One period for each particular channel : $1.690 \text{ ms} \times 159.9 = 270.23 \text{ ms}$

Channel	Pulse Time(ms)	Limit(ms)	PASS/FAIL
39	270.23	400	PASS

Calculation: The Bluetooth system hops at a rate of 1600 times per second. This means there are 1600 timeslots in one second, the DH3 data rate operates on a three-slot transmission and one-slot receiving basis. Thus there are $1600/(3+1)=400$ transmissions per second. In one period for each particular channel there are $5.06 \times 31.6 = 159.9$ times of transmissions.

C. DH5 Mode

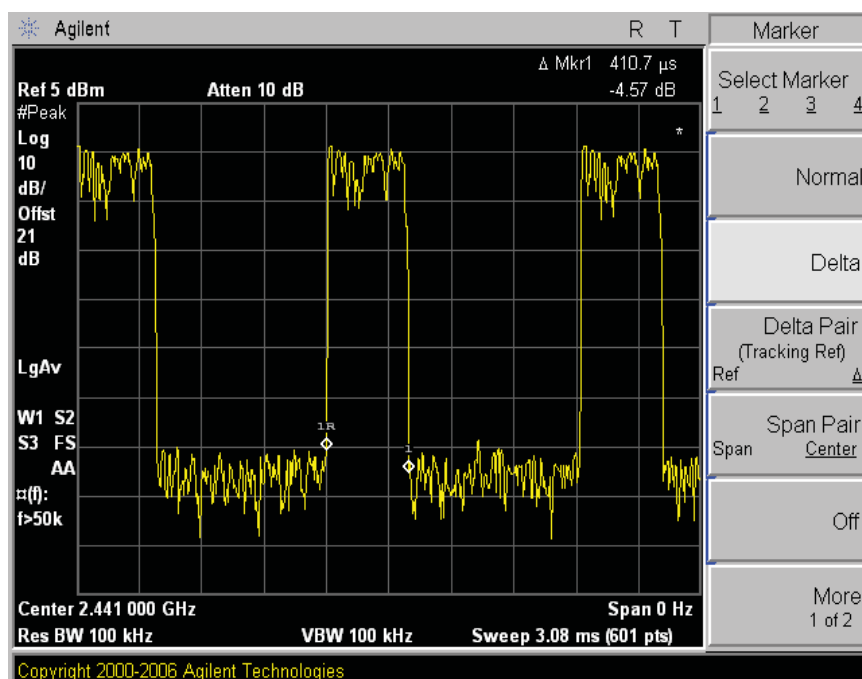
One period for each particular channel : $2.968 \text{ ms} \times 106.81 = 317.01 \text{ ms}$

Channel	Pulse Time(ms)	Limit(ms)	PASS/FAIL
39	317.01	400	PASS

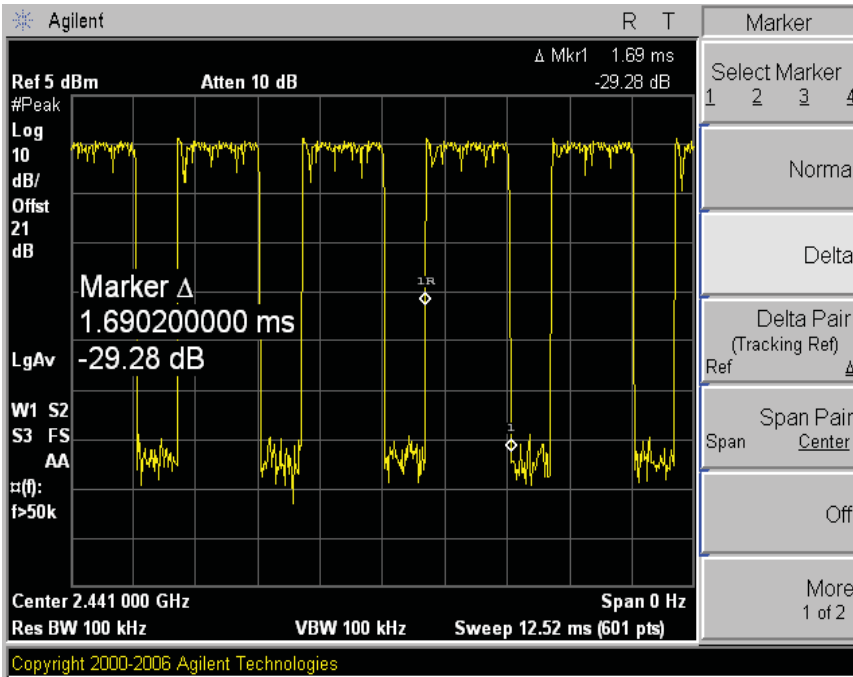
Calculation: The Bluetooth system hops at a rate of 1600 times per second. This means there are 1600 timeslots in one second, the DH5 data rate operates on a five-slot transmission and one-slot receiving basis. Thus there are $1600/(5+1)=266.7$ transmissions per second. In one period for each particular channel there are $3.38 \times 31.6 = 106.81$ times of transmissions.

8.4 Trace data

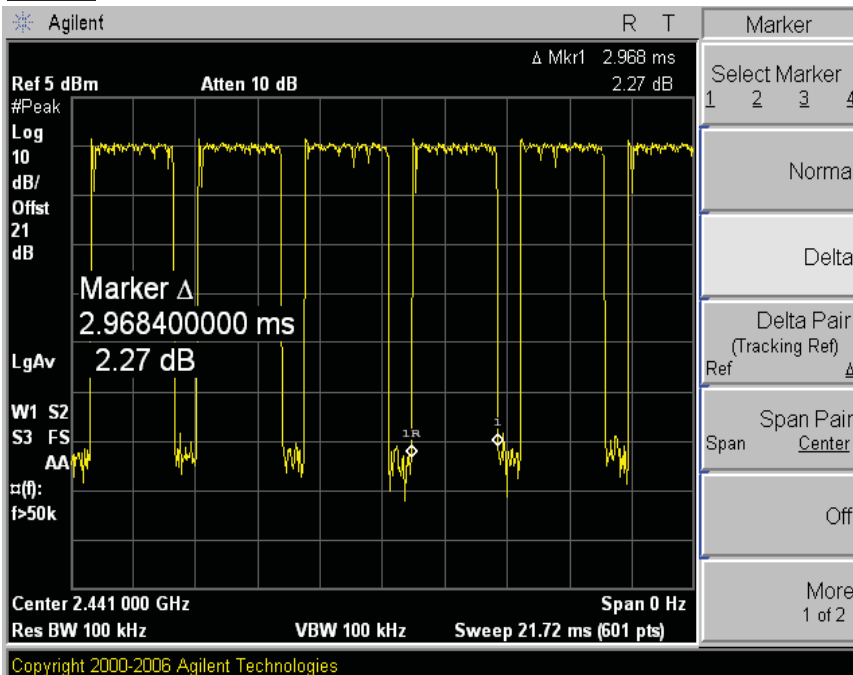
DH1



DH3



DH5



8DPSK

A. DH1 Mode

One period for each particular channel : $0.444 \text{ ms} \times 320.1 = 142.12 \text{ ms}$

Channel	Pulse Time(ms)	Limit (ms)	PASS/FAIL
39	142.12	400	PASS

B. DH3 Mode

One period for each particular channel : $1.715 \text{ ms} \times 159.9 = 274.26 \text{ ms}$

Channel	Pulse Time(ms)	Limit (ms)	PASS/FAIL
39	274.26	400	PASS

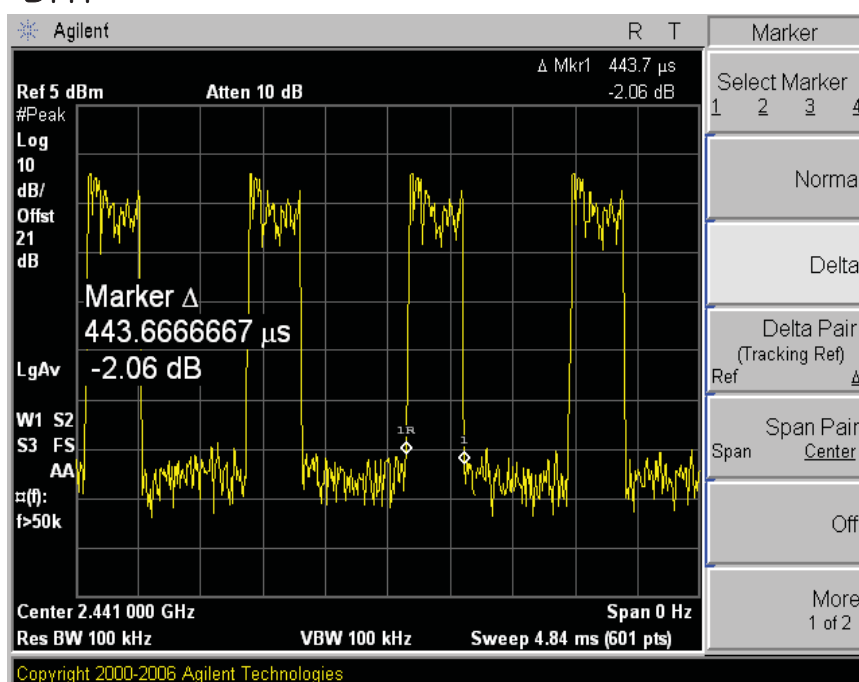
C. DH5 Mode

One period for each particular channel : $2.972 \text{ ms} \times 106.81 = 317.44 \text{ ms}$

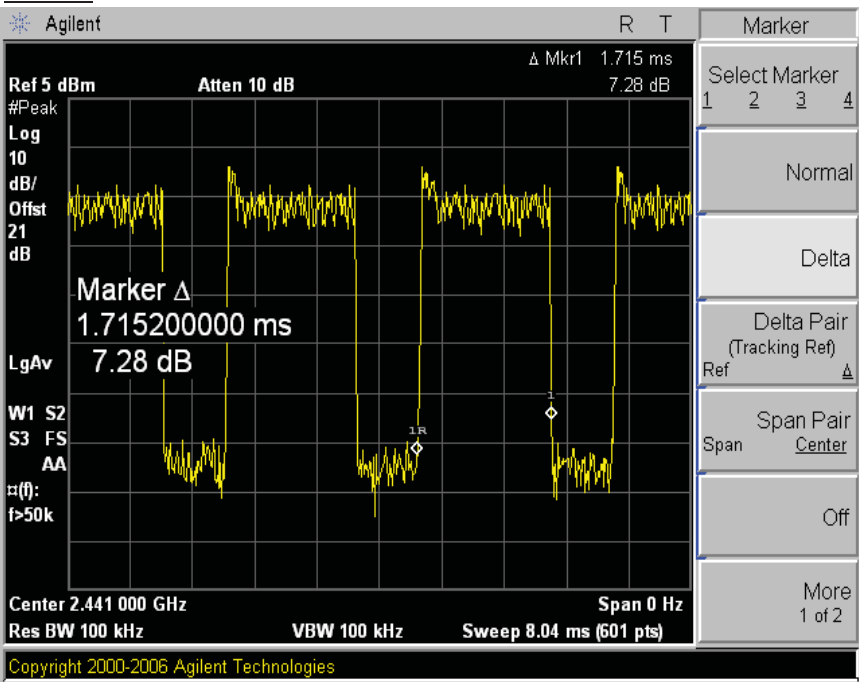
Channel	Pulse Time(ms)	Limit (ms)	PASS/FAIL
39	317.44	400	PASS

8.5 Trace data

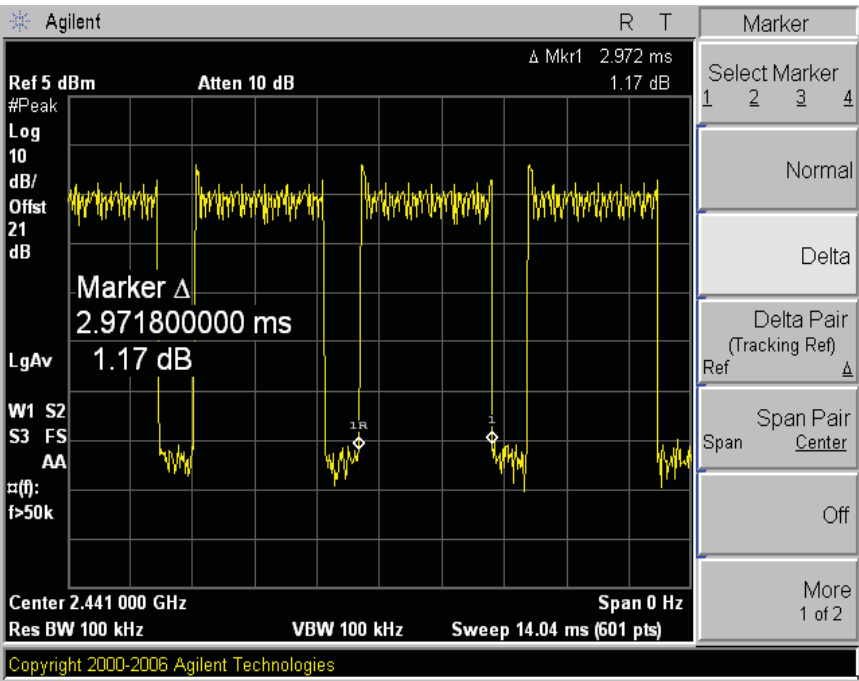
DH1



8DPSK DH3



DH5



9. band-edge and out of band emissions.

9.1 Test procedure

The radio frequency power at 20dB down from the highest inband power level is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency. The band edge&out of band emission shall be at least 20dB below of the highest inband power level.

9.2 Test instruments and measurement setup

The spectrum analyzer is set to as following.

- . RBW= 100KHz
- . VBW= >100KHz
- . Span= suitable frequency span
- . Sweep= suitable duration based on the EUT specification.

Band Edge&Out of Emission Test Instruments

Description	Model	Serial Number	Cal. Due Date
Spectrum Analyzer	E4440A	US41421291	2013-09-11
Bluetooth Tester	TC-3000A	3000A570224	2013-12-26
Dual Directional Coupler	772D	3736A22424	2014-01-27
Signal Analyzer	FSV	100939	2014-01-25
-Spectrum Analyzer <=> EUT	Loss: 21.0dB		

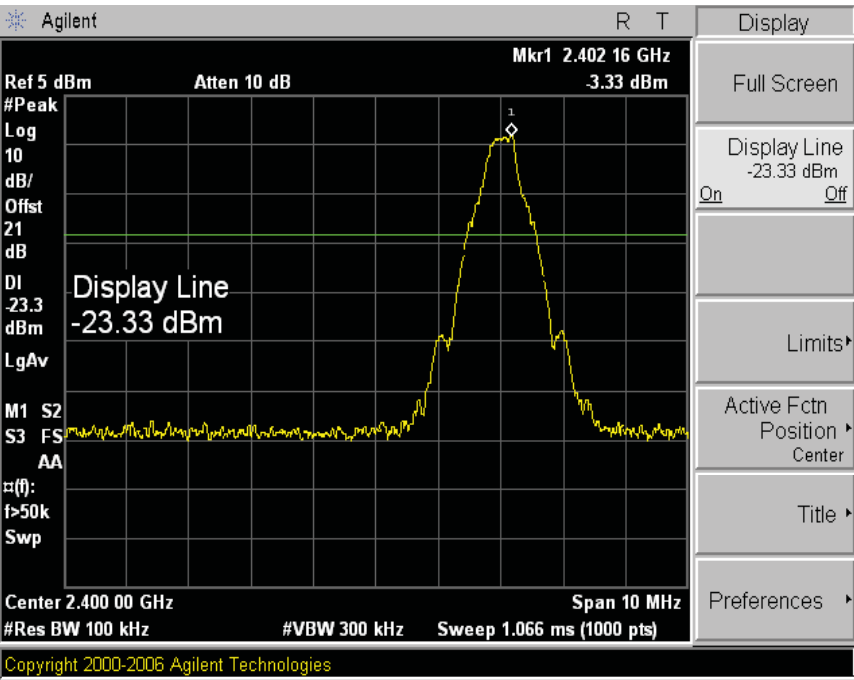
9.3 Measurement results of band-edge & out of emission

EUT	Mobile Computer	MODEL	Dolphin 6110
MODE	GFSK	ENVIRONMENTAL CONDITION	24 °C, 43 % R.H.
INPUT POWER	5Vdc		

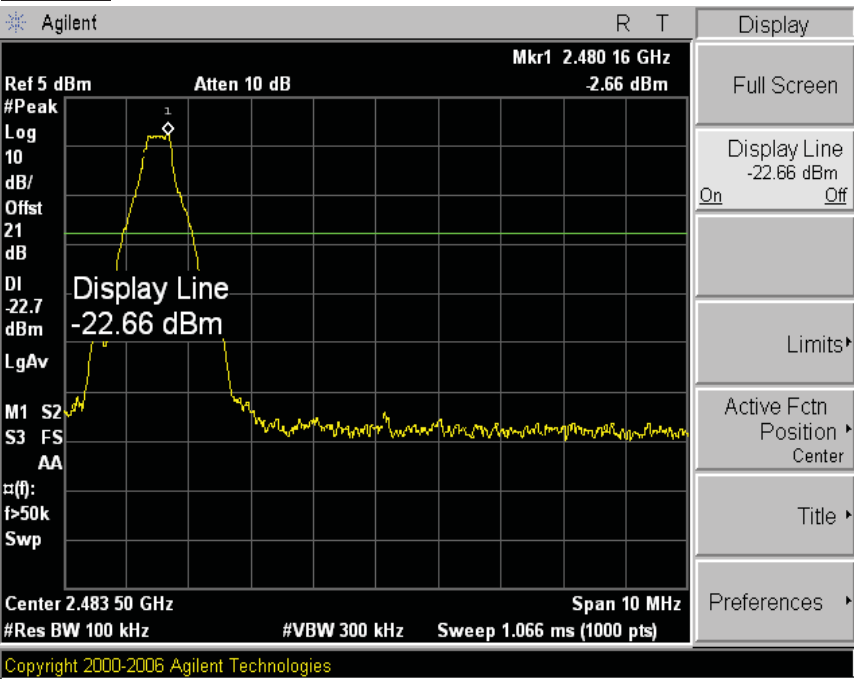
* Refer to attach spectrum analyzer data chart.

9.4 Trace data of band-edge & Out of Emission

CH0



CH78





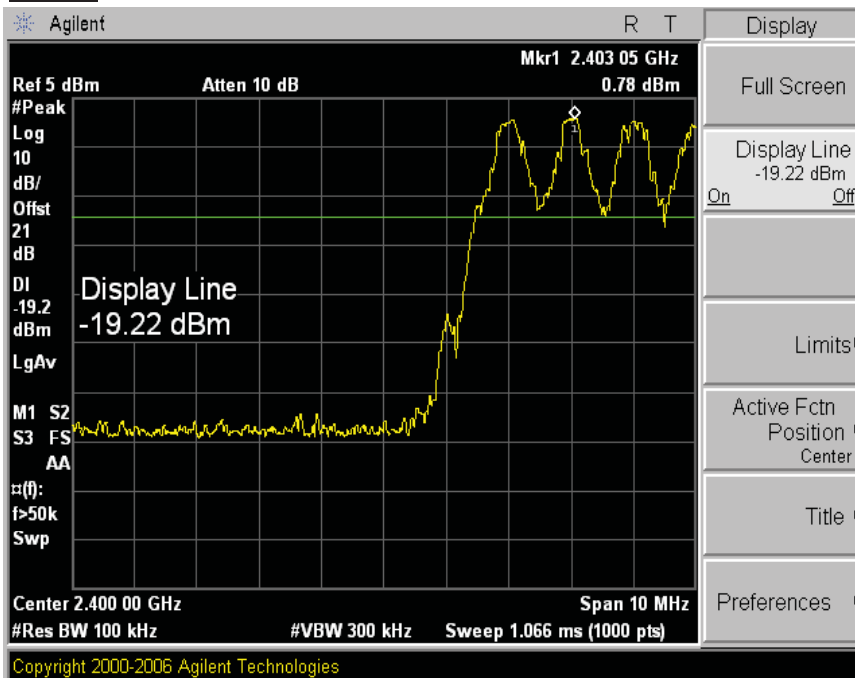
ESTECH Co., Ltd.

Rm 1015, World Venture Center II,
426-5 Gaseon-dong, Guncheon-gu,
Seoul 158-803, Korea

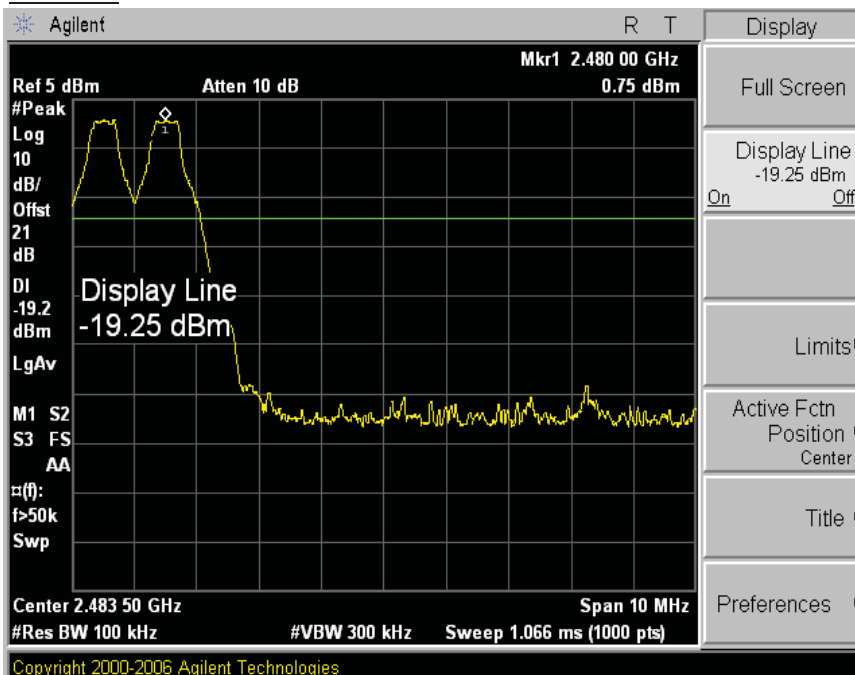


**Electromagnetic
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Hopping on CH0

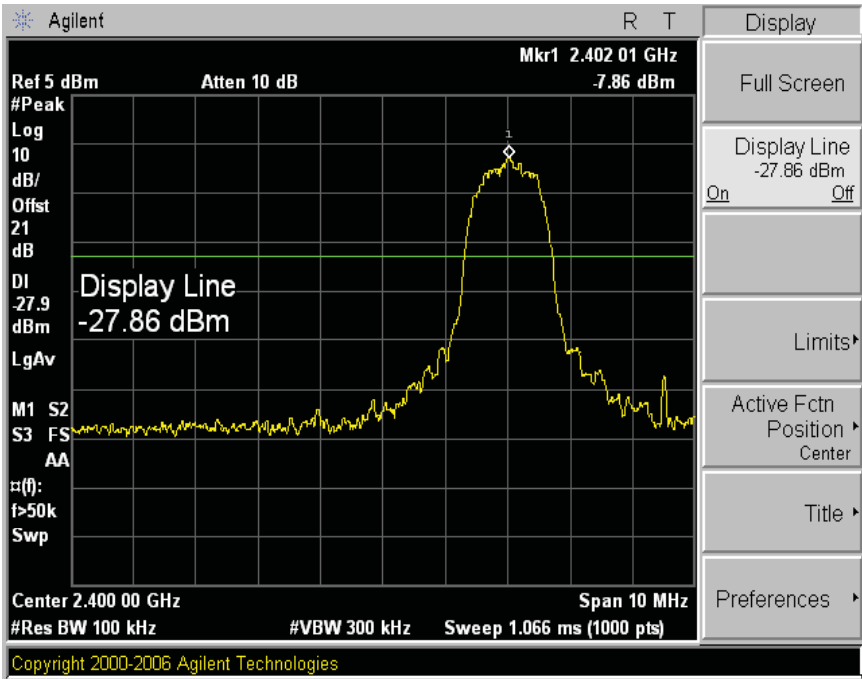


CH78

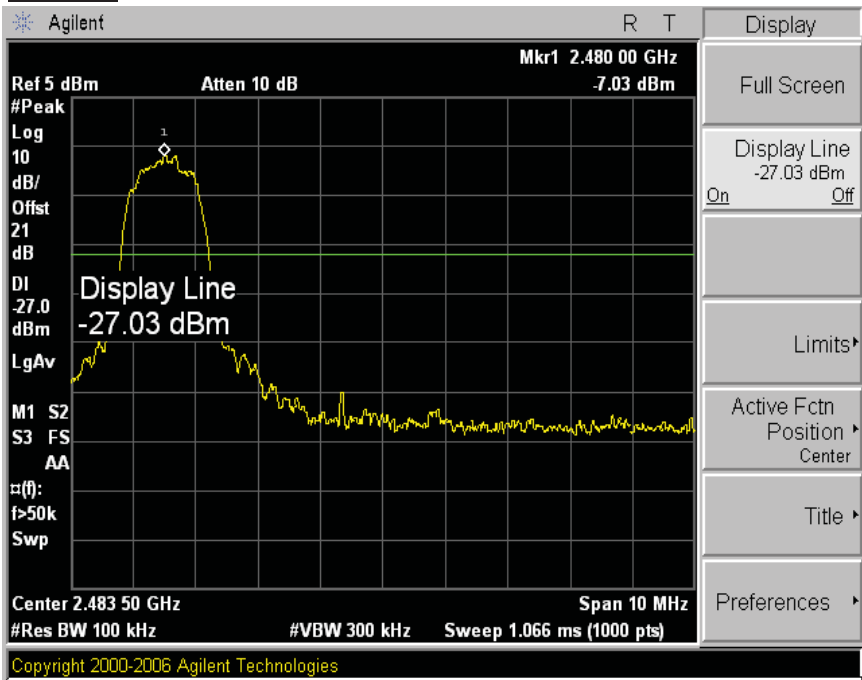


8DPSK

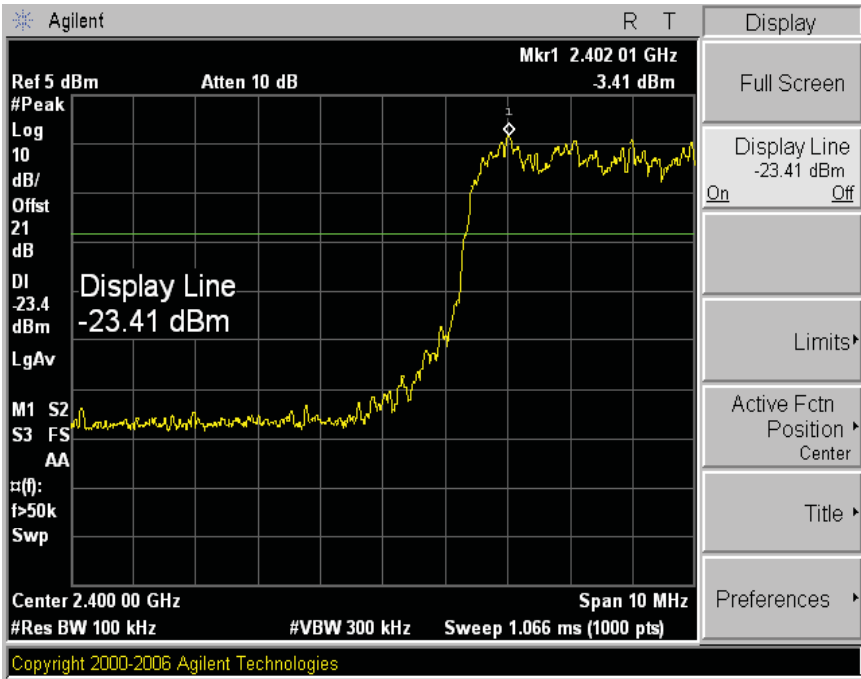
CH 0



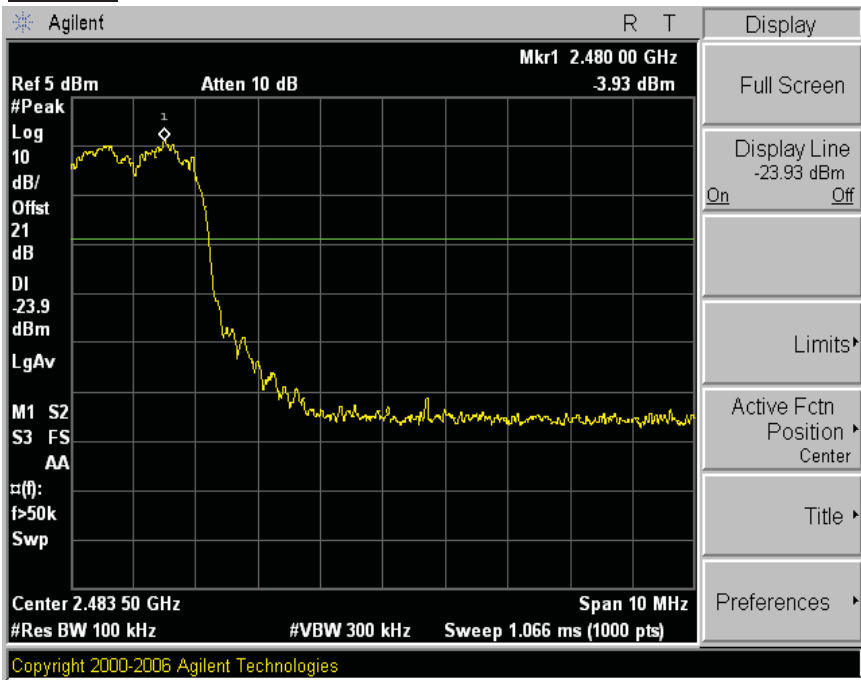
CH78



Hopping on CH 0



CH78





ESTECH Co., Ltd.

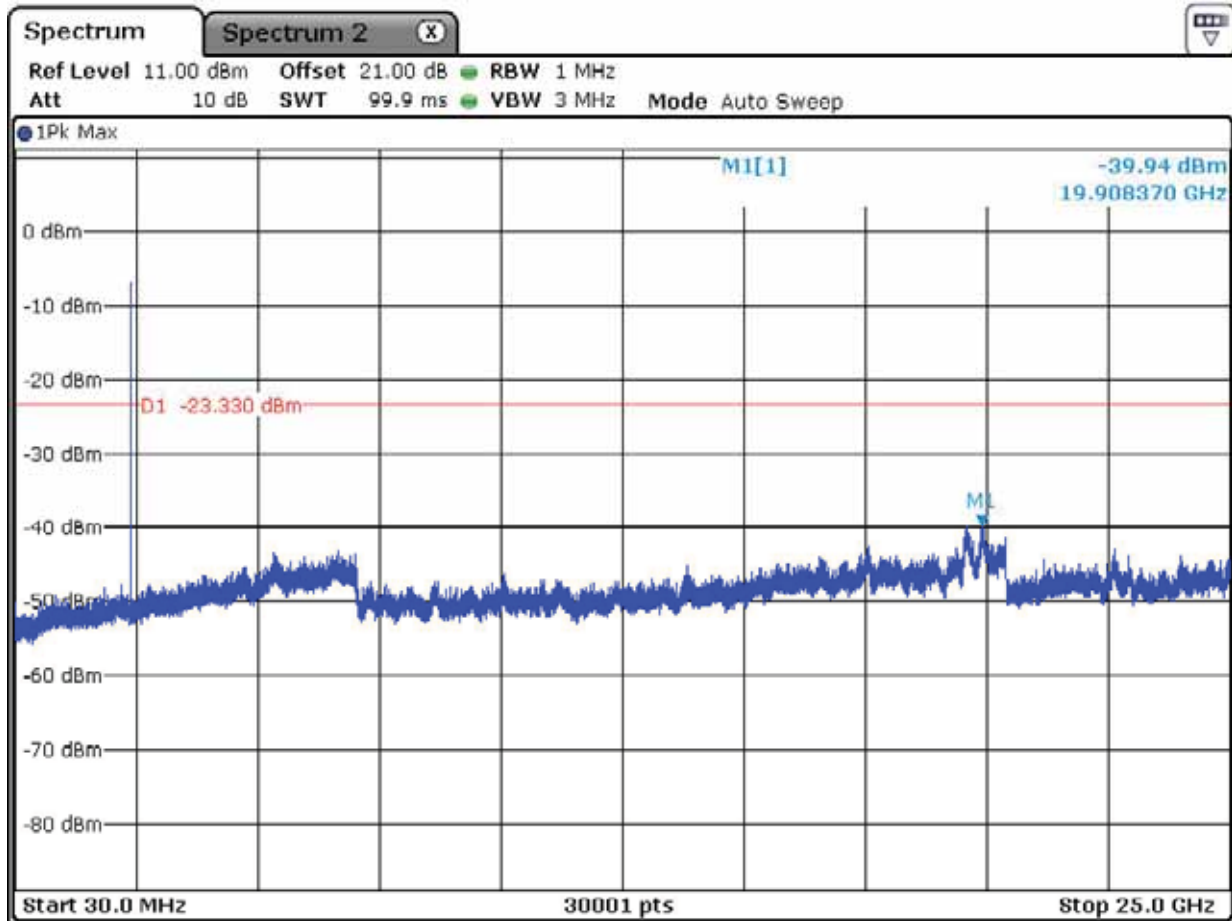
Rm 1015, World Venture Center II,
426-5 Gaseon-dong, Guncheon-gu,
Seoul 158-809, Korea



**Electromagnetic
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Test Report**

GFSK

CH 0





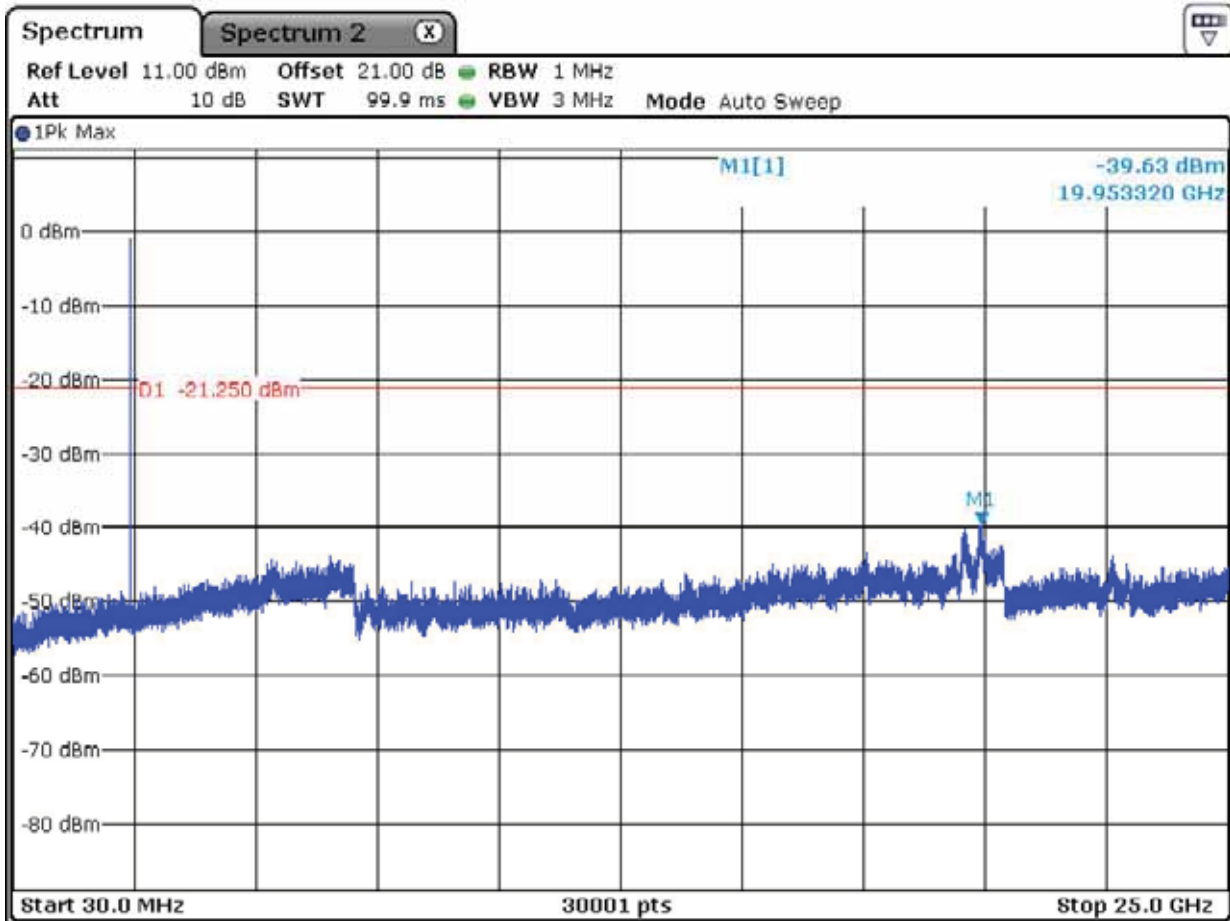
ESTECH Co., Ltd.

Rm 1015, World Venture Center II,
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Seoul 158-803, Korea



**Electromagnetic
Interference
Test Report**

CH 39





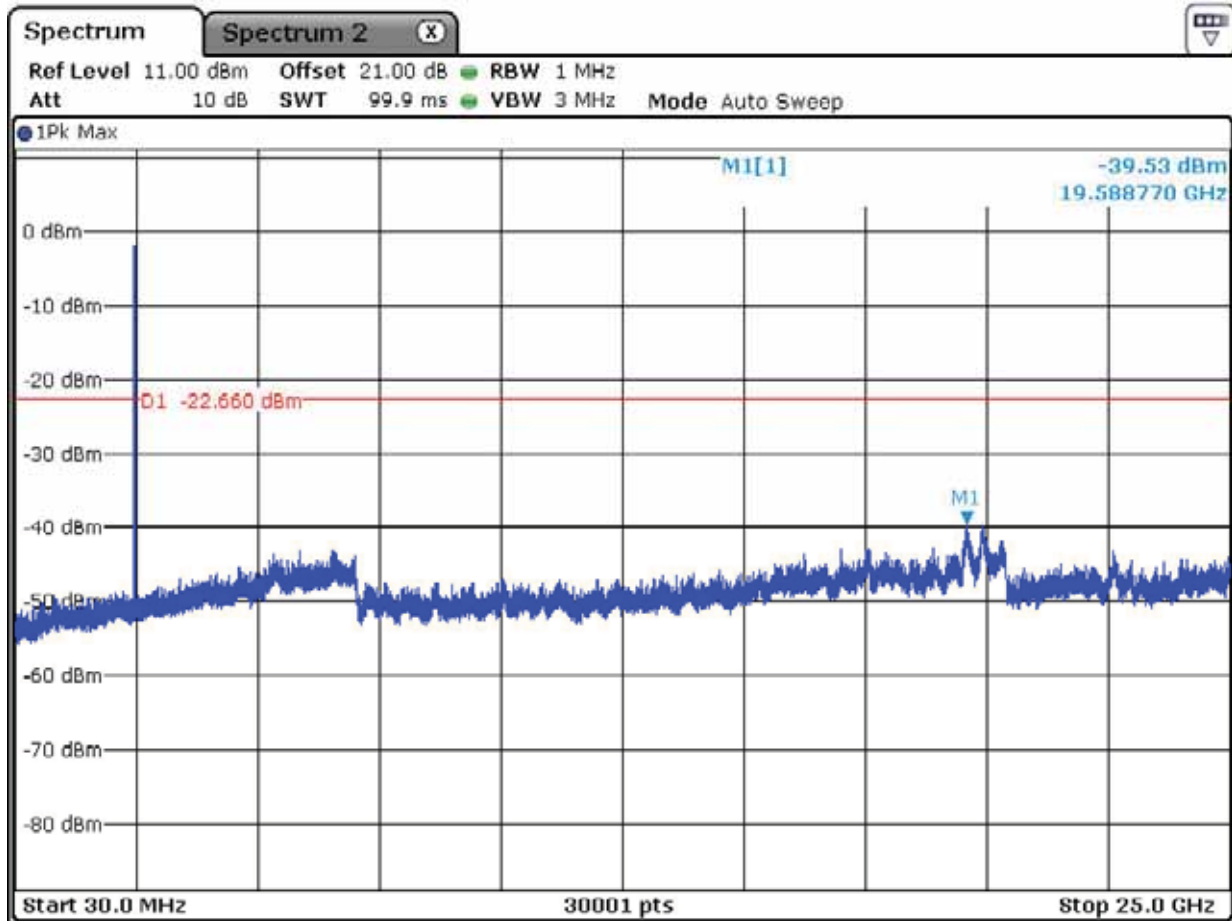
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126-5 Gaseon-dong, Guncheon-gu,
Seoul 158-809, Korea



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CH 78





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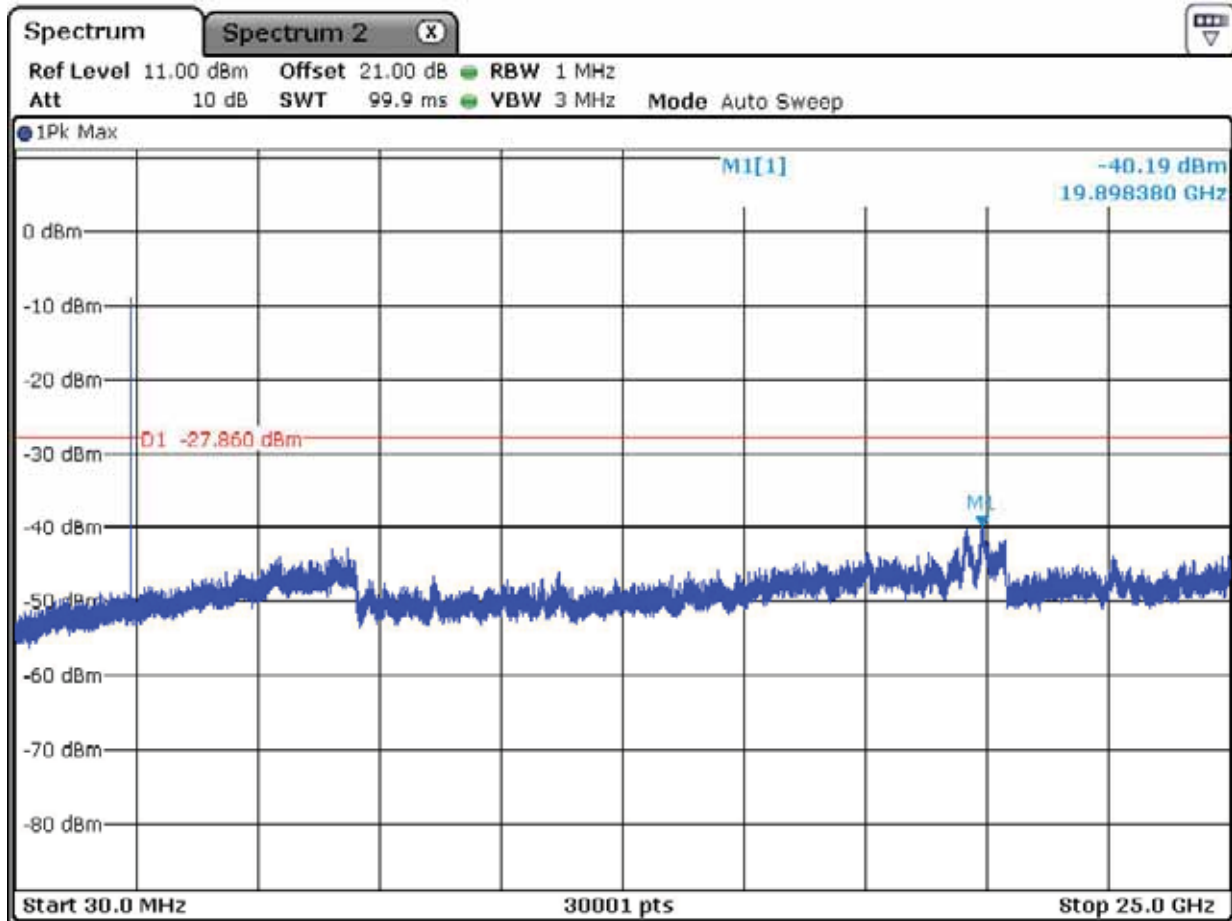
Rm 1015, World Venture Center II,
126-5 Gaseon-dong, Guncheon-gu,
Seoul 158-800, Korea



**Electromagnetic
Interference
Test Report**

8DPSK

CH 0





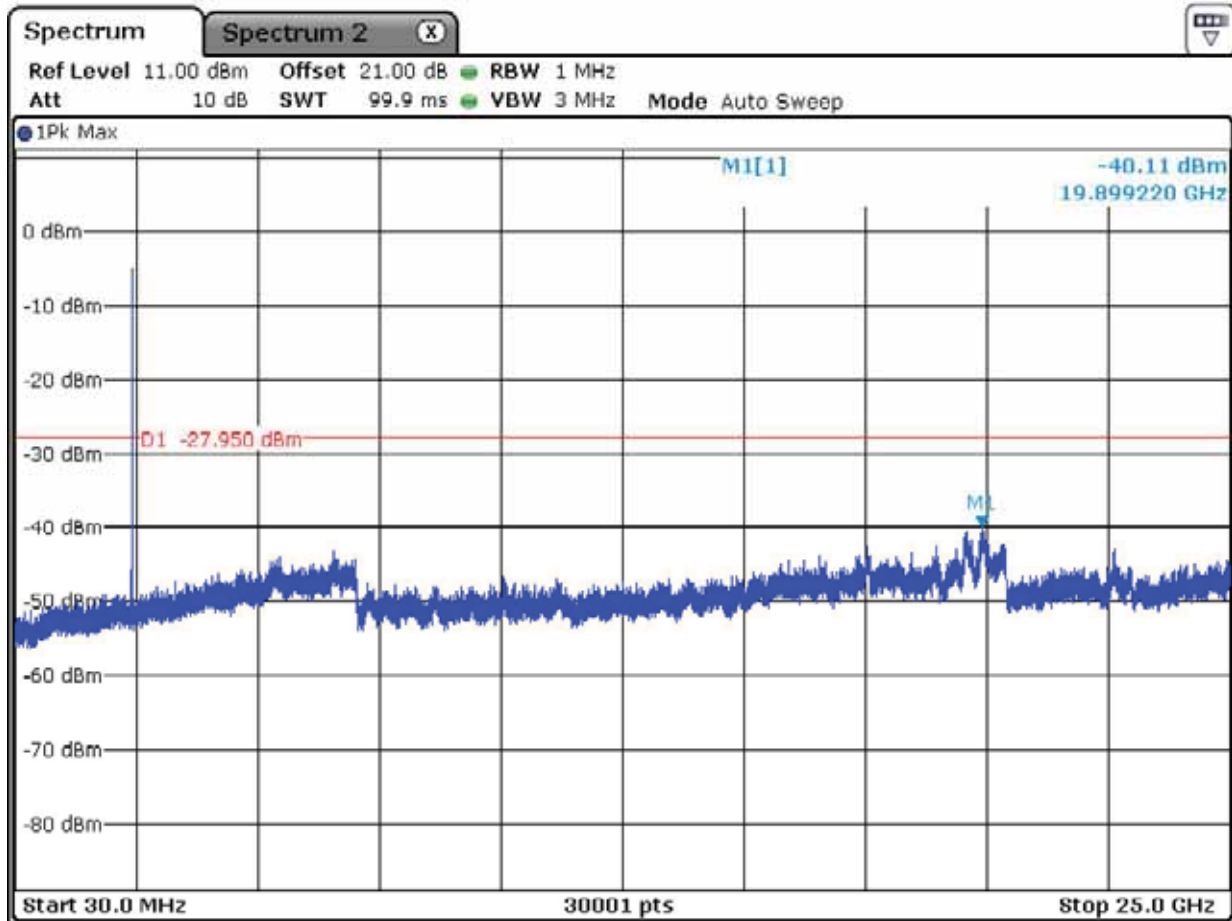
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126-5 Gaseon-dong, Guncheon-gu,
Seoul 158-809, Korea



**Electromagnetic
Interference
Test Report**

CH 39





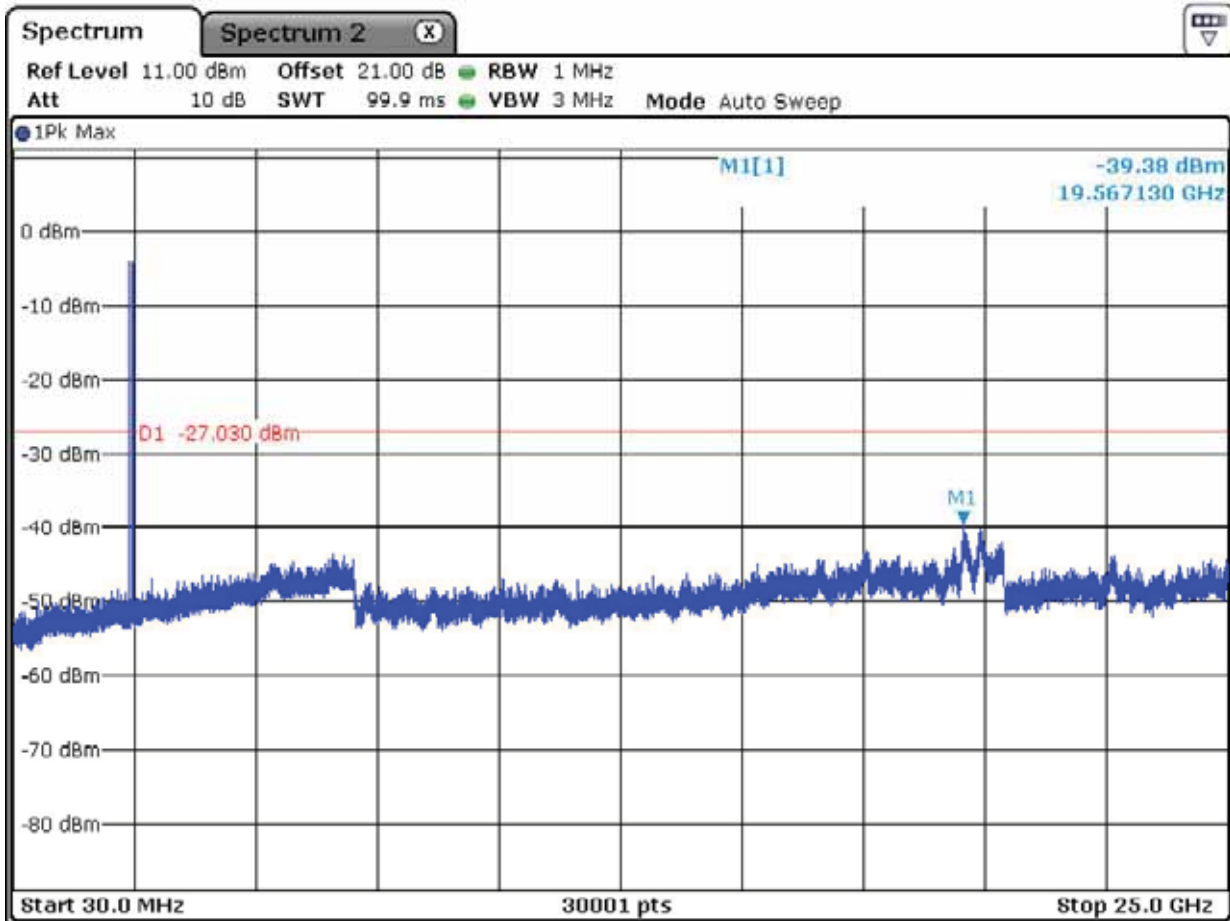
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**Electromagnetic
Interference
Test Report**

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10. Measurement of radiated disturbance

Above 30 MHz Electric Field strength was measured in accordance with FCC PART 15.205, 15.209 & IC RSS-210 (A8.5). The test setup was made according to ANSI C 63.4 (2009) & DA 00-705 Semi-anechoic chamber, which allows a 3 m distance measurement. The EUT was placed in the center of styrofoam turntable. The height of this table was 0.8 m. The measurement was conducted with both horizontal and vertical antenna polarization. The turntable has fully rotated. For further description of the configuration refer to the picture of the test setup.

10.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
TEST Receiver	ESCI7	ROHDE & SCHWARZ	1166.5950.07	25-Jan-14
Logbicon Antenna	VULB 9168	SCHWARZBECK	237	24-Jan-14
Turn Table	DT3000-2t	Innco System GmbH	N/A	-
Antenna Mast	MA4000-EP	Innco System GmbH	N/A	-
PREAMPLIFIER	8449B	AGILENT	3008A00595	25-Jan-14
Horn Antenna	BBHA9120D	SCHWARZBECK	469	21-Oct-13
Test Receiver	ESPI7	ROHDE & SCHWARZ	100185	25-Jan-14
Spectrum Analyzer	R3273	ADVANTEST	110600592	26-Jan-14
Turn Table	DT1500-S	Innco System GmbH	N/A	-
Antenna Mast	MA4000-EP	Innco System GmbH	N/A	-
Pyramidal Horn Antenna	3160-09-01	EST-LINDGREN	102642	22-Oct-13
Antenna Master & Turn table controller	C02000-P	Innco System GmbH	CO2000/642 /28051111/L	-
Bluetooth Tester	TC-3000A	TESCOM	3000A570224	23-Aug-13

10.2 Environmental Condition

Below 1 GHz –Test Place : 10 m Semi-anechoic chamber

BT Basic Rate Mode

Temperature (°C) : 22.2 °C
 Humidity (% R.H.) : 47.2 % R.H.

BT EDR Mode

Temperature (°C) : 22.3 °C
 Humidity (% R.H.) : 47.9 % R.H.

Above 1 GHz–Test Place : 3 m Semi-anechoic chamber

BT Basic Rate Mode

Temperature (°C) : 21.8 °C
 Humidity (% R.H.) : 47.2 % R.H.

BT EDR Mode

Temperature (°C) : 21.6 °C
 Humidity (% R.H.) : 47.2 % R.H.

10.3 Test Data for Bluetooth (Basic Rate)

Test Date : 3-Jul-13

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
72.00	6.27	V	1.0	10.75	1.40	40.00	18.42	-21.58
84.00	8.67	H	4.0	8.75	1.53	40.00	18.95	-21.05
120.00	6.89	V	1.0	9.55	1.79	43.50	18.23	-25.27
130.80	5.75	V	1.0	10.93	1.87	43.50	18.55	-24.95
156.00	6.00	H	4.0	12.74	2.00	43.50	20.74	-22.76
208.00	12.06	H	4.0	9.49	2.29	43.50	23.84	-19.66
260.00	9.40	H	1.3	11.78	2.54	46.00	23.72	-22.28
312.00	7.22	H	1.0	13.55	2.77	46.00	23.54	-22.46
364.00	4.42	V	1.0	14.88	2.99	46.00	22.29	-23.71
390.00	9.85	H	1.0	15.54	3.10	46.00	28.49	-17.51
Remark	H : Horizontal, V : Vertical Bluetooth (Basic Rate , 39 CH , 2441 MHz) *Checked in all 3 axis and the maximum measured data were reported. *CL = Cable Loss(In case of below 1 000 MHz) *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1 GHz. *Result Value = Reading + Ant Factor + Cable loss *Margin= Limit - Result							

10.3-1 Test Data for Bluetooth(Basic Rate)

Test Date : 4-Jul-13

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
PEAK(RBW:1 MHz VBW:3 MHz)									
2386.80	26.34	V	1.2	26.98	5.60	0.00	74.00	58.92	-15.08
2385.60	25.74	H	1.4	26.97	5.60	0.00	74.00	58.31	-15.69
2390.00	24.31	H	1.4	26.99	5.60	0.00	74.00	56.90	-17.10
2390.00	24.77	V	1.2	26.99	5.60	0.00	74.00	57.36	-16.64
4804.00	45.24	H	1.4	31.47	-23.95	0.00	74.00	52.76	-21.24
4804.00	45.88	V	1.2	31.47	-23.95	0.00	74.00	53.40	-20.60
Average (RBW:1 MHz VBW:1 kHz)									
2386.80	13.10	V	1.2	26.98	5.60	-30.55	54.00	15.13	-38.87
2385.60	13.21	H	1.4	26.97	5.60	-30.55	54.00	15.23	-38.77
2390.00	13.25	H	1.4	26.99	5.60	-30.55	54.00	15.29	-38.71
2390.00	13.15	V	1.2	26.99	5.60	-30.55	54.00	15.19	-38.81
4804.00	33.97	H	1.4	31.47	-23.95	-30.55	54.00	10.94	-43.06
4804.00	33.86	V	1.2	31.47	-23.95	-30.55	54.00	10.83	-43.17
Remark	H : Horizontal, V : Vertical TEST MODE : Bluetooth Basic Rate-CH0(2402 MHz) *The TX signal wasn't detected from 3th harmonics. *Checked in all 3 axis and the maximum measured data were reported. *Result Value = Reading + Ant Factor + Cable loss - Amplifier Gain + Duty Cycle Correction Factor *Margin= Limit - Result *The resolution bandwidth and video bandwidth of spectrum analyzer is 1 MHz and 1 kHz for average detection at frequency above 1 GHz. FYI : Duty Cycle Correction Factor (79 channel hopping) a. Time to cycle through all channels= $\Delta t = \tau$ [ms] x 79 channels = 234.472 ms, where τ = pulse width b. $100 \text{ ms} / \Delta t$ [ms] = H $\rightarrow$ Round up to next highest integer, H ' =1 c. Worst Case Dwell Time = τ [ms] x H ' = 2.968 ms d. Duty Cycle Correction = $20\log (\text{Worst Case Dwell Time} / 100\text{ms}) \text{ dB} = - 30.55 \text{ dB}$								

10.3-2 Test Data for Bluetooth(Basic Rate)

Test Date : 5-Jul-13

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK(RBW:1 MHz VBW:3 MHz)									
4882.00	46.35	H	1.4	31.62	-23.73	0.00	74.00	54.24	-19.76
4882.00	46.85	V	1.2	31.62	-23.73	0.00	74.00	54.74	-19.26
Average (RBW:1 MHz VBW:1 kHz)									
4882.00	33.72	H	1.4	31.62	-23.73	-30.55	54.00	11.06	-42.94
4882.00	34.14	V	1.2	31.62	-23.73	-30.55	54.00	11.48	-42.52
Remark	H : Horizontal, V : Vertical TEST MODE : Bluetooth Basic Rate-CH39(2441 MHz)								
	*The TX signal wasn't detected from 3th harmonics. *Checked in all 3 axis and the maximum measured data were reported. *Result Value = Reading + Ant Factor + Cable loss - Amplifier Gain + Duty Cycle Correction Factor *Margin= Limit - Result *The resolution bandwidth and video bandwidth of spectrum analyzer is 1 MHz and 1 kHz for average detection at frequency above 1 GHz. FYI : Duty Cycle Correction Factor (79 channel hopping) a. Time to cycle through all channels= Δ t= τ [ms] x 79 channels = 234.472 ms, where τ = pulse width b. 100 ms/ Δt [ms] = H → Round up to next highest integer, H ' =1 c. Worst Case Dwell Time = τ [ms] x H ' = 2.968 ms d. Duty Cycle Correction = 20log (Worst Case Dwell Time/ 100ms) dB = - 30.55 dB								

10.3-3 Test Data for Bluetooth(Basic Rate)

Test Date : 6-Jul-13

Measurement Distance : 3 m

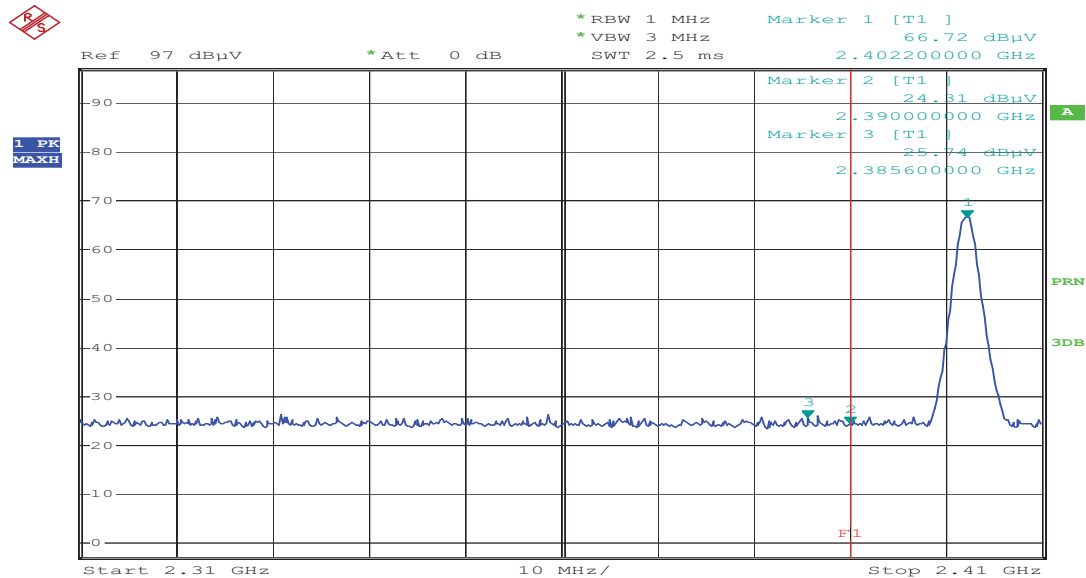
Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK(RBW:1 MHz VBW:3 MHz)									
2483.50	29.42	H	1.4	27.25	5.60	0.00	74.00	56.67	-17.33
2483.50	26.20	V	1.2	27.25	5.60	0.00	74.00	59.05	-14.95
2489.30	26.02	H	1.4	27.26	5.60	0.00	74.00	58.88	-15.12
2487.70	25.35	V	1.2	27.26	5.60	0.00	74.00	58.21	-15.79
4960.00	43.85	H	1.4	31.78	-23.39	0.00	74.00	52.24	-13.37
4960.00	43.72	V	1.2	31.78	-23.39	0.00	74.00	52.11	-13.50
Average (RBW:1 MHz VBW:1 kHz)									
2483.50	25.52	H	1.4	27.25	5.60	-30.55	54.00	27.82	-26.18
2483.50	20.85	V	1.2	27.25	5.60	-30.55	54.00	23.15	-30.85
2489.30	12.95	H	1.4	27.26	5.60	-30.55	54.00	15.26	-38.74
2487.70	12.98	V	1.2	27.26	5.60	-30.55	54.00	15.29	-38.71
4960.00	33.72	H	1.4	31.78	-23.39	-30.55	54.00	11.56	-42.44
4960.00	33.65	V	1.2	31.78	-23.39	-30.55	54.00	11.49	-42.51
Remark	H : Horizontal, V : Vertical TEST MODE : Bluetooth Basic rate-CH78(2480 MHz)								
	*The TX signal wasn't detected from 3th harmonics.								
	*Checked in all 3 axis and the maximum measured data were reported.								
	*Result Value = Reading + Ant Factor + Cable loss - Amplifier Gain + Duty Cycle Correction Factor								
	*Margin= Limit - Result								
	*The resolution bandwidth and video bandwidth of spectrum analyzer is 1 MHz and 1 kHz for average detection at frequency above 1 GHz.								
	FYI : Duty Cycle Correction Factor (79 channel hopping)								
	a. Time to cycle through all channels= Δ t= τ [ms] x 79 channels = 234.472 ms, where τ = pulse width								
	b. 100 ms/ Δt [ms] = H → Round up to next highest integer, H ' =1								
	c. Worst Case Dwell Time = τ [ms] x H ' = 2.968 ms								
	d. Duty Cycle Correction = 20log (Worst Case Dwell Time/ 100ms) dB = - 30.55 dB								

10.4 Restricted Band Edges for BT(Basic Rate)

Band Edges(CH Low)

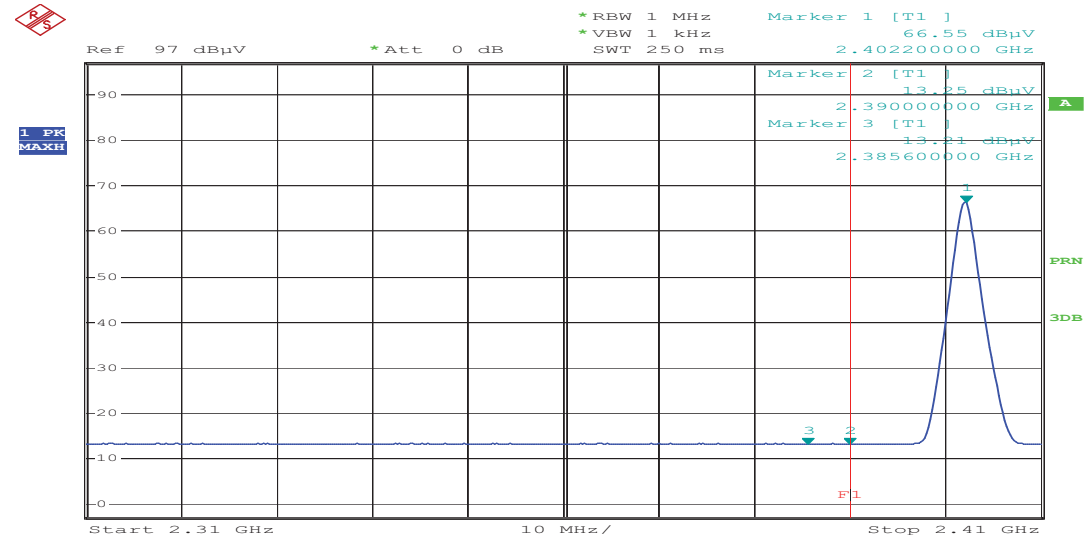
Detector mode:Peak

Polarity:Horizontal



Detector mode:Average

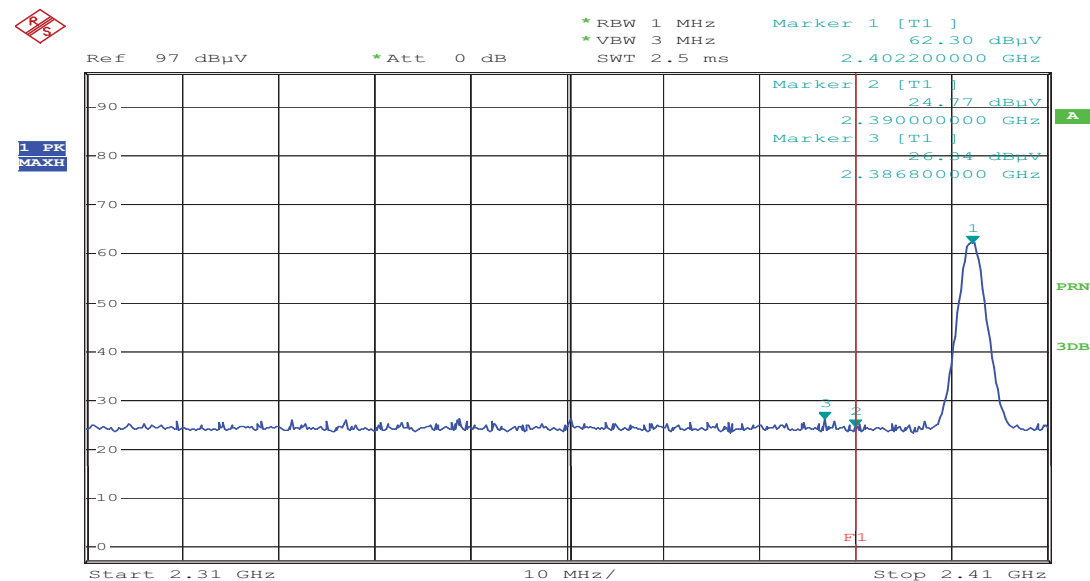
Polarity:Horizontal



Band Edges(CH Low)

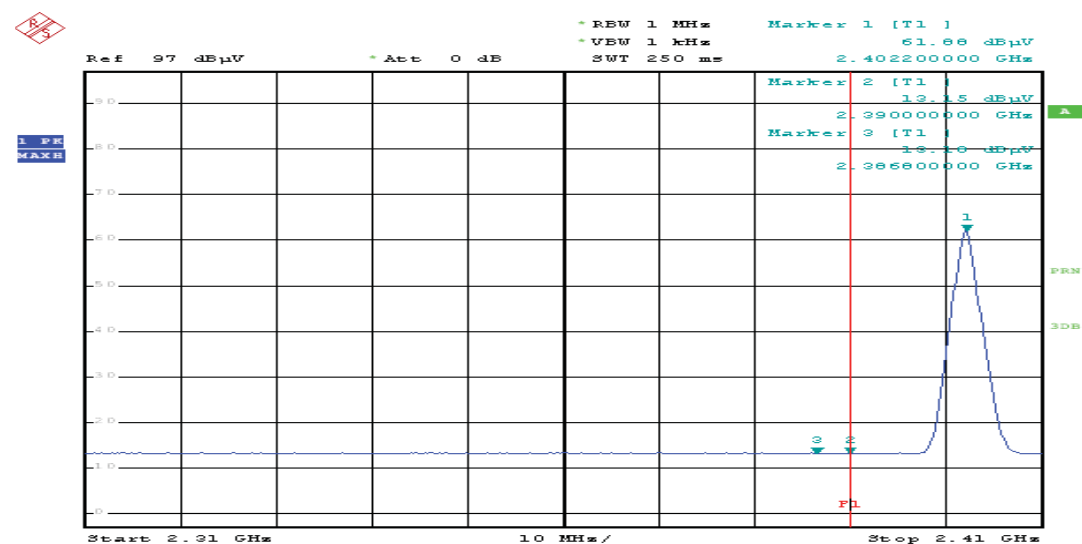
Detector mode:Peak

Polarity:Vertical



Detector mode:Average

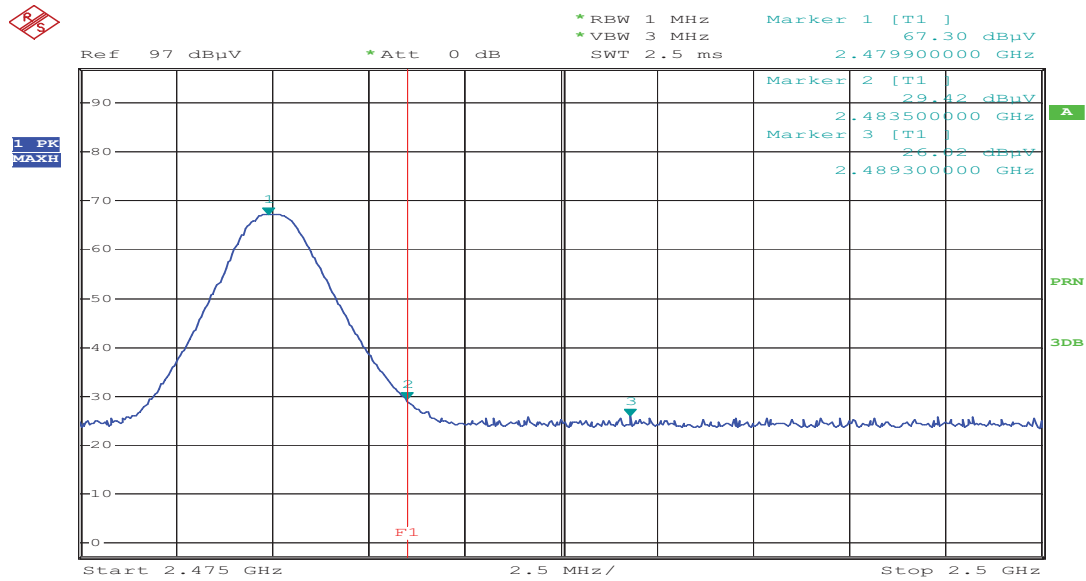
Polarity:Vertical



Band Edges(CH High)

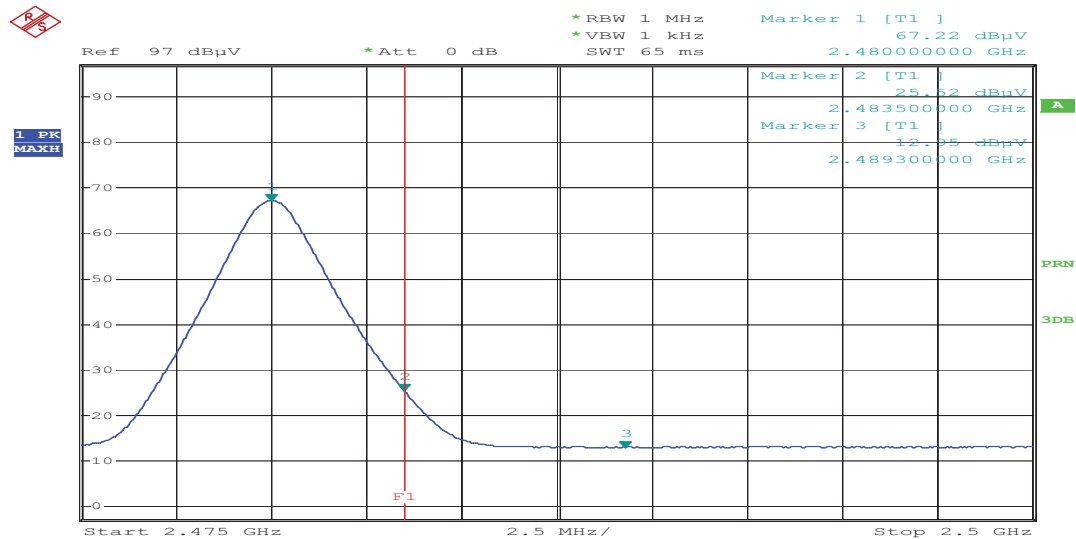
Detector mode:Peak

Polarity:Horizontal



Detector mode:Average

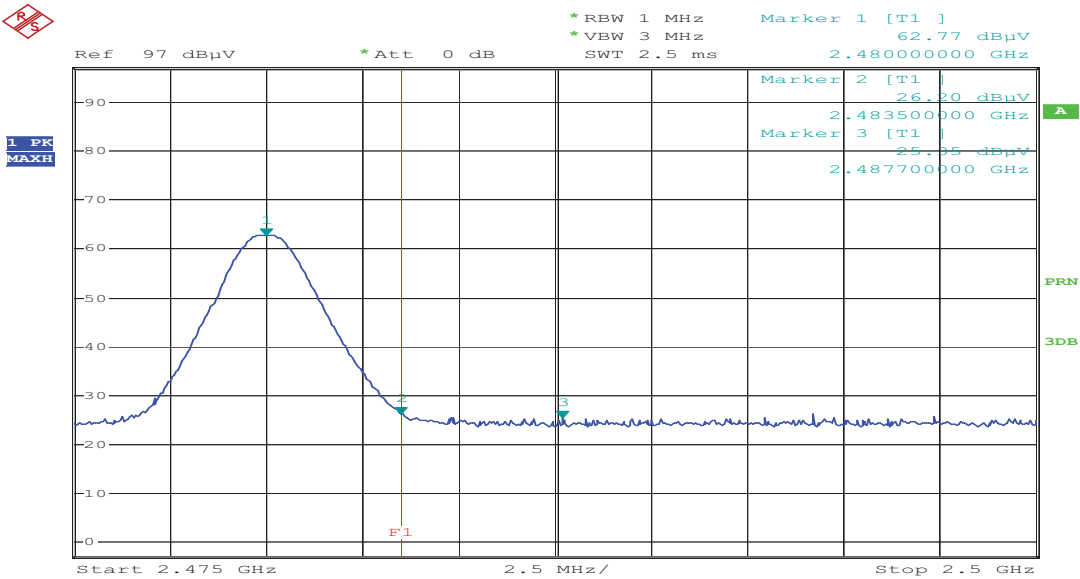
Polarity:Horizontal



Band Edges(CH High)

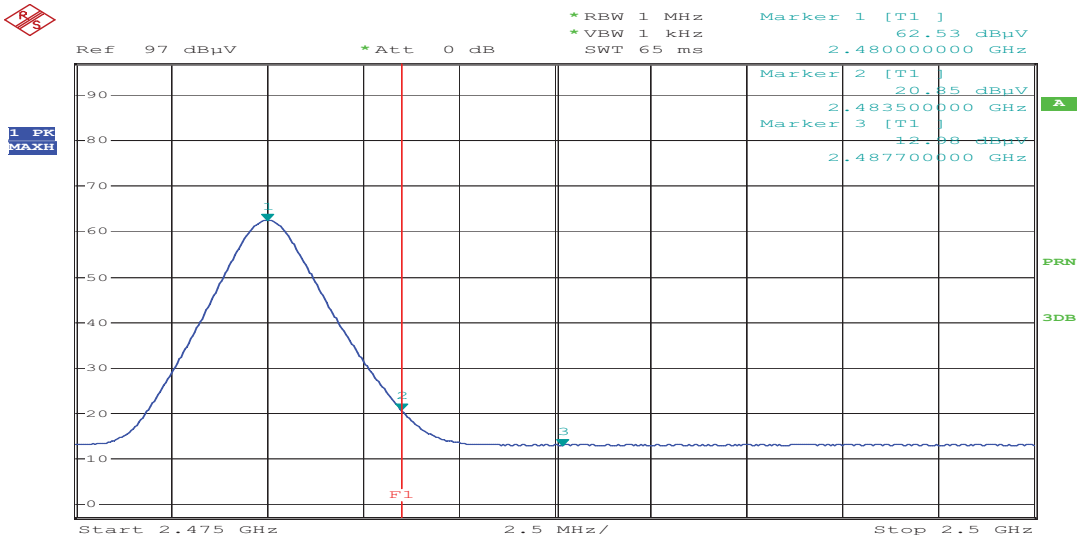
Detector mode:Peak

Polarity:Vertical



Detector mode:Average

Polarity:Vertical



10.5 Test Data for Bluetooth (EDR)

Test Date : 7-Jul-13

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
75.00	7.54	V	1.0	10.26	1.44	40.00	19.23	-20.77
84.00	9.17	H	4.0	8.75	1.53	40.00	19.45	-20.55
102.20	8.11	H	4.0	8.34	1.67	43.50	18.12	-25.38
130.80	6.06	V	1.0	10.93	1.87	43.50	18.86	-24.64
156.00	6.51	H	3.0	12.74	2.00	43.50	21.25	-22.25
183.90	10.83	V	1.0	10.62	2.19	43.50	23.63	-19.87
260.00	10.53	H	2.0	11.78	2.54	46.00	24.85	-21.15
286.00	7.50	H	1.0	12.73	2.66	46.00	22.89	-23.11
312.00	8.50	H	1.0	13.55	2.77	46.00	24.82	-21.18
442.00	5.80	V	1.0	16.60	3.27	46.00	25.67	-20.33
Remark	H : Horizontal, V : Vertical Bluetooth (EDR , 39 CH , 2441 MHz) *Checked in all 3 axis and the maximum measured data were reported. *CL = Cable Loss(In case of below 1 000 MHz) *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1 GHz. *Result Value = Reading + Ant Factor + Cable loss *Margin= Limit - Result							

10.5-1 Test Data for Bluetooth(EDR)

Test Date : 8-Jul-13

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
PEAK(RBW:1 MHz VBW:3 MHz)									
2386.20	28.16	V	1.1	26.98	5.60	0.00	74.00	60.74	-13.26
2364.40	31.05	H	1.4	26.91	5.60	0.00	74.00	63.56	-10.44
2390.00	24.63	H	1.4	26.99	5.60	0.00	74.00	57.22	-16.78
2390.00	24.58	V	1.1	26.99	5.60	0.00	74.00	57.17	-16.83
4804.00	45.45	H	1.4	31.47	-23.95	0.00	74.00	52.97	-21.03
4804.00	45.80	V	1.1	31.47	-23.95	0.00	74.00	53.32	-20.68
Average (RBW:1 MHz VBW:1 kHz)									
2386.20	13.27	H	1.1	26.98	5.60	-30.53	54.00	15.32	-38.68
2364.40	13.20	V	1.4	26.91	5.60	-30.53	54.00	15.18	-38.82
2390.00	13.10	H	1.4	26.99	5.60	-30.53	54.00	15.16	-38.84
2390.00	13.12	V	1.1	26.99	5.60	-30.53	54.00	15.18	-38.82
4804.00	33.46	H	1.4	31.47	-23.95	-30.53	54.00	10.45	-43.55
4804.00	33.18	V	1.1	31.47	-23.95	-30.53	54.00	10.17	-43.83
Remark	H : Horizontal, V : Vertical TEST MODE : Bluetooth EDR-CH0(2402 MHz)								
	*The TX signal wasn't detected from 3th harmonics. *Checked in all 3 axis and the maximum measured data were reported. *Result Value = Reading + Ant Factor + Cable loss - Amplifier Gain + Duty Cycle Correction Factor *Margin= Limit - Result *The resolution bandwidth and video bandwidth of spectrum analyzer is 1 MHz and 1 kHz for average detection at frequency above 1 GHz.								
	FYI : Duty Cycle Correction Factor (79 channel hopping) a. Time to cycle through all channels= Δ t= τ [ms] x 79 channels = 234.788 ms, where τ = pulse width b. 100 ms/ Δ t [ms] = H → Round up to next highest integer, H '=1 c. Worst Case Dwell Time = τ [ms] x H ' = 2.972 ms d. Duty Cycle Correction = 20log (Worst Case Dwell Time/ 100ms) dB = - 30.53 dB								

10.5-2 Test Data for Bluetooth(EDR)

Test Date : 9-Jul-13

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
PEAK(RBW:1 MHz VBW:3 MHz)									
4882.00	45.78	H	1.4	31.62	-23.73	0.00	74.00	53.67	-20.33
4882.00	45.73	V	1.1	31.62	-23.73	0.00	74.00	53.62	-20.38
Average(RBW:1 MHz VBW:1 kHz)									
4882.00	33.84	H	1.4	31.62	-23.73	-30.53	54.00	11.20	-42.80
4882.00	33.60	V	1.1	31.62	-23.73	-30.53	54.00	10.96	-43.04
Remark	H : Horizontal, V : Vertical TEST MODE : Bluetooth EDR-CH39(2441 MHz)								
	*The TX signal wasn't detected from 3th harmonics. *Checked in all 3 axis and the maximum measured data were reported. *Result Value = Reading + Ant Factor + Cable loss - Amplifier Gain + Duty Cycle Correction Factor *Margin= Limit - Result *The resolution bandwidth and video bandwidth of spectrum analyzer is 1 MHz and 1 kHz for average detection at frequency above 1 GHz. FYI : Duty Cycle Correction Factor (79 channel hopping) a. Time to cycle through all channels= $\Delta t = \tau$ [ms] x 79 channels = 234.788 ms, where τ = pulse width b. 100 ms/ Δt [ms] = H $\rightarrow$ Round up to next highest integer, H ' =1 c. Worst Case Dwell Time = τ [ms] x H ' = 2.972 ms d. Duty Cycle Correction = 20log (Worst Case Dwell Time/ 100ms) dB = - 30.53 dB								

10.5-3 Test Data for Bluetooth(EDR)

Test Date : 10-Jul-13

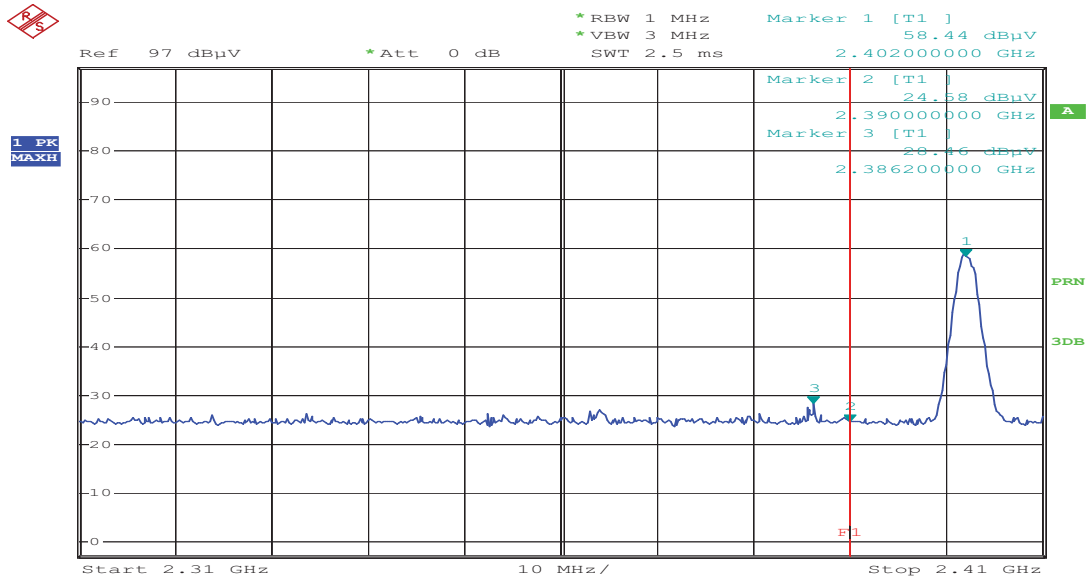
Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Duty Cycle Correction (dB)	Result Value		
				Ant Factor (dB)	Cable (dB)		Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
PEAK(RBW:1 MHz VBW:3 MHz)									
2483.50	26.96	H	1.4	27.25	5.60	0.00	74.00	59.81	-14.19
2483.50	25.24	V	1.1	27.25	5.60	0.00	74.00	58.09	-15.91
2488.10	28.01	H	1.4	27.26	5.60	0.00	74.00	60.87	-13.13
2487.90	26.88	V	1.1	27.26	5.60	0.00	74.00	59.74	-14.26
4960.00	45.84	H	1.4	31.78	-23.39	0.00	74.00	54.23	-19.77
4960.00	45.62	V	1.1	31.78	-23.39	0.00	74.00	54.01	-19.99
Average (RBW:1 MHz VBW:1 kHz)									
2483.50	21.21	H	1.4	27.25	5.60	-30.53	54.00	23.53	-30.47
2483.50	17.24	V	1.1	27.25	5.60	-30.53	54.00	19.56	-34.44
2488.10	13.10	H	1.4	27.26	5.60	-30.53	54.00	15.43	-38.57
2487.90	13.10	V	1.1	27.26	5.60	-30.53	54.00	15.43	-38.57
4960.00	33.85	H	1.4	31.78	-23.39	-30.53	54.00	11.71	-42.29
4960.00	33.75	V	1.1	31.78	-23.39	-30.53	54.00	11.61	-42.39
Remark	H : Horizontal, V : Vertical TEST MODE : Bluetooth EDR-CH78(2480 MHz)								
	*The TX signal wasn't detected from 3th harmonics.								
	*Checked in all 3 axis and the maximum measured data were reported.								
	*Result Value = Reading + Ant Factor + Cable loss - Amplifier Gain + Duty Cycle Correction Factor								
	*Margin= Limit - Result								
	*The resolution bandwidth and video bandwidth of spectrum analyzer is 1 MHz and 1 kHz for average detection at frequency above 1 GHz.								
	FYI : Duty Cycle Correction Factor (79 channel hopping)								
	a. Time to cycle through all channels= $\Delta t = \tau$ [ms] x 79 channels = 234.788 ms, where τ = pulse width								
	b. 100 ms/ Δt [ms] = H $\rightarrow$ Round up to next highest integer, H ' =1								
	c. Worst Case Dwell Time = τ [ms] x H ' = 2.972 ms								
	d. Duty Cycle Correction = 20log (Worst Case Dwell Time/ 100ms) dB = - 30.53 dB								

Band Edges(CH Low)

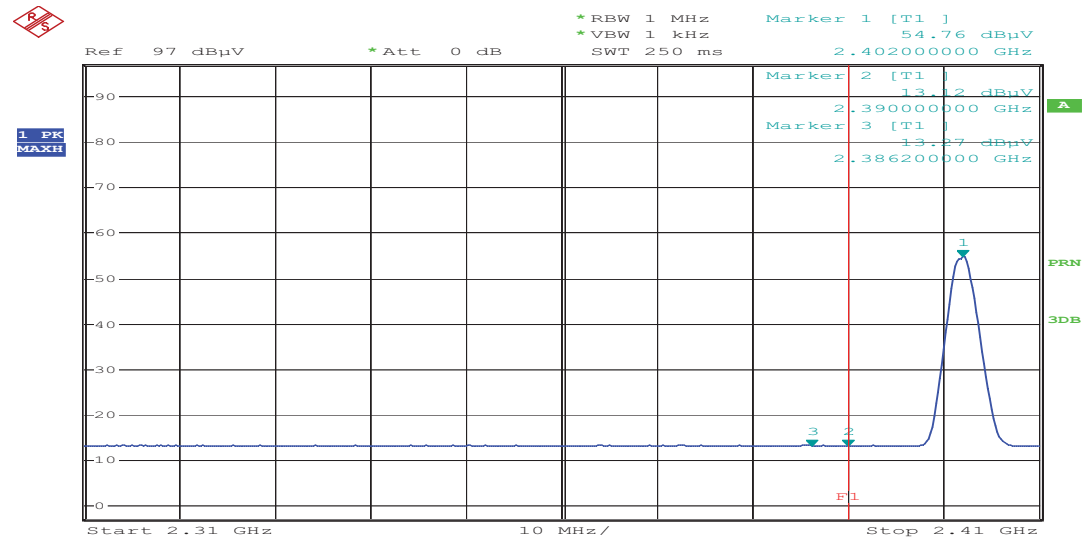
Detector mode:Peak

Polarity:Vertical



Detector mode:Average

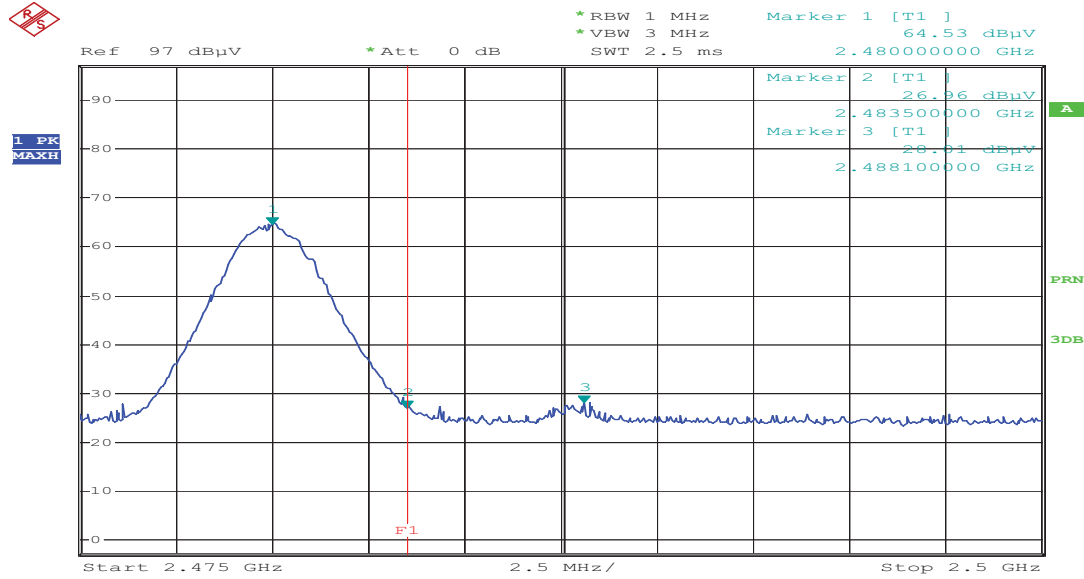
Polarity:Vertical



Band Edges(CH High)

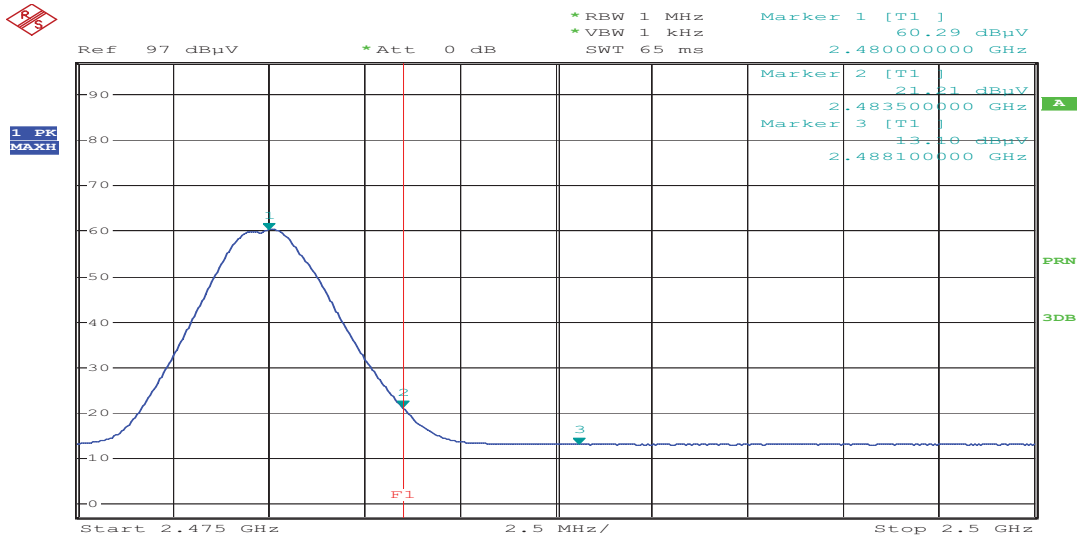
Detector mode:Peak

Polarity:Horizontal



Detector mode:Average

Polarity:Horizontal



11. Measurement of conducted disturbance

The continuous disturbance voltage of AC Mains in the frequency from 0.15 MHz to 30 MHz was measured in accordance to FCC PART 15.207 & IC RSS-Gen 7.2.2. The test setup was made according to ANSI C 63.4 (2009) in a shielded room. The EUT was placed on a non-conductive table at least 0.8 m above the ground plan. A grounded vertical reference plane was positioned in a distance of 0.4 m from the EUT. The distance from the EUT to other metal surfaces was at least 0.8 m. The EUT was only earthen by its power cord through the line impedance stabilizing network. The power cord has been bundled to a length of 1.0 m. The test receiver with Quasi Peak detector complies with CISPR 16.

11.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
TEST Receiver	ESHS 30	Rohde & Schwarz	828765/002	25-Jan-14
LISN	ENV216	Rohde & Schwarz	101231	25-Jan-14
LISN	ESH3-Z5	Rohde & Schwarz	838979/010	25-Jan-14
Pulse Limiter	ESH3Z2	Rohde & Schwarz	NONE	25-Jan-14
Bluetooth Tester	TC-3000A	TESCOM	3000A570224	23-Aug-13

11.2 Environmental Condition

Test Place : Shielded Room

BT Basic Mode

Temperature (°C) : 22.1 °C

Humidity (% R.H.) : 46.8 % R.H.

BT EDR Mode

Temperature (°C) : 22.3 °C

Humidity (% R.H.) : 47.9 % R.H.

11.3-1 Test Data for Bluetooth (Basic Rate)

Test Date : 3-Jul-13

Frequency (MHz)	Correction Factor		Line (H/N)	Quasi-peak Value			Average Value		
	Lisn (dB)	Cable (dB)		Limit (dB μ V)	Reading (dB μ V)	Result (dB μ V)	Limit (dB μ V)	Reading (dB μ V)	Result (dB)
0.16	0.13	0.17	N	65.36	48.43	48.73	55.36	32.13	32.43
0.17	0.13	0.17	H	64.96	55.79	56.09	54.96	37.19	37.49
0.20	0.13	0.16	N	63.69	45.03	45.32	53.69	29.37	29.66
0.22	0.13	0.16	H	62.86	51.79	52.08	52.86	33.75	34.04
0.26	0.13	0.16	H	61.46	48.61	48.90	51.46	31.07	31.36
0.30	0.13	0.17	H	60.13	44.88	45.17	50.13	28.39	28.68
Remark	H : Hot Line, N : Neutral Line TEST MODE : Bluetooth Basic Rate CH39(2441 MHz) *Correction Factor = Lisn + Cable *Result = Correction Factor + Reading								

11.3-2 Test Data for Bluetooth (EDR)

Test Date : 7-Jul-13

Frequency (MHz)	Correction Factor		Line (H/N)	Quasi-peak Value			Average Value		
	Lisn (dB)	Cable (dB)		Limit (dB μ V)	Reading (dB μ V)	Result (dB μ V)	Limit (dB μ V)	Reading (dB μ V)	Result (dB)
0.16	0.13	0.17	N	65.52	48.67	48.97	55.52	33.75	34.05
0.17	0.13	0.17	H	64.91	53.37	53.67	54.91	35.67	35.97
0.20	0.13	0.16	N	63.78	44.93	45.22	53.78	29.18	29.47
0.21	0.13	0.16	H	63.13	49.94	50.23	53.13	32.65	32.94
0.25	0.13	0.16	H	61.66	47.04	47.33	51.66	30.10	30.39
0.30	0.13	0.17	H	60.24	43.39	43.68	50.24	27.26	27.55
Remark	H : Hot Line, N : Neutral Line TEST MODE : Bluetooth EDR-CH39(2441 MHz) *Correction Factor = Lisn + Cable *Result = Correction Factor + Reading								

12. Photographs of test setup

12.1. Setup for Radiated Test : 30 ~ 1 000 MHz

[Front]



[Rear]



12.2. Setup for Radiated Test :Above 1 000 MHz

[Front]



[Rear]

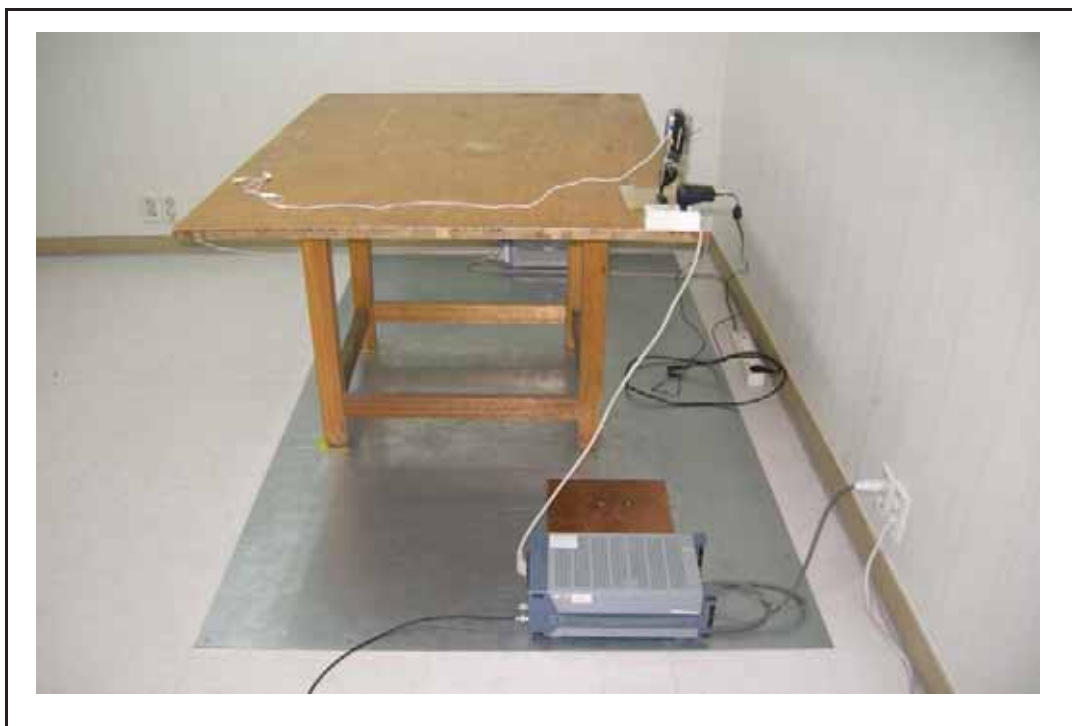


12.3. Setup for Conducted Test : 0.15 ~ 30 MHz

[Front]



[Rear]



12.4. Photographs of EUT

[Front]



[Rear]



Appendix 1. Special diagram for Bluetooth (Basic Rate)

Bluetooth – CH 39

*HOT

ES TECH

03 Jul 2013 09:40

HOT

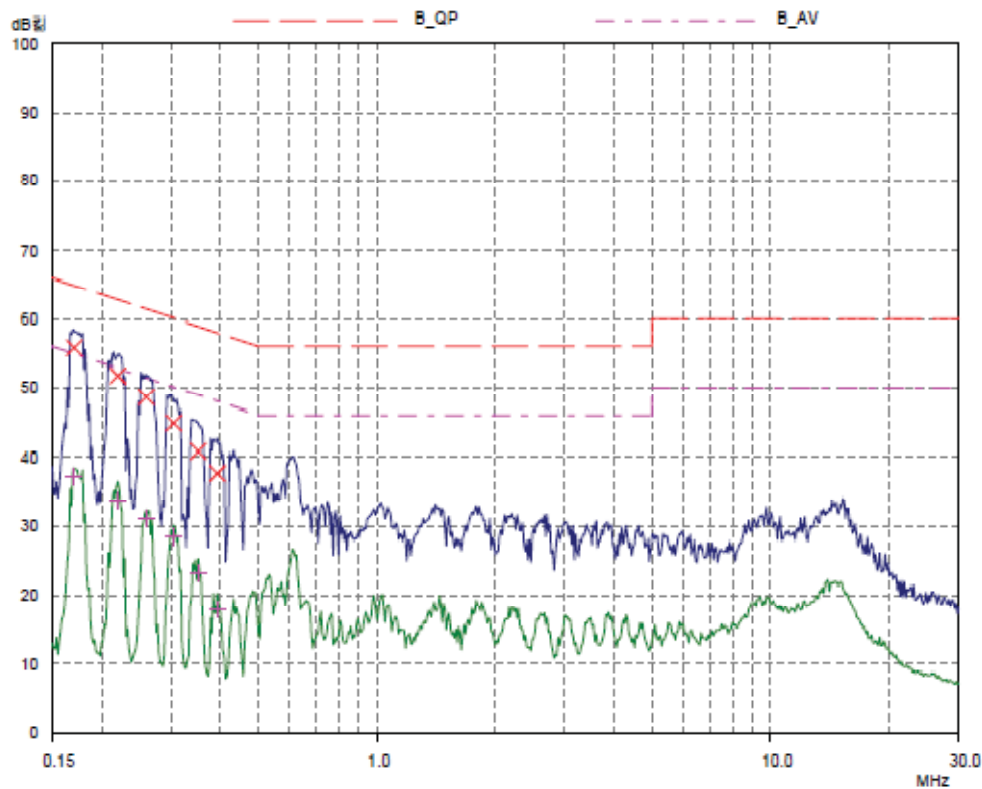
EUT: Dolphin 6110
Manuf:
Op Cond: 120 V.a. c.
Operator: Engineer S.D.Hong
Test Spec: CLASS B
Comment: Bluetooth BR Mode

Result File: 130802_h.dat :

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	0.8%	10kHz	PK+AV	10msec	Auto	OFF	60dB

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Subranges: 25
Acc Margin: 0 dB



Special diagram for Bluetooth (Basic Rate)

Bluetooth – CH 39

*NEUTRAL

ES TECH

03 Jul 2013 09:50

NEUTRAL

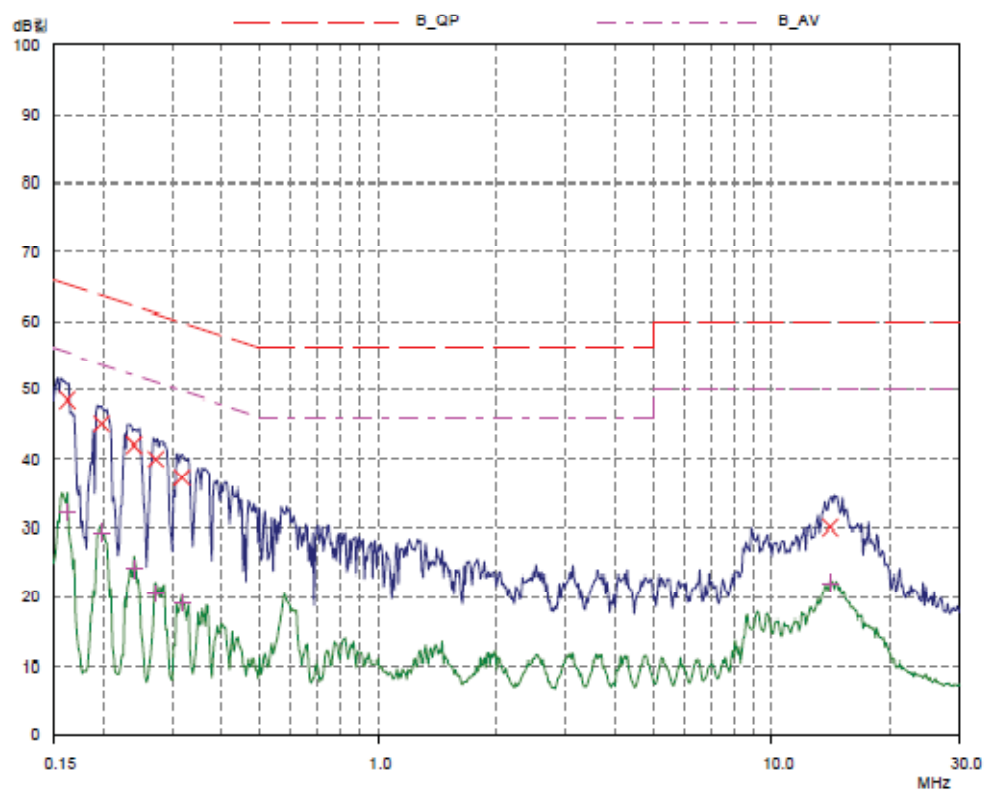
EUT: Dolphin 6110
Manuf:
Op Cond: 120 Va. c.
Operator: Engineer S.D.Hong
Test Spec: CLASS B
Comment: Bluetooth BR Mode

Result File: 130802_n.dat :

Scan Settings (1 Range)

Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	0.6%	10kHz	PK+AV	10msec	Auto	OFF	60dB

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Subranges: 25
Acc Margin: 0 dB



Special diagram for Bluetooth EDR

Bluetooth – CH 39

*HOT

ES TECH

07 Jul 2013 11:30

HOT

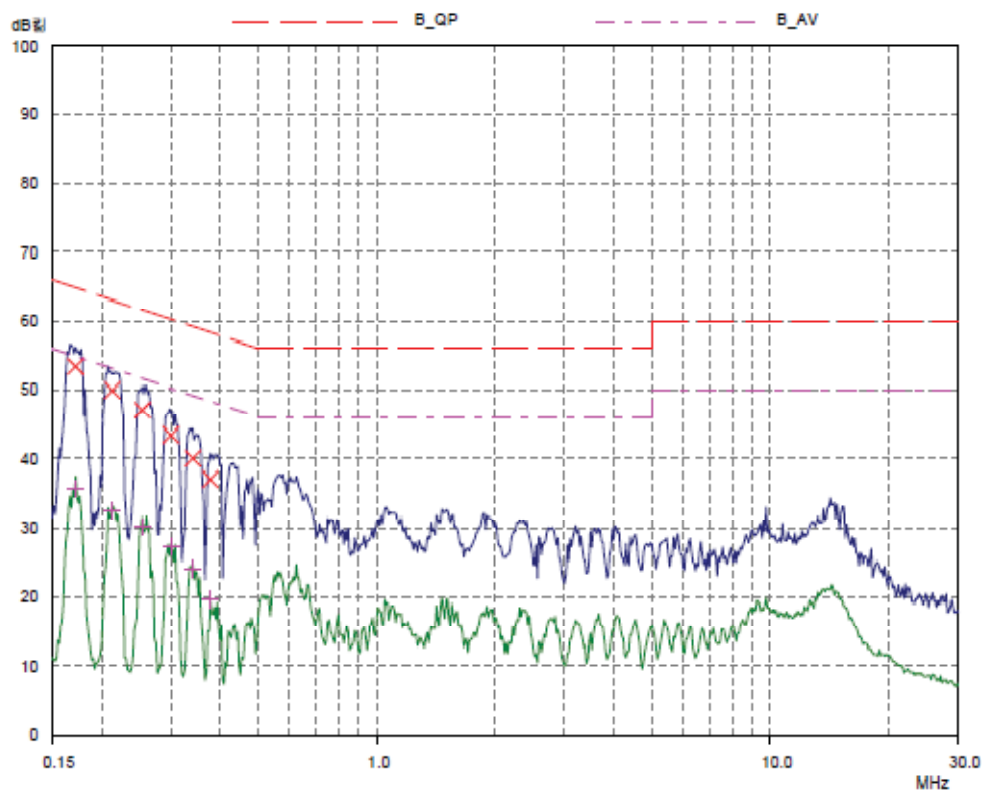
EUT: Dolphin 6110
Manuf:
Op Cond: 120 Va. c.
Operator: Engineer S.D.Hong
Test Spec: CLASS B
Comment: Bluetooth EDR Mode

Result File: 130803_h.dat :

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	0.8%	10kHz	PK+AV	10msec	Auto	OFF	60dB

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Subranges: 25
Acc Margin: 0 dB



Special diagram for Bluetooth EDR

Bluetooth – CH 39

*NEUTRAL

ES TECH
NEUTRAL

07 Jul 2013 11:38

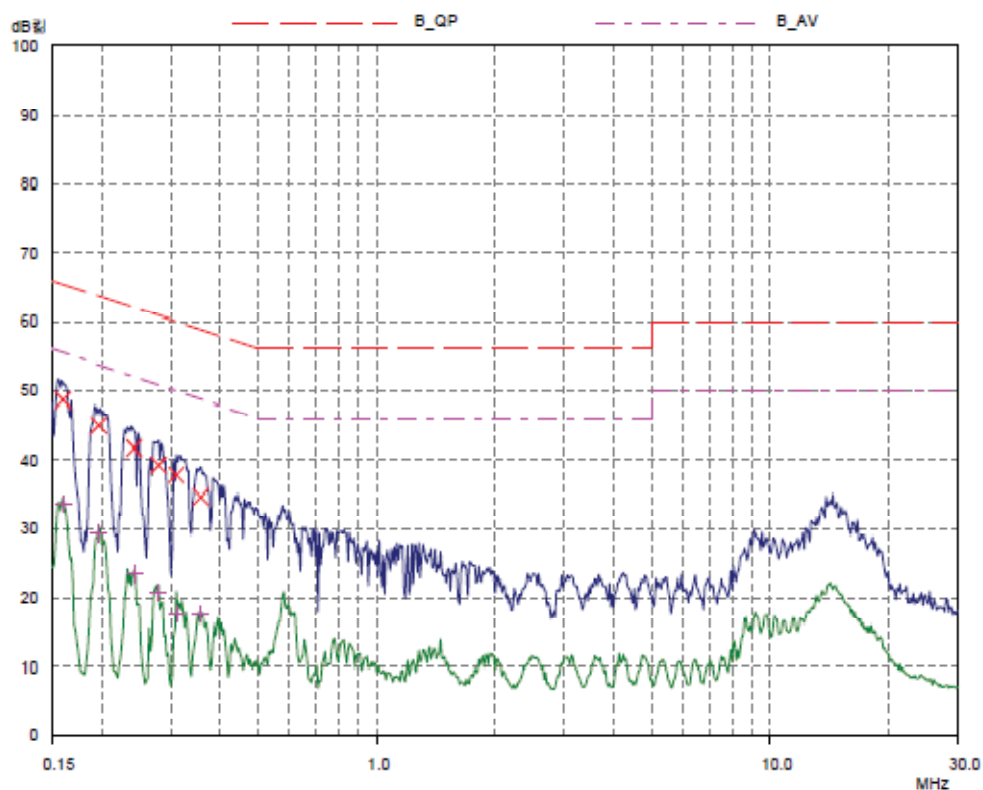
EUT: Dolphin 5110
Manuf:
Op Cond: 120 Va. c.
Operator: Engineer S.D.Hong
Test Spec: CLASS B
Comment: Bluetooth EDR Mode

Result File: 130803_n.dat :

Scan Settings (1 Range)

Frequencies			Receiver Settings						
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge	
150kHz	30MHz	0.8%	10kHz	PK+AV	10msec	Auto	OFF	60dB	

Final Measurement: Detectors: X QP / + AV
Meas Time: 1sec
Subranges: 25
Acc Margin: 0 dB



Appendix 2. Antenna Requirement

1. Antenna Requirement

1.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.24

1.2 Antenna Connected Construction

The antenna types used in this product are Intergrated Sandwich antenna . The maximum Gain of this antenna is 1.75 dBi.