FCC Test Report

Report No.: AGC018110201-3F2

FCC ID	:	WXO-FATDOCKBLU
PRODUCT DESIGNATION	:	FATDOCK BLU
BRAND NAME	:	FATMAN
TEST MODEL	:	FATDOCK BLU
CLIENT	:	TL AUDIO LIMITED
DATE OF ISSUE	:	Feb.22, 2011
STANDARD(S)	:	FCC Part 15 Rules

Attestation of ***G***lobal ***C***ompliance Co., Ltd.

VERIFICATION OF COMPLIANCE

Applicant	TL AUDIO LIMITED
	Unit 2 Iceni Court, Ickneild Way，Letchworth Garden, Hertfordshire， United Kingdom
Manufacturer	Shen Zhen WeiChengDa Industr Co., LTD
	FA16 HONG TIAN INDUSTRIL DISTRICT SHA JING STREET BAO AN COUNTY SHENZHEN GUANGDONG CHINA
Product Designation	FATDOCK BLU
Brand Name	FATMAN
Model Name	FATDOCK BLU
FCC ID	WXO-FATDOCKBLU
Report Number	AGC018110201-3F2
Date of Test	Feb.16, 2011 to Feb.23, 2011

WE HEREBY CERTIFY THAT:

The above equipment was tested by Attestation of Global Compliance Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rules Part 15.247.

Checked By: Mary Liu

Mary Liu Feb.23, 2011

Authorized By

King Zhang Feb.23, 2011

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

The EUT is designed as an “Communication Device”. It is designed by way of utilizing the FHSS technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	2.402 GHz to 2.480GHz
Rated Output Power	Bluetooth (1Mbps) -5.0dBm Bluetooth EDR (2Mbps) -4.85dBm Bluetooth EDR(3Mbps) -4.76 dBm
Modulation	GFSK, π /4-DQPSK, 8-DPSK
Number of channels	79
Antenna Designation	Integrated Antenna
Antenna Gain	1.02dBi
Rating Voltage:	DC 6V by Adapter
Adapter	INPUT: AC100-240V, 50-60Hz OUTPUT: DC6.0V/1.5A

1.2 TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
2400~2483.5MHZ	0	2402MHZ
	1	2403MHZ
	:	:
	38	2440 MHZ
	39	2441 MHZ
	40	2442 MHZ
	:	:
	77	2479 MHZ
	78	2480 MHZ

1.3 RECEIVER INPUT BANDWIDTH

The input bandwidth of the receiver is 1MHZ,In every connection one Bluetooth device is the master and the other one is slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally the type of connection(e.g. single of multislot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also the slave of the connection will use these settings.
Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

1.4 EXAMPLE OF A HOPPING SEQUENCY IN DATA MODE

Example of a 79 hopping sequence in data mode:
40,21,44,23,42,53,46,55,48,33,52,35,50,65,54,67
56,37,60,39,58,69,62,71,64,25,68,27,66,57,70,59
72,29,76,31,74,61,78,63,01,41,05,43,03,73,07,75
09,45,13,47,11,77,15,00,64,49,66,53,68,02,70,06
01,51,03,55,05,04

1.5 EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR

The generation of the hopping sequence in connection mode depends essentially on two input values:
1 LAP/UAP of the master of the connection
2 Internal master clock
The LAP(lower address part) are the 24 LSB's of the 48 BD_ADDRESS. The BD_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP(upper address part) are the 24MSB's of the 48BD_ADDRESS
The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and Is never turned off. For synchronisation with other units only offset are used. It has no relation to the time Of the day. Its resolution is at least half the RX/TX slot length of 312.5us.The clock has a cycle of about One day(23h30).In most case it is implemented as 28 bit counter. For the deriving of the hopping sequence the entire.
LAP(24 bits),4LSB's(4bits)(Input 1) and the 27MSB's of the clock(Input 2) are used. With this input values different mathematical procedures(permutations, additions, XOR-operations)are performed to generate te Sequence. This will be done at the beginning of every new transmission.
Regarding short transmissions the Bluetooth system has the following behaviour:
The first connection between the two devices is established, a hopping sequence was generated. For Transmitting the wanted data the complete hopping sequence was not used. The connection ended.
The second connection will be established. A new hopping sequence is generated. Due to the fact the Bluetooth clock has a different value, because the period between the two transmission is longer(and it Cannot be shorter)than the minimum resolution of the clock(312.5us).The hopping sequence will always Differ from the first one.

1.6 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for FCC ID: WXO-FATDOCKBLU filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

1.7 TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

1.8 TEST FACILITY

All measurement facilities used to collect the measurement data are located at
Attestation of Global Compliance Co., Ltd.
1F., No.2 Building, Huafeng No.1 Technical Industrial Park, Sanwei, Xixiang, Baoan District, Shenzhen
The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003.
FCC register No.: 259865

1.9 SPECIAL ACCESSORIES

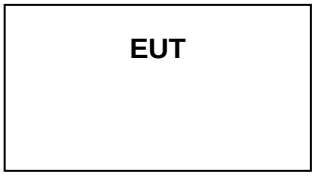
Not available for this EUT intended for grant.

1.10 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

2. SYSTEM TEST CONFIGURATION

2.1 CONFIGURATION OF TESTED SYSTEM



2.2 EQUIPMENT USED IN TESTED SYSTEM

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID
1	FATDOCK BLU	FATMAN	FATDOCK BLU	WXO-FATDOCKBLU

3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.207	Conduction Emission	Compliant
§15.209	Radiated Emission	Compliant
§15.247	Maximum Output Power	Compliant
§15.247	20 dB Bandwidth	Compliant
§15.247	Band Edges	Compliant
§15.247	Spurious Emission	Compliant
§15.247	Frequency Separation	Compliant
§15.247	Number of Hopping Frequency	Compliant
§15.247	Time of Occupancy	Compliant

4. DESCRIPTION OF TEST MODES

1. The EUT has been set to operate continuously on the lowest, middle and highest operation frequency individually.
2. The EUT stays in continuous transmitting mode on the operation frequency being set.

5 MAXIMUM OUTPUT POWER

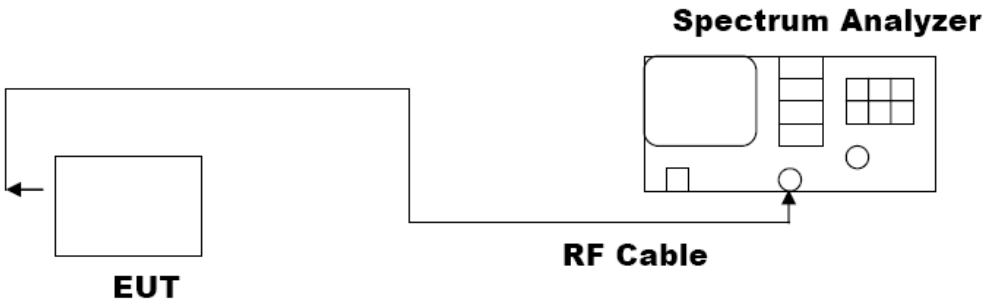
5.1 MEASUREMENT PROCEDURE

CONDUCTED METHOD
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
4. Set SPA Centre Frequency = Operation Frequency, RBW= 3 MHz,
   VBW= 3 MHz.
5. Set SPA Trace 1 Max hold, then View.

RADIATED METHOD
According to ANSI C63.4:2003

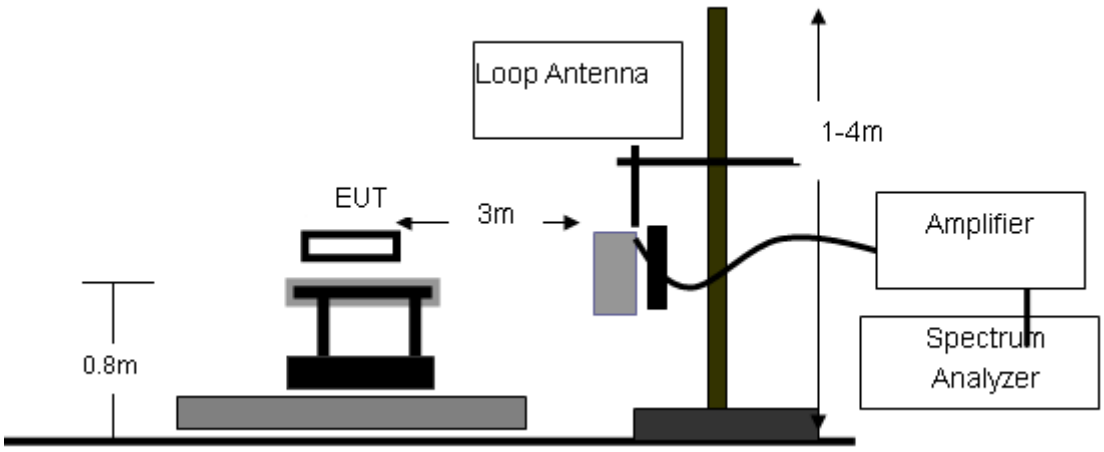
5.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

CONDUCTED METHOD

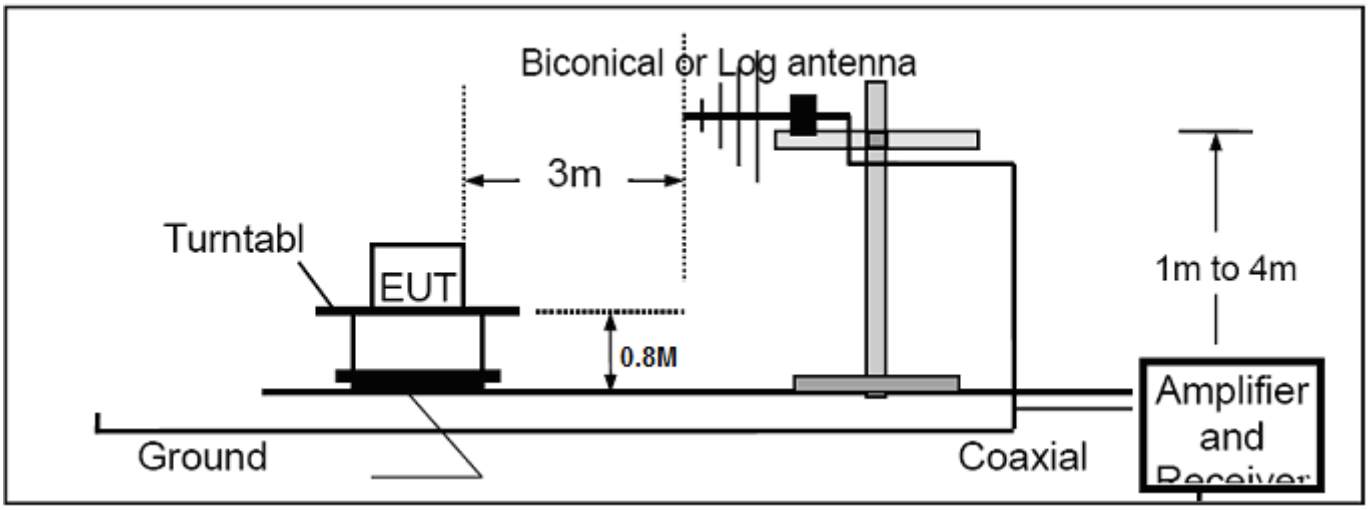


RADIATED EMISSION TEST SETUP

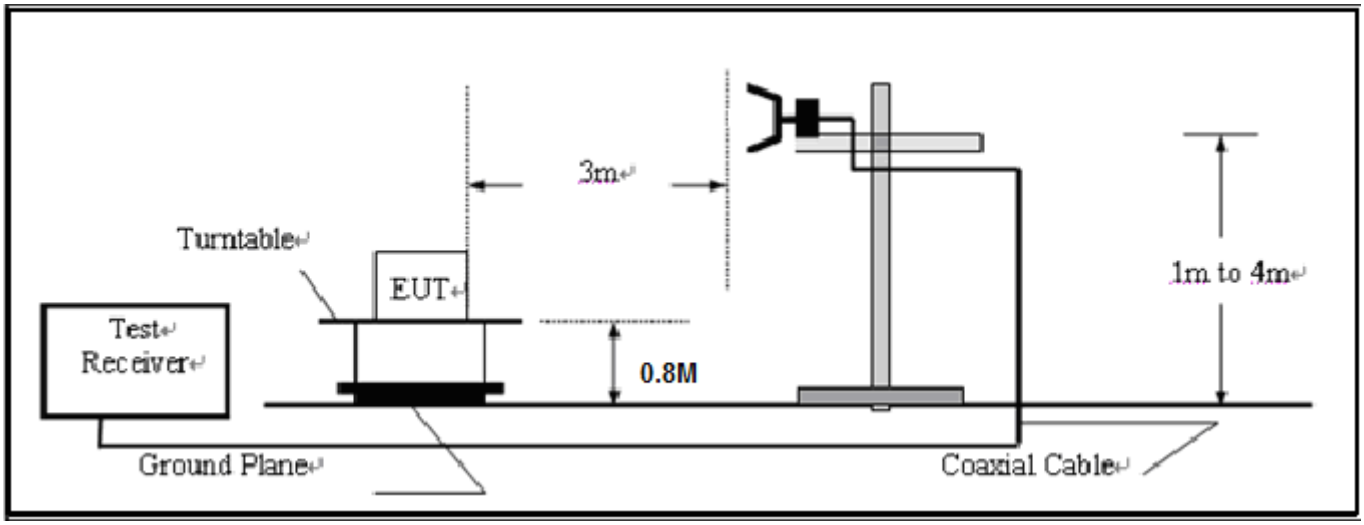
RADIATED EMISSION TEST SETUP BELOW 30MHz



RADIATED MISSION TEST SETUP 30MHz-1000MHz

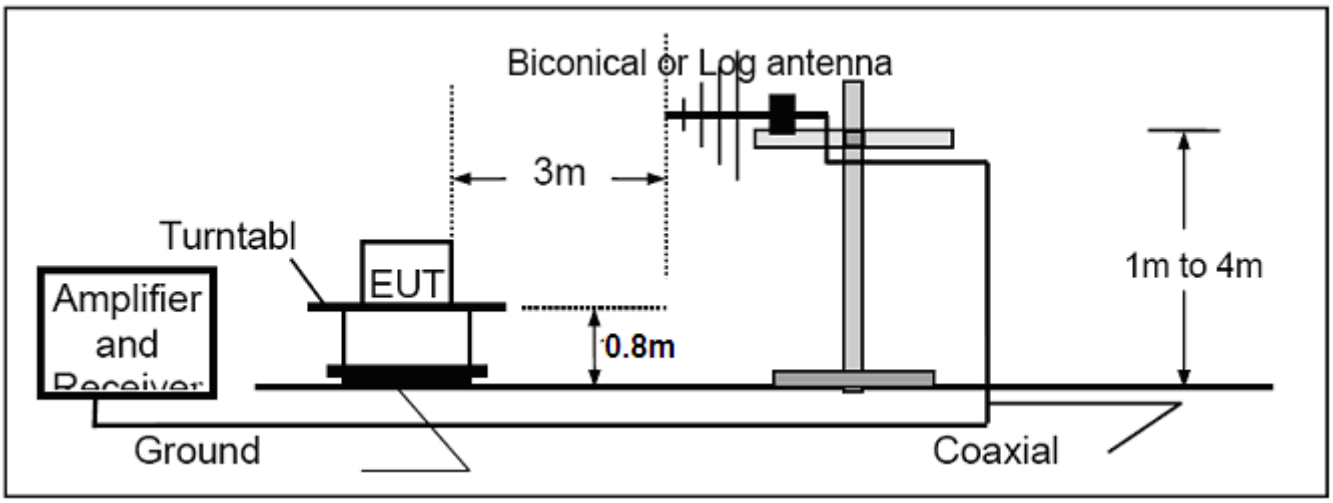


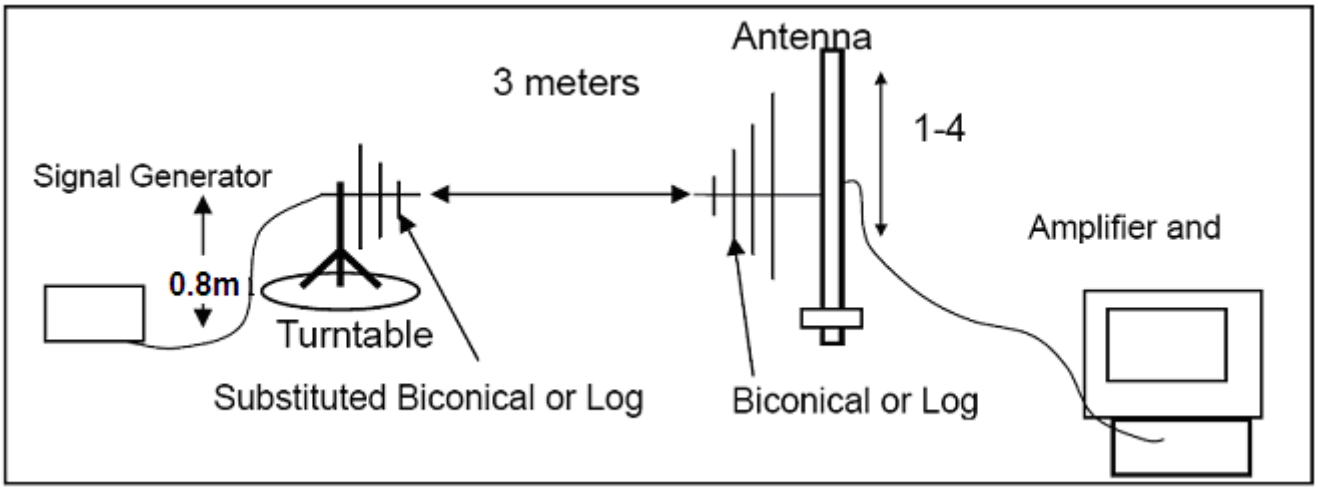
RADIATED MISSION TEST SETUP ABOVE 1000MHz



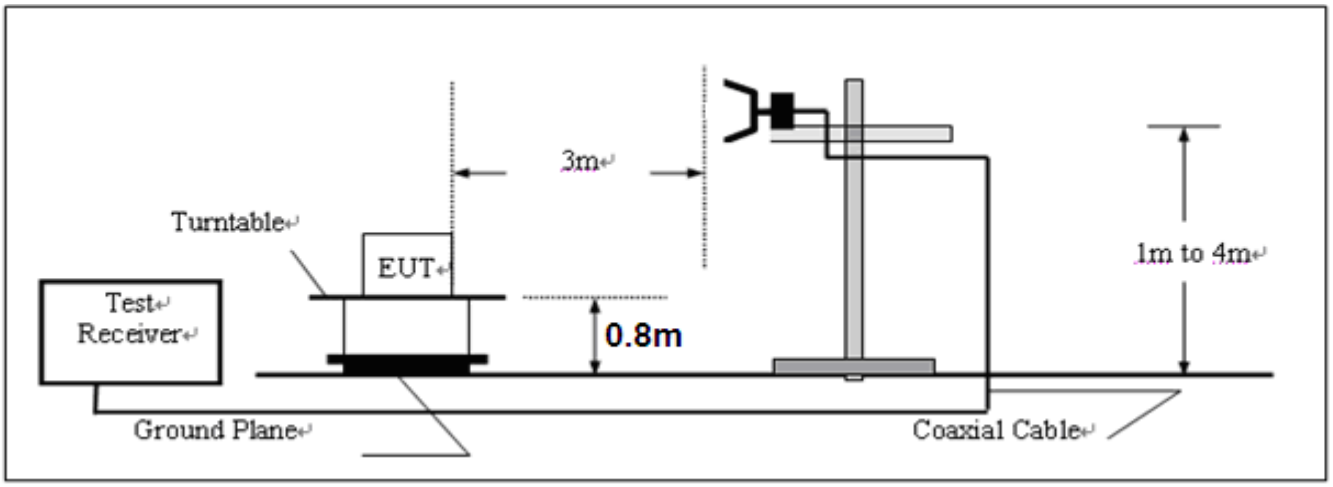
EIRP TEST SETUP

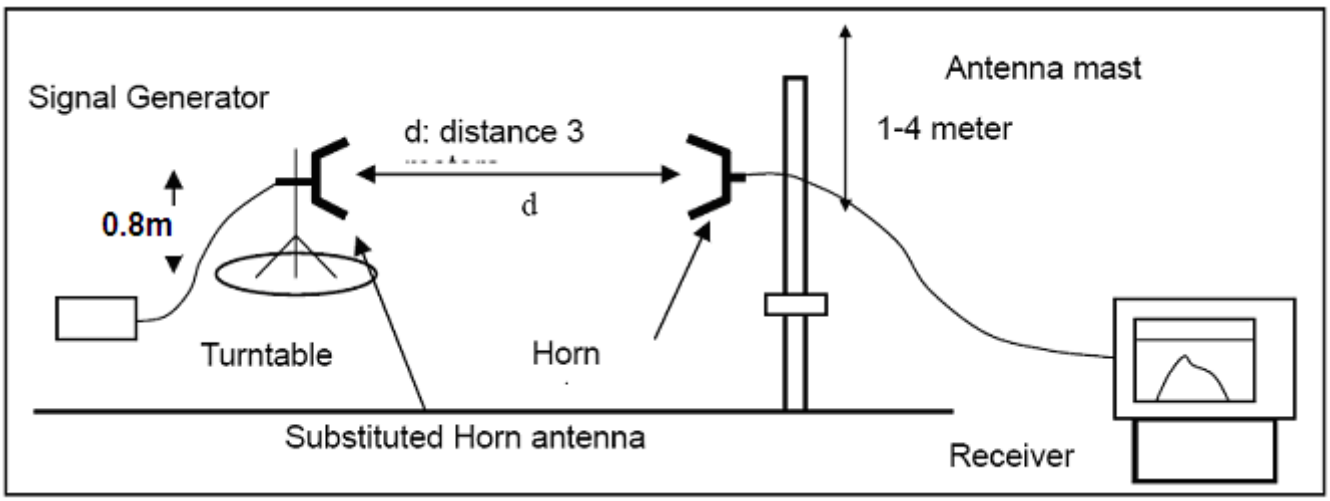
TEST SETUP BELOW 1GHZ





TEST SETUP ABOVE 1GHZ





5.3 MEASUREMENT EQUIPMENT USED

Description	Manufacturer	Model	SERIAL NUMBER	Cal. Date	Cal. Due
Spectrum Analyzer	Agilent	E4440A	N/A	06/29/2010	06/28/2011
Amplifier	EM	EM30180	0607030	06/29/2010	06/28/2011
Horn Antenna	EM	EM-AH-10180	N/A	06/29/2010	06/28/2011
EMI Test Receiver	Rohde & Schwarz	ESCI	N/A	06/29/2010	06/28/2011
Amplifier	EM	EM30180	N/A	06/29/2010	06/28/2011
Bilogical Antenna	A.H. Systems Inc.	SAS-521-4	N/A	06/29/2010	06/28/2011
Loop Antenna	Daze	ZN30900N	SEL0097	06/29/2010	06/28/2011
Isolation Transformer	LETEAC	LTBK	--	06/08/2010	06/07/2011

5.4 LIMITS AND MEASUREMENT RESULT

BLUETOOTH 1MBPS LIMITS AND MEASUREMENT RESULT				
Applicable Limits	Frequency	Measurement Result		
		EIRP (dBm)	Conducted (dBm)	Criteria
30 dBm	2.402GHz	-4.53	-4.97	PASS
30 dBm	2.441GHz	-4.62	-5.07	PASS
30 dBm	2.480GHz	-4.58	-4.88	PASS

BLUETOOTH 2MBPS LIMITS AND MEASUREMENT RESULT				
Applicable Limits	Frequency	Measurement Result		
		EIRP (dBm)	Conducted (dBm)	Criteria
30 dBm	2.402GHz	-4.46	-4.75	PASS
30 dBm	2.441GHz	-4.62	-4.79	PASS
30 dBm	2.480GHz	-4.47	-4.86	PASS

BLUETOOTH 3MBPS LIMITS AND MEASUREMENT RESULT				
Applicable Limits	Frequency	Measurement Result		
		EIRP (dBm)	Conducted (dBm)	Criteria
30 dBm	2.402GHz	-4.45	-4.80	PASS
30 dBm	2.441GHz	-4.37	-4.76	PASS
30 dBm	2.480GHz	-4.40	-4.62	PASS

6 20 DB BANDWIDTH

6.1 MEASUREMENT PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
3, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Centre Frequency = Operation Frequency, RBW= 100 KHz,
   VBW= 100 KHz.
4. Set SPA Trace 1 Max hold, then View.

6.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The Same as described in Section 5.2

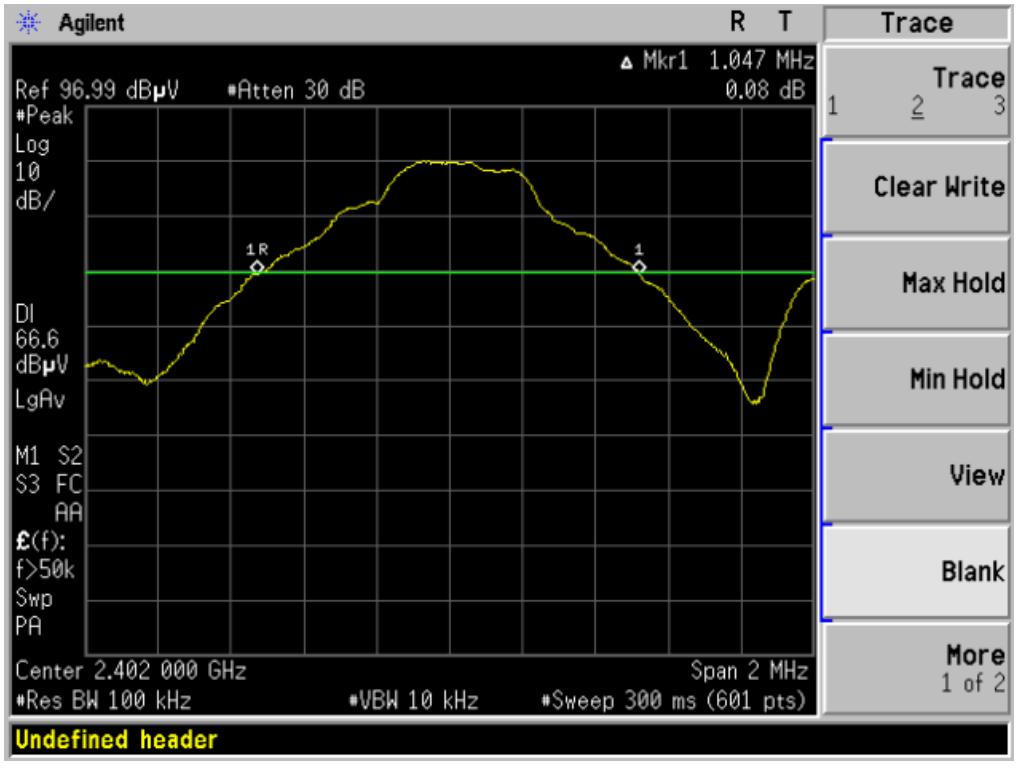
6.3 MEASUREMENT EQUIPMENT USED

The same as described in Section 5.3

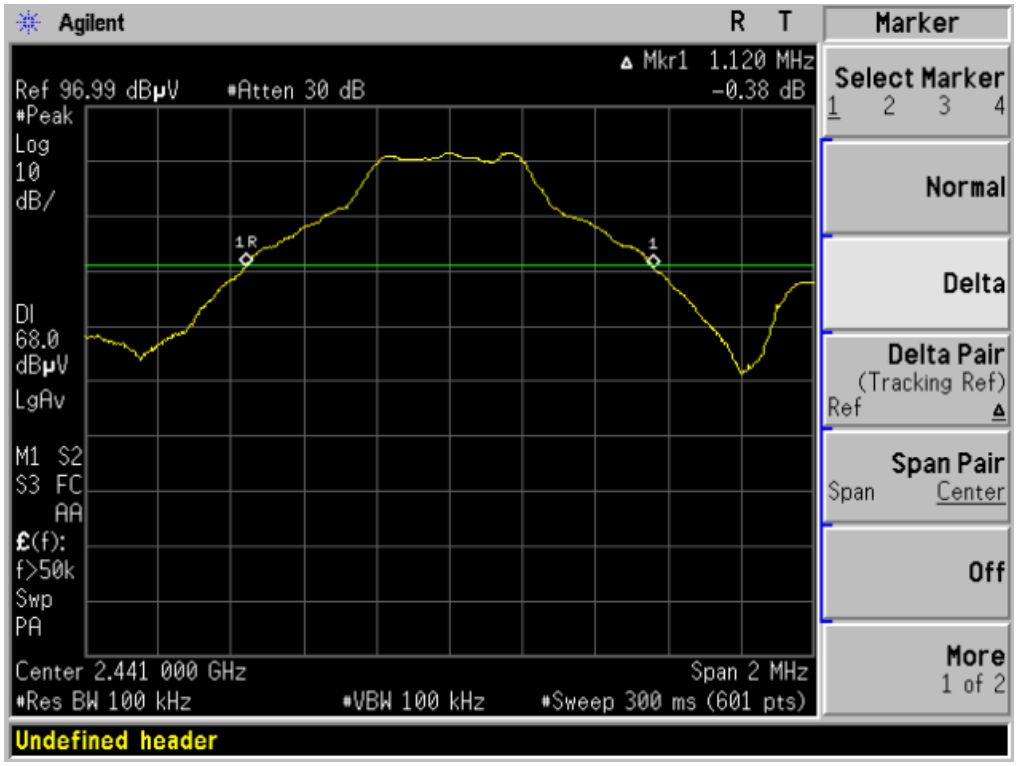
6.4 LIMITS AND MEASUREMENT RESULTS

BLUETOOTH 1MBPS LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Measurement Result		
	Test Data (MHz)		Criteria
--	Low Channel	1.047	PASS
	Middle Channel	1.120	PASS
	High Channel	1.103	PASS

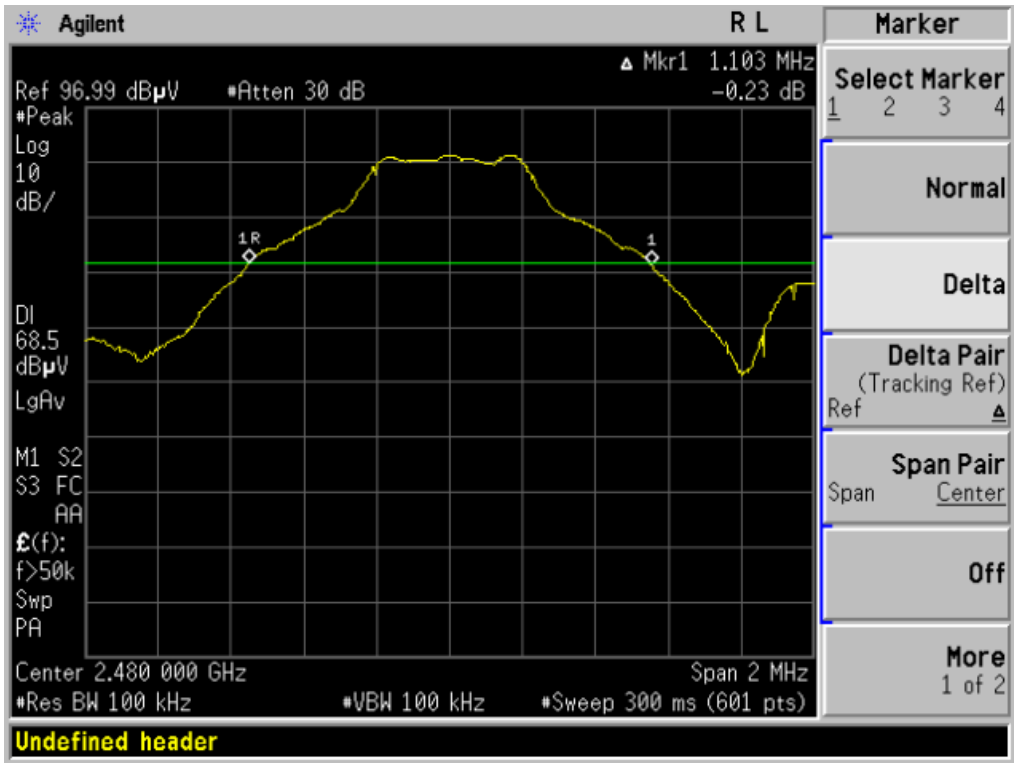
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

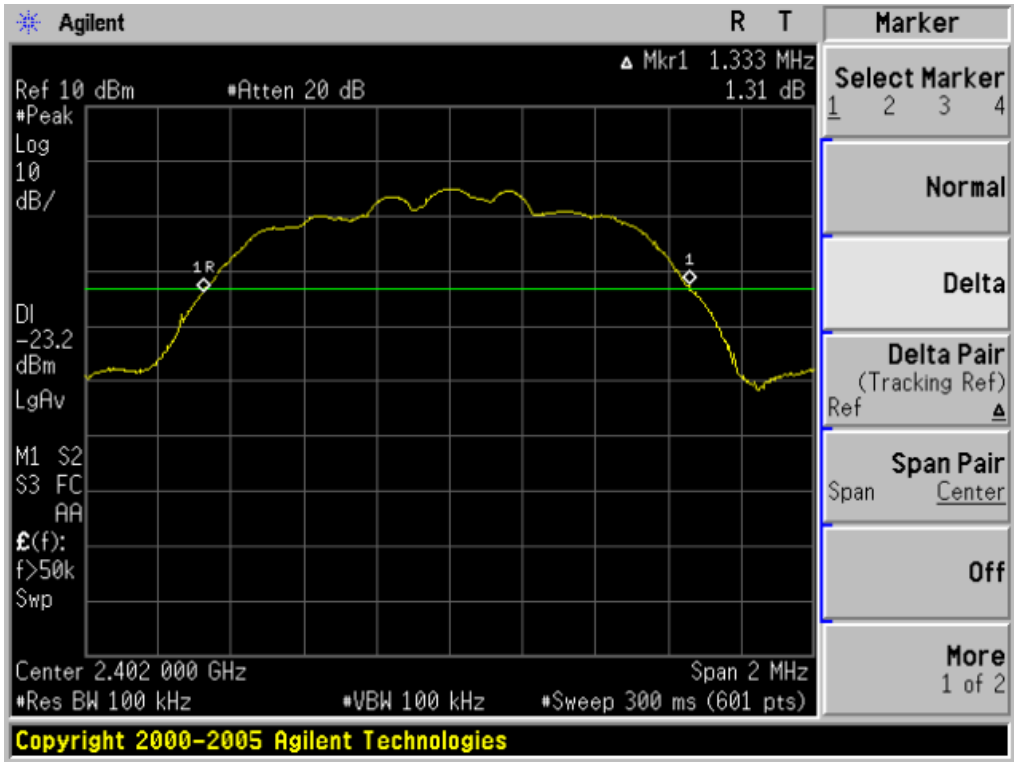


TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

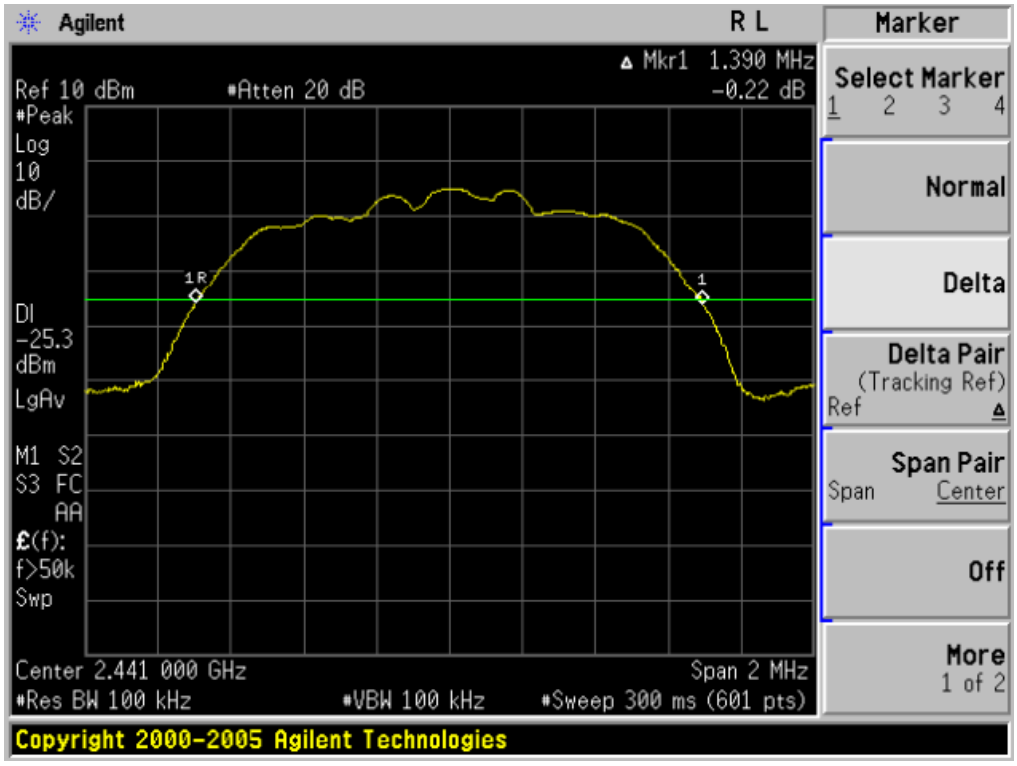


BLUETOOTH 2MBPS LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Measurement Result		
	Test Data (MHz)		Criteria
--	Low Channel	1.333	PASS
	Middle Channel	1.390	PASS
	High Channel	1.383	PASS

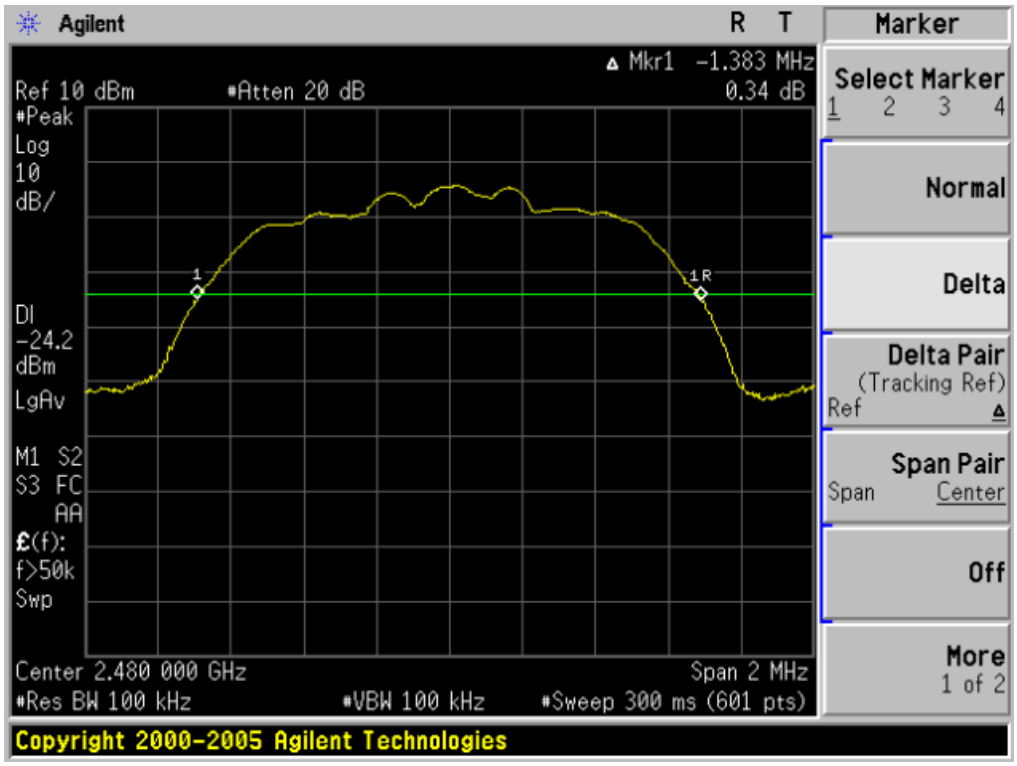
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

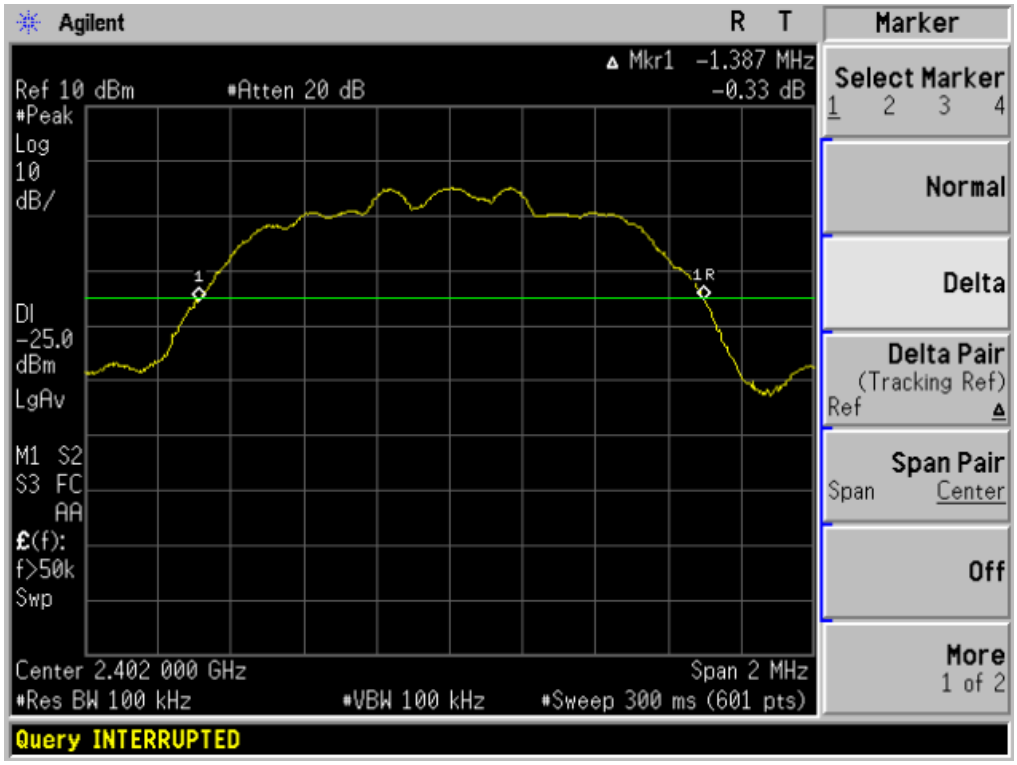


TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

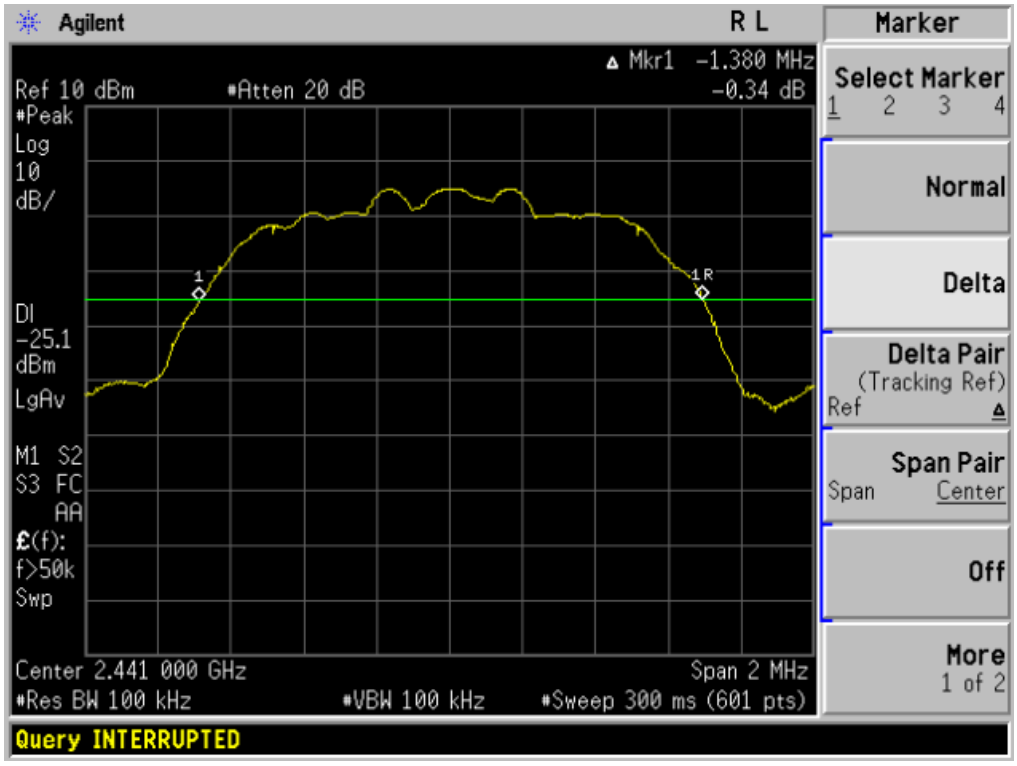


BLUETOOTH 3MBPS LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Measurement Result		
	Test Data (MHz)		Criteria
--	Low Channel	1.387	PASS
	Middle Channel	1.380	PASS
	High Channel	1.383	PASS

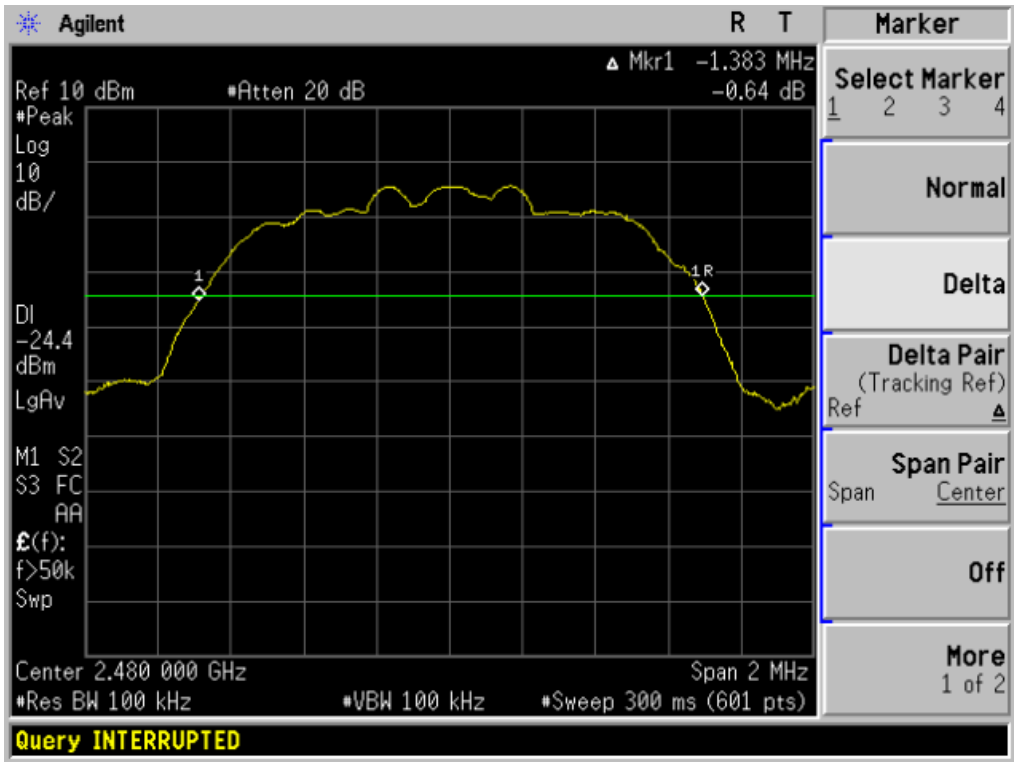
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

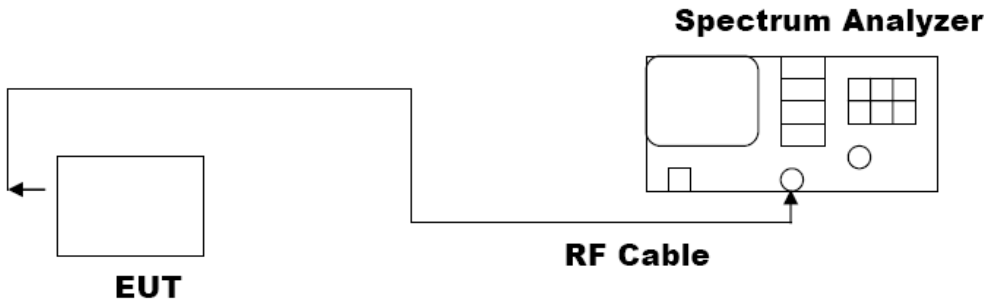


7. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY (N/A)

7.1 MEASUREMENT PROCEDURE

(1). The EUT was placed on a turn table which is 0.8m above ground plane.
(2). Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
(3), Set the EUT Work on the top, the middle and the bottom operation frequency individually.
(4). Set SPA Centre Frequency = Operation Frequency, RBW= 3 KHz,
VBW= 10 KHz., Sweep time= Auto
(5). Set SPA Trace 1 Max hold, then View.

7.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



7.3 MEASUREMENT EQUIPMENT USED

SHIELDING ROOM					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4440A	N/A	06/29/2010	06/28/2011

7.4 LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Measurement Result		
	Test Data (dBm/3KHz)		Criteria
8 dBm / 3KHz	Low Channel	--	--
	Middle Channel	--	--
	High Channel	--	--

8. OUT OF BAND EMISSION

8.1 MEASUREMENT PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
3, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Centre Frequency = Operation Frequency, RBW= 100 KHz, VBW= 100 KHz.
4. Set SPA Trace 1 Max hold, then View.

8.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The Same as described in section 5.2

1. Conducted test setup
2. Radiated Emission test Setup below 1GHz and Above 1GHz

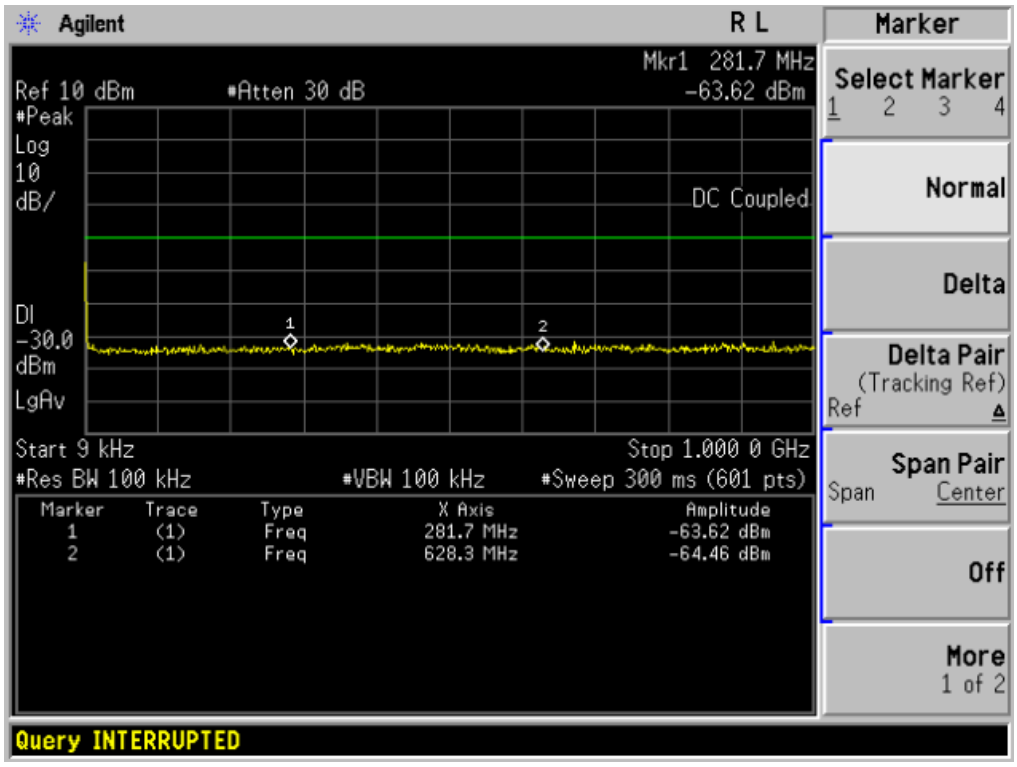
8.3 MEASUREMENT EQUIPMENT USED

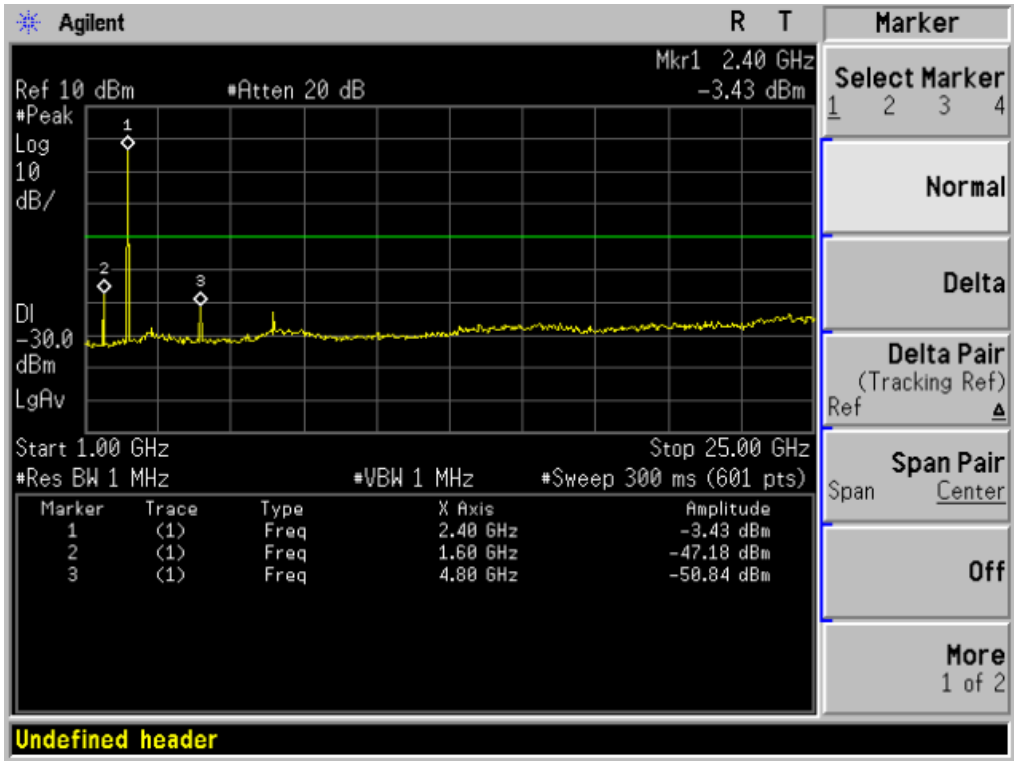
The Same as described in section 5.3

8.4 LIMITS AND MEASUREMENT RESULT

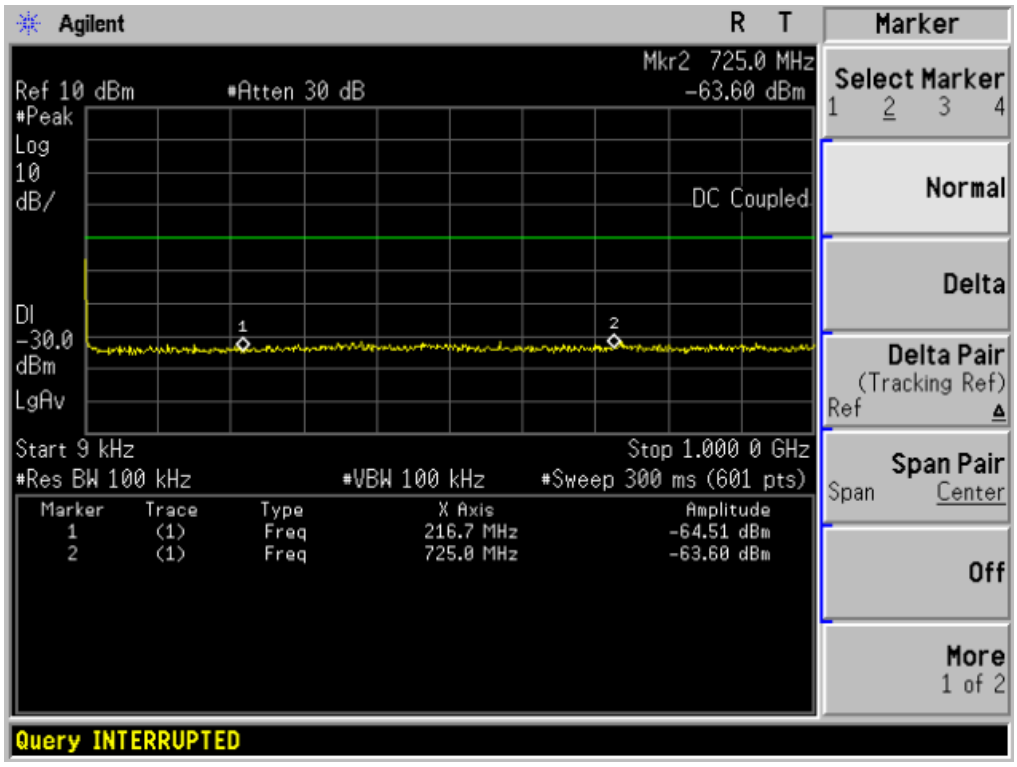
LIMITS AND MEASUREMENT RESULT		
Applicable Limits	Measurement Result	
	Test Data	Criteria
In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power.	At least -20dBc than the limit Specified on the BOTTOM Channel	PASS
In addition, radiation emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in§15.209(a))	At least -20dBc than the limit Specified on the TOP Channel	PASS

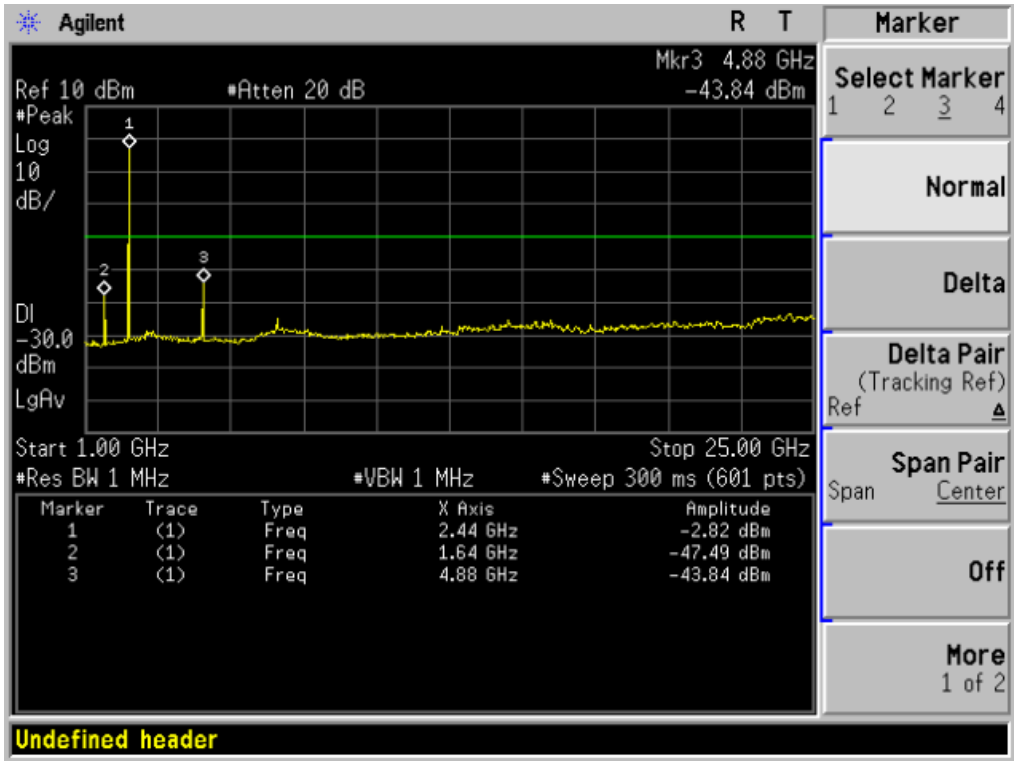
TEST PLOT OF OUT OF BAND EMISSIONS FOR LOW CHANNEL(1Mbps)



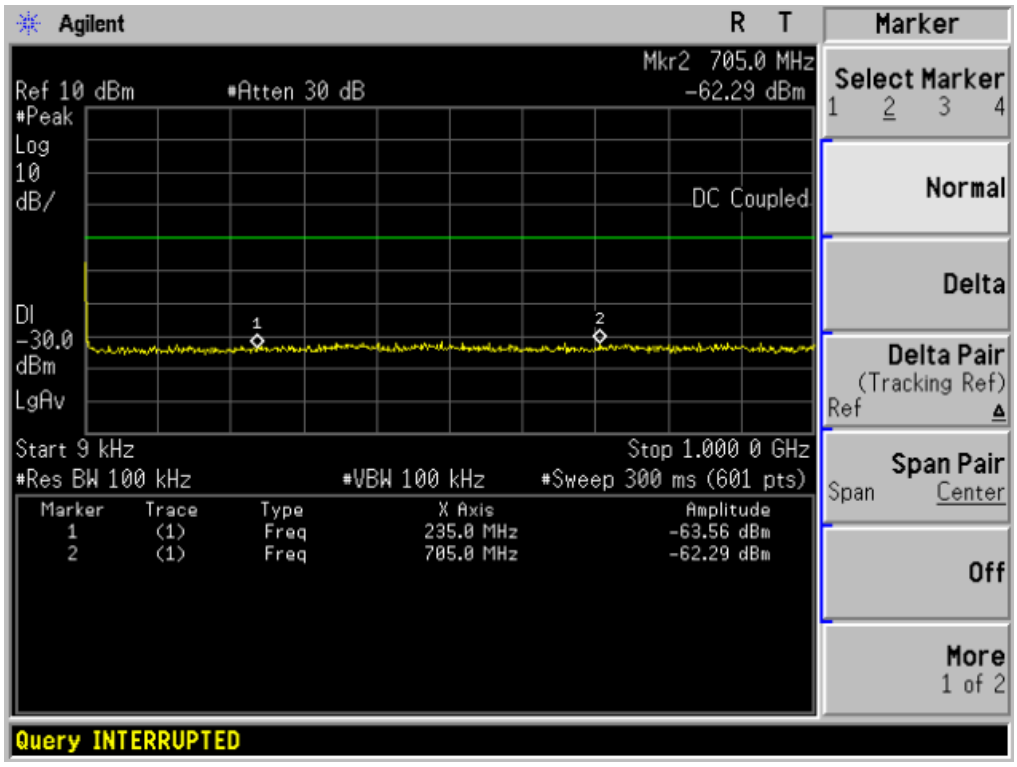


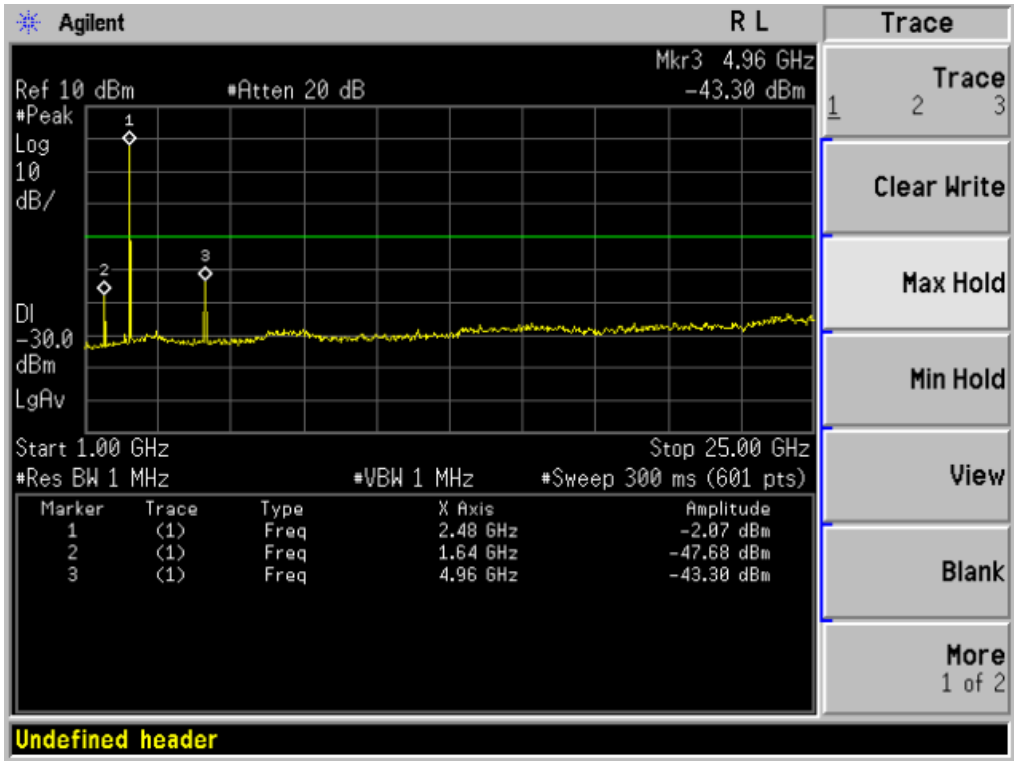
TEST PLOT OF OUT OF BAND EMISSIONS FOR MIDDLE CHANNEL (1Mbps)



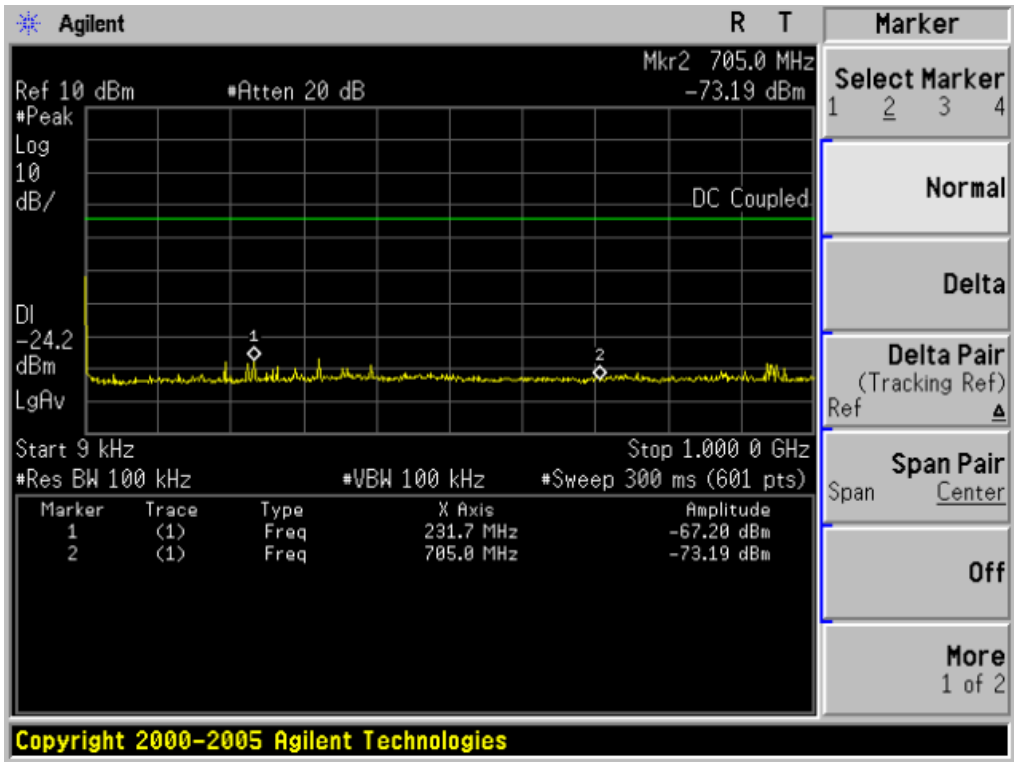


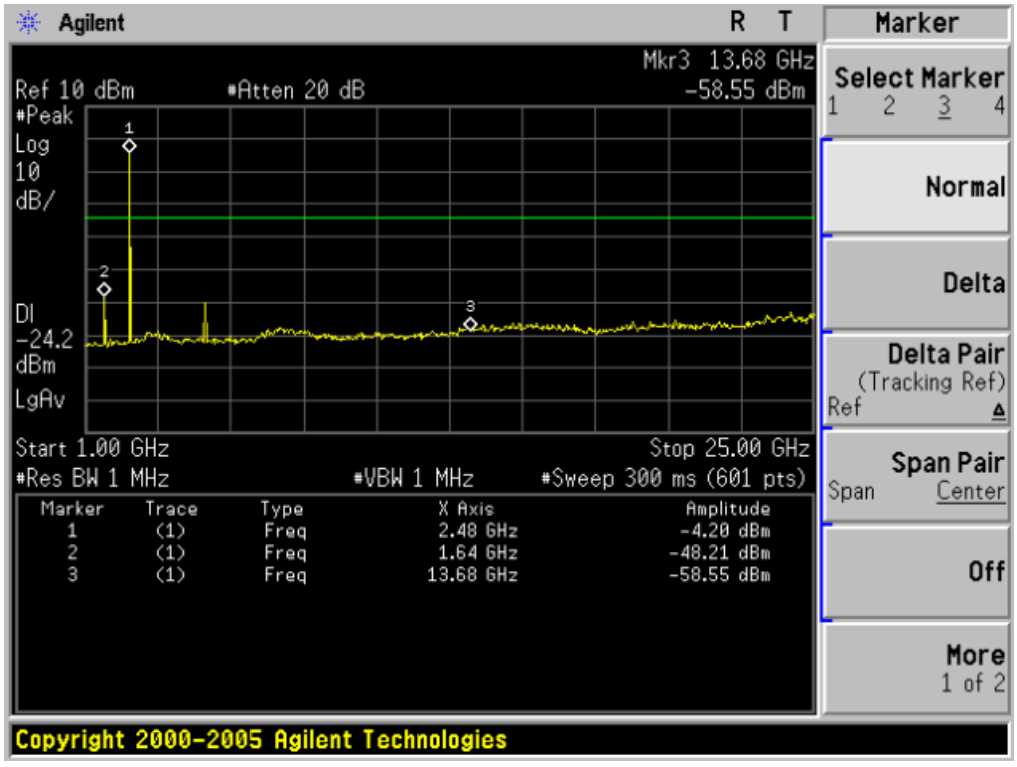
TEST PLOT OF OUT OF BAND EMISSIONS FOR HIGH CHANNEL(1Mbps)



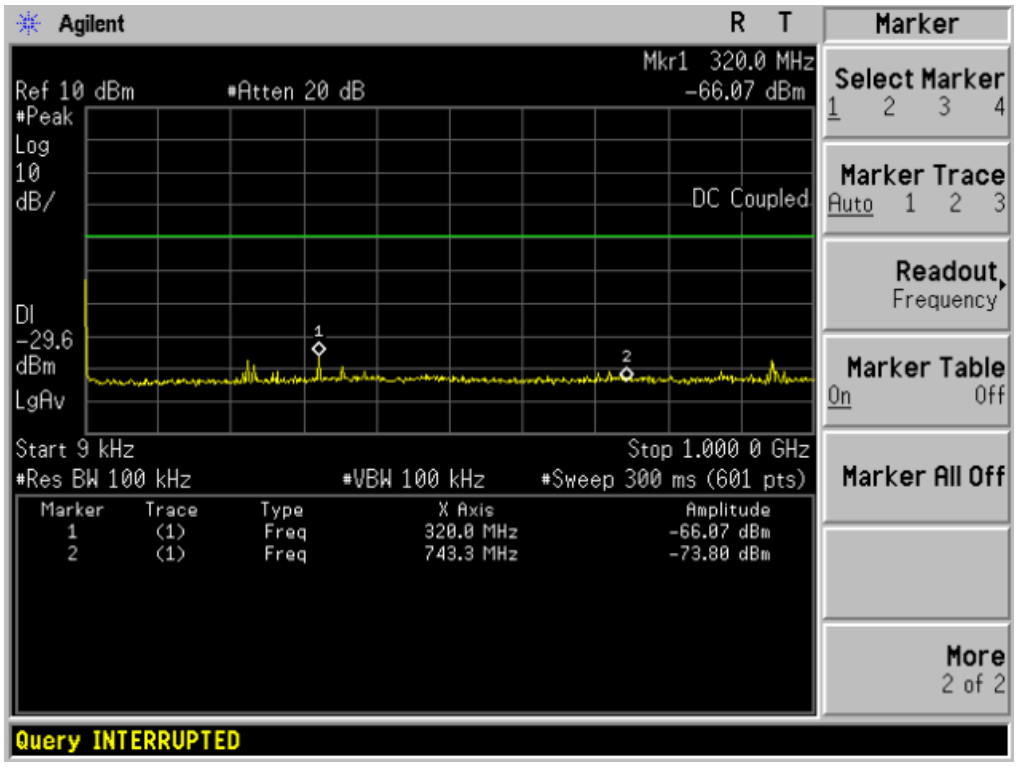


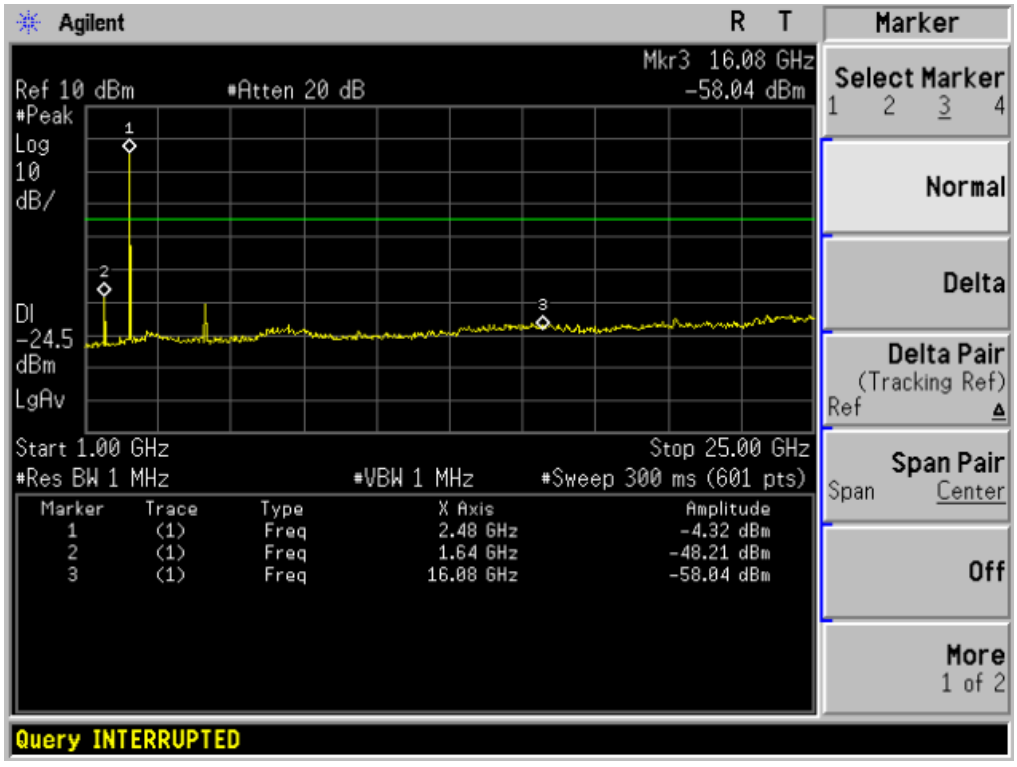
TEST PLOT OF OUT OF BAND EMISSIONS FOR HIGH CHANNEL(2Mbps)





TEST PLOT OF OUT OF BAND EMISSIONS FOR HIGH CHANNEL(3Mbps)





RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequency to 30MHz.

RADIATED EMISSION BELOW 1GHZ

EUT	FATDOCK BLU	Model Name	FATDOCK BLU
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC6V
Test Mode	BT2402MHZ	Modulation	GFSK

Freq. (MHZ)	Ant.Pol. H/V	Detector (PK/QP)	Reading (dBuV)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
42.77	H	Peak	15.02	15.33	30.35	40	-9.65
124.78	H	Peak	16.03	14.11	30.14	43.5	-13.36
175.02	H	Peak	10.97	15.66	26.63	43.5	-16.87
421.74	H	Peak	12.85	18.74	31.95	46	-14.05
640.89	H	Peak	9.36	26.02	35.38	46	-10.62
917.25	H	Peak	8.48	25.14	33.62	46	-12.38
56.25	V	Peak	15.45	10.25	25.70	40	-14.30
78.03	V	Peak	18.25	10.74	28.99	40	-11.01
132.78	V	Peak	19.62	13.88	33.50	43.5	-10.00
174.00	V	Peak	13.47	18.76	32.23	43.5	-11.27
725.12	V	Peak	6.87	25.33	32.20	46	-13.80
940.28	V	Peak	5.02	27.02	32.04	46	-13.96

EUT	FATDOCK BLU	Model Name	FATDOCK BLU
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC6V
Test Mode	BT2441MHZ	Modulation	GFSK

Freq. (MHZ)	Ant.Pol. H/V	Detector (PK/QP)	Reading (dBuV)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
--	H	Peak	--	--	--	--	--
--	H	Peak	--	--	--	--	--
--	V	Peak	--	--	--	--	--
--	V	Peak	--	--	--	--	--

EUT	FATDOCK BLU	Model Name	G-ViB2
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC6V or DC9V
Test Mode	BT2480MHZ	Modulation	GFSK

Freq. (MHZ)	Ant.Pol. H/V	Detector (PK/QP)	Reading (dBuV)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
--	H	Peak	--	--	--	--	--
--	H	Peak	--	--	--	--	--
--	V	Peak	--	--	--	--	--
--	V	Peak	--	--	--	--	--

EUT	FATDOCK BLU	Model Name	FATDOCK BLU
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC6V
Test Mode	BT2402/2441/2480MHZ	Modulation	π /4-DQPSK 8-DPSK

Freq. (MHZ)	Ant.Pol. H/V	Detector (PK/QP)	Reading (dBuV)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
--	H	Peak	--	--	--	--	--
--	H	Peak	--	--	--	--	--
--	V	Peak	--	--	--	--	--
--	V	Peak	--	--	--	--	--

Note: ”--“means the mode at least have 20dB margin.

RADIATED EMISSION ABOVE 1GHZ

EUT	FATDOCK BLU	Model Name	FATDOCK BLU
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC6V
Test Mode	BT2402/2441/2480MHZ	Modulation	GFSK

Freq. (MHZ)	Ant.Pol. H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Factor (dB)	Result		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin
					Peak (dBuV/m)	AV (dBuV/m)			
--	H	--	--	--	--	--	--	--	--
--	H	--	--	--	--	--	--	--	--
--	V	--	--	--	--	--	--	--	--
--	V	--	--	--	--	--	--	--	--

EUT	FATDOCK BLU	Model Name	FATDOCK BLU
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC6V
Test Mode	BT2402/2441/2480MHZ	Modulation	π /4-DQPSK 8-DPSK

Freq. (MHZ)	Ant.Pol. H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Factor (dB)	Result		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin
					Peak (dBuV/m)	AV (dBuV/m)			
--	H	--	--	--	--	--	--	--	--
--	H	--	--	--	--	--	--	--	--
--	V	--	--	--	--	--	--	--	--
--	V	--	--	--	--	--	--	--	--

Note: This Handheld EUT was tested in 3 orthogonal positions and the worst-case data was presented.
Note:"--"means the mode at least have 20dB margin.

9 BAND EDGE EMISSION

9.1 MEASUREMENT PROCEDURE

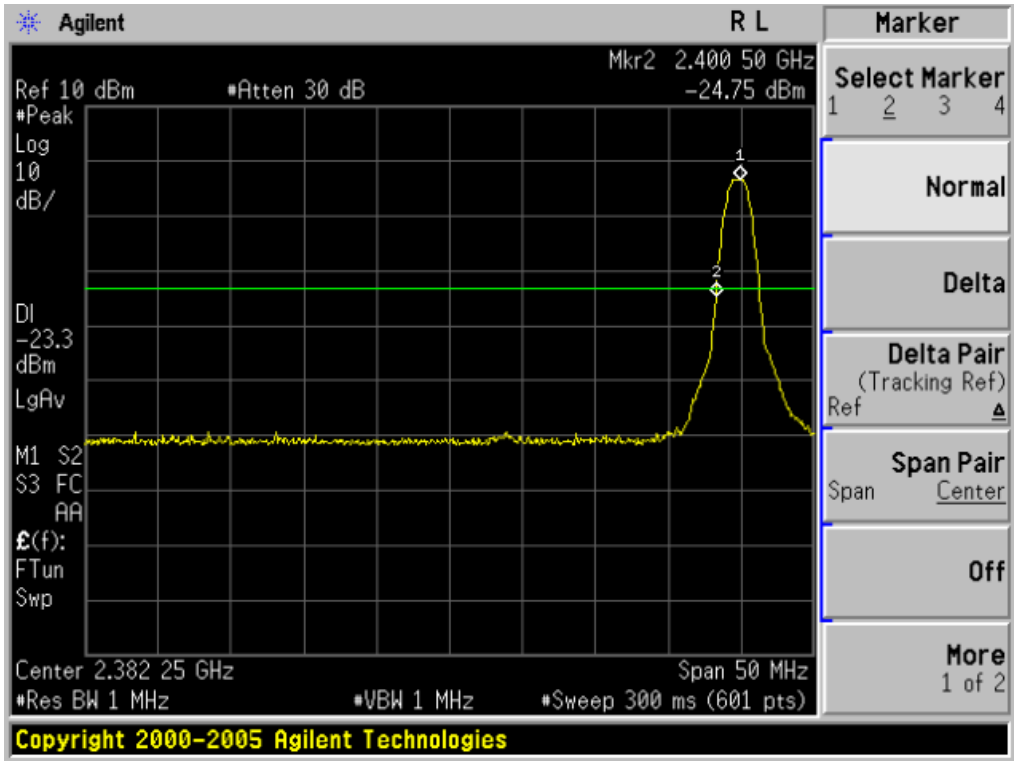
1, Set the EUT Work on the top, the bottom operation frequency individually.
2. Set SPA Start or Stop Frequency = Operation Frequency, RBW= 1MHz, VBW= 1MHz.
3. The band edges was measured and recorded.

9.2 TEST SET-UP

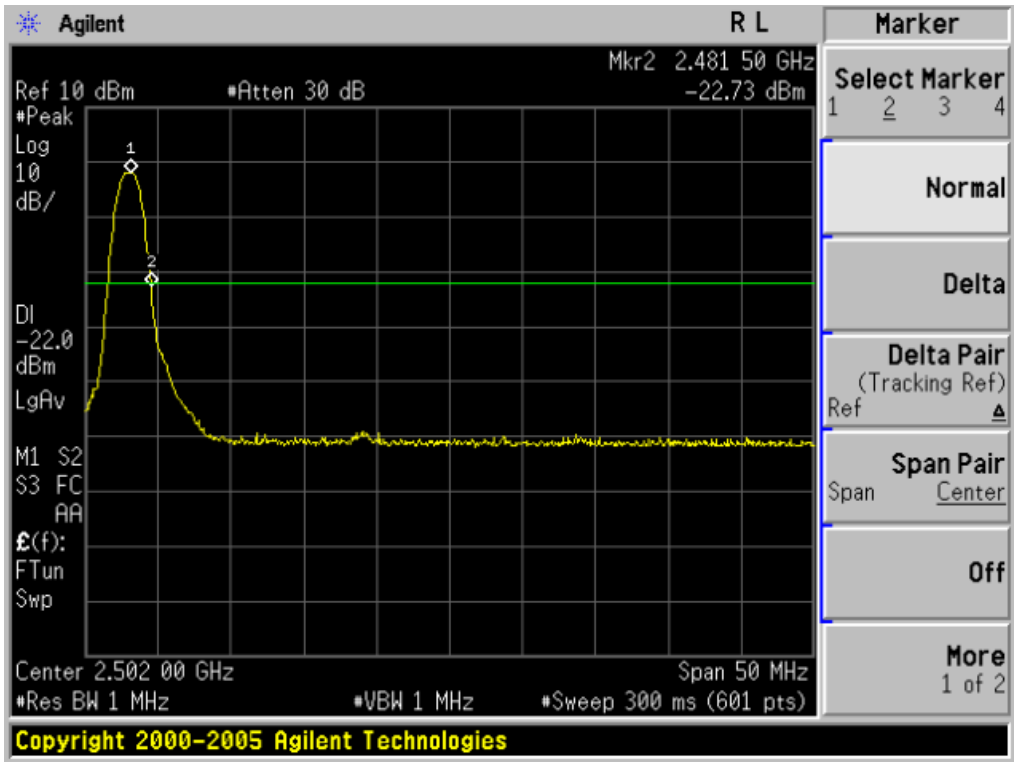
The Same as described in section 5.2

9.3 TEST RESULT

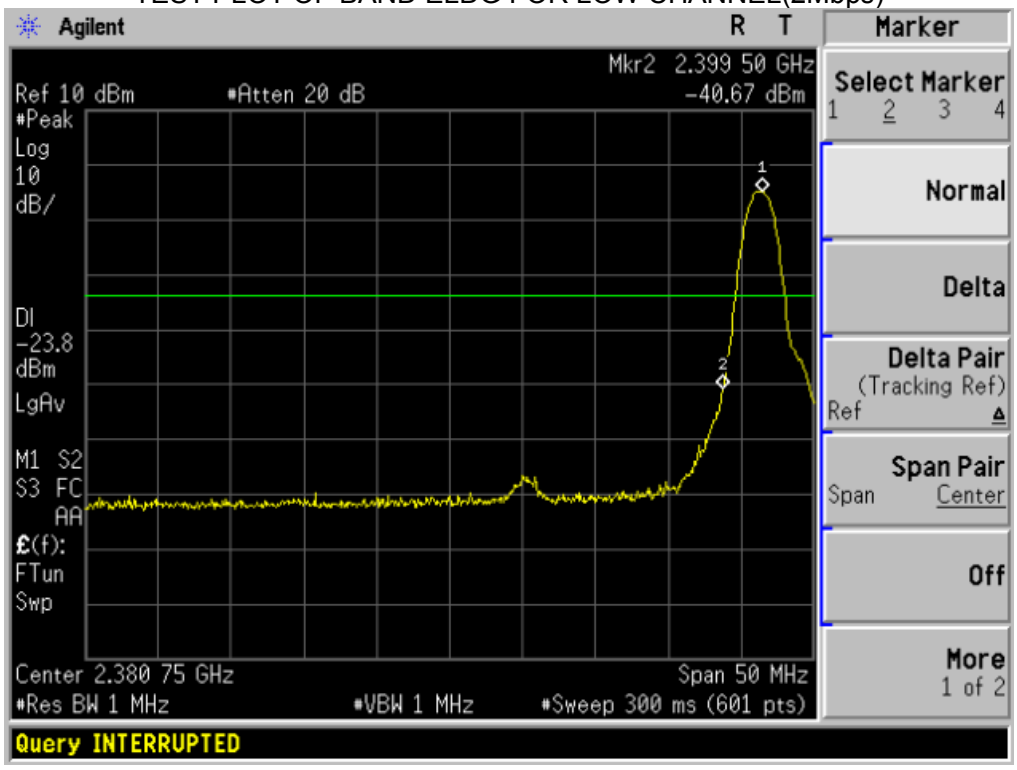
TEST PLOT OF BAND ELDG FOR LOW CHANNEL(1Mbps)



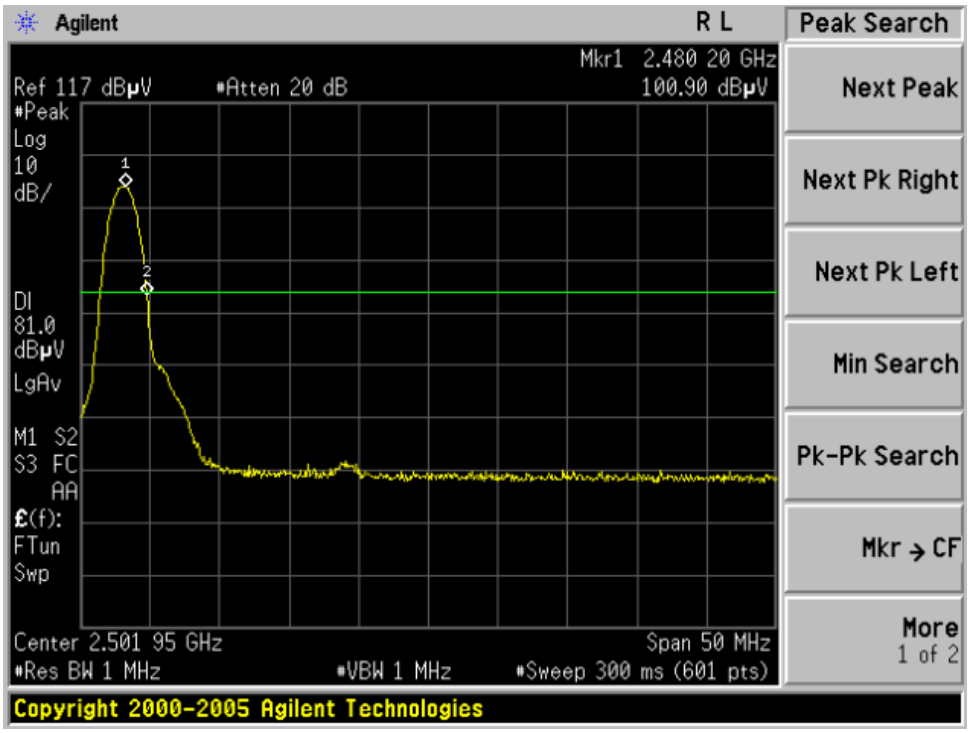
TEST PLOT OF BAND ELDG FOR HIGH CHANNEL(1Mbps)



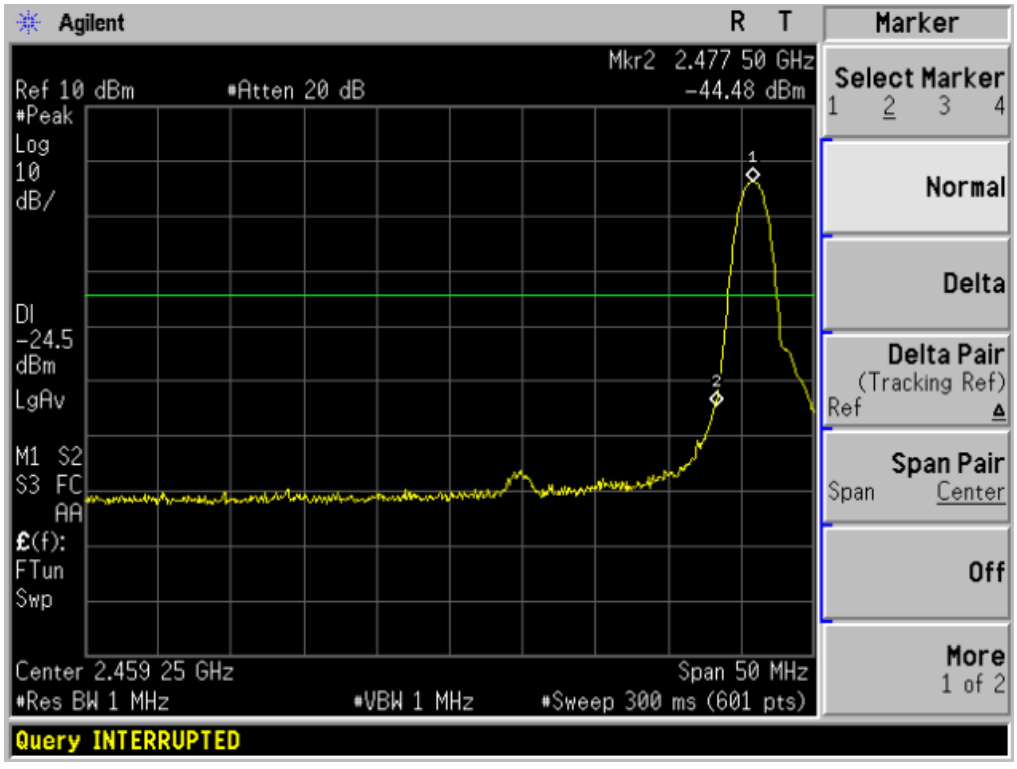
TEST PLOT OF BAND ELDG FOR LOW CHANNEL(2Mbps)



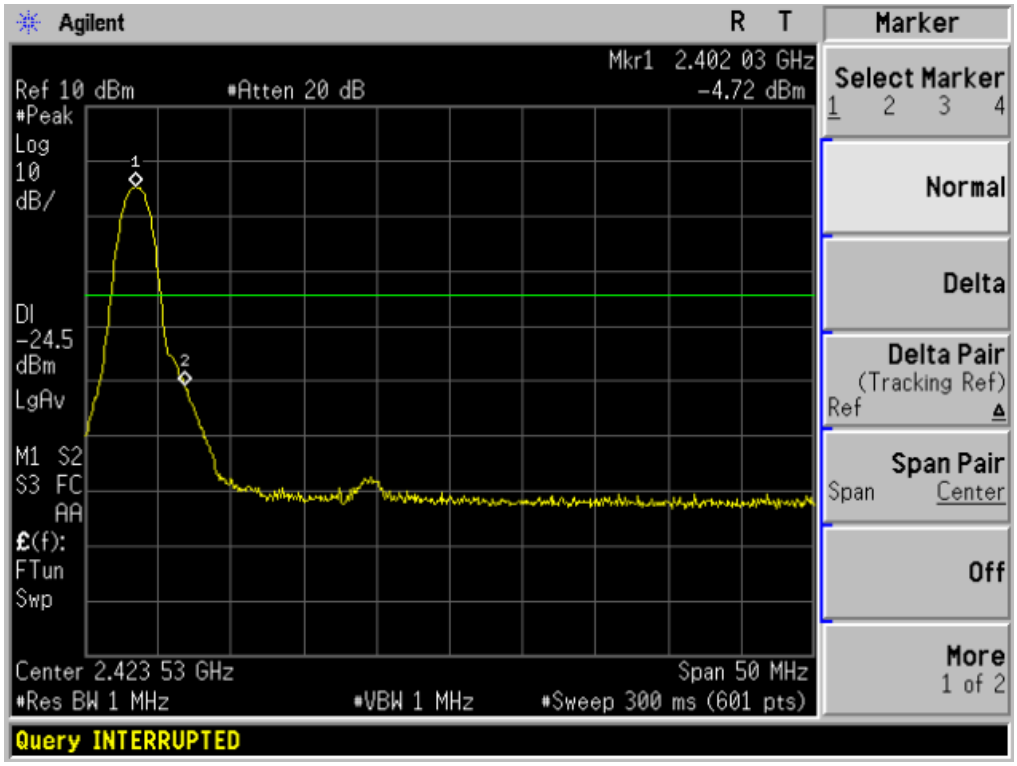
TEST PLOT OF BAND ELDG FOR HIGH CHANNEL(2Mbps)



TEST PLOT OF BAND ELDG FOR LOW CHANNEL(3Mbps)



TEST PLOT OF BAND ELDG FOR HIGH CHANNEL(3Mbps)



EUT	ATDOCK BLU	Model Name	ATDOCK BLU
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC6V
Test Mode	BT2402MHZ	Modulation	GFSK

Freq. (MHZ)	Ant.Pol. H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Factor (dB)	Result		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin
					Peak (dBuV/m)	AV (dBuV/m)			
--	H	--	--	--	--	--	--	--	--
--	H	--	--	--	--	--	--	--	--
--	V	--	--	--	--	--	--	--	--
--	V	--	--	--	--	--	--	--	--

EUT	ATDOCK BLU	Model Name	ATDOCK BLU
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC6V
Test Mode	BT2480MHZ	Modulation	GFSK

Freq. (MHZ)	Ant.Pol. H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Factor (dB)	Result		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin
					Peak (dBuV/m)	AV (dBuV/m)			
--	H	--	--	--	--	--	--	--	--
--	H	--	--	--	--	--	--	--	--
--	V	--	--	--	--	--	--	--	--
--	V	--	--	--	--	--	--	--	--

Note: "--"means other frequencies at least have 20dB margin.
The other modulation modes comply with standard requirement and at least have 20dB margin.

10 NUMBER OF HOPPING FREQUENCY

10.1 MEASUREMENT PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer Start = 2.4GHz Stop = 2.4835GHz
4. Set the Spectrum Analyzer as RBW = 100KHZ

10.2 TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 5.2
1. Conducted Method.

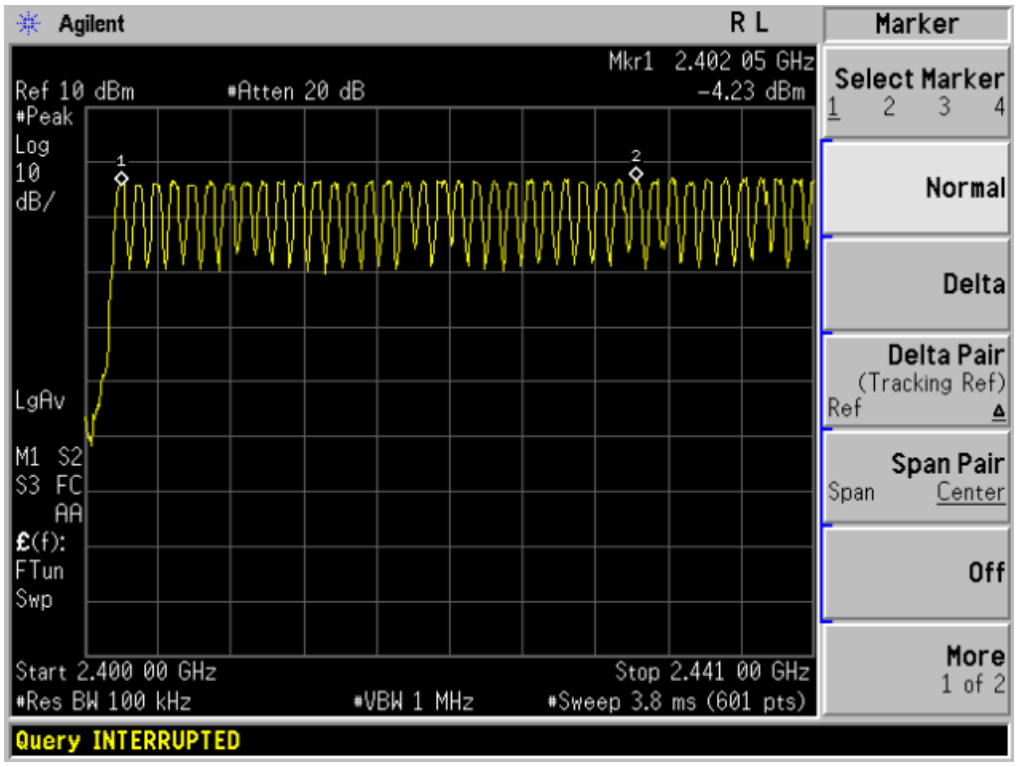
10.3 MEASUREMENT EQUIPMENT USED

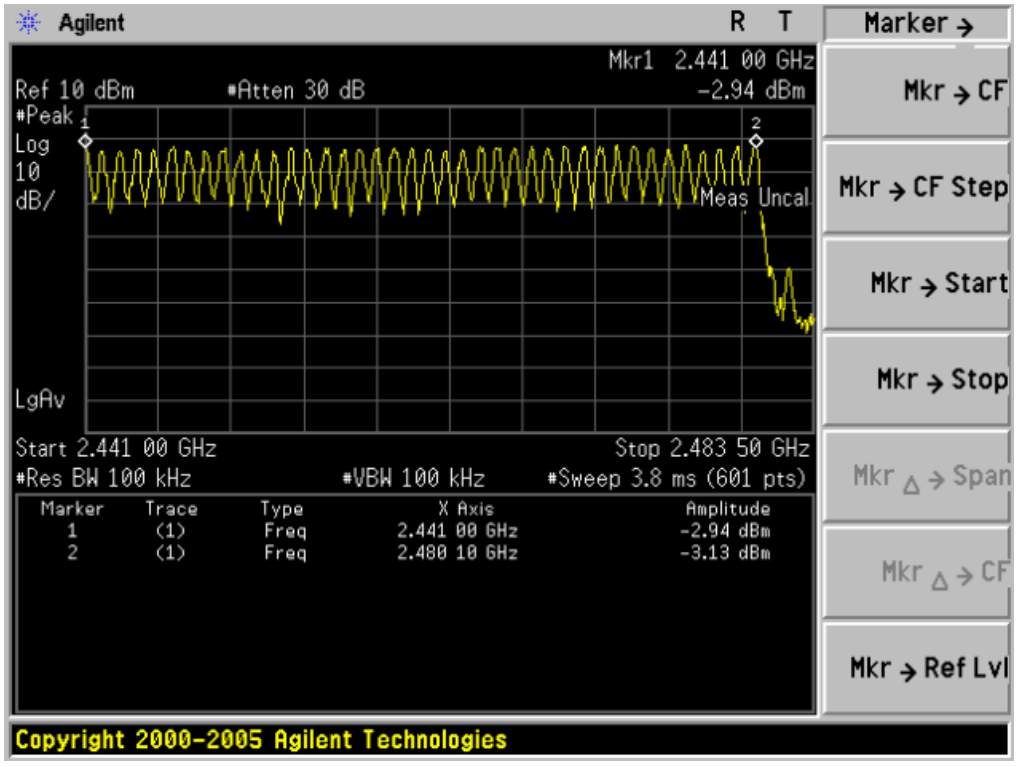
The Same as described in section 5.3

10.4 LIMITS AND MEASUREMENT RESULT

TOTAL NO. OF HOPPING CHANNEL	LIMIT (NO. OF CH)	MEASUREMENT (NO. OF CH)	RESULT
	>=15	79	PASS

TEST PLOT FOR NO. OF TOTAL CHANNELS





11 TIME OF OCCUPANCY (DWELL TIME)

11.1 MEASUREMENT PROCEDURE

1. Place the EUT on the table and set it in transmitting mode
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer
3. Set center frequency of spectrum analyzer = Operating frequency
4. Set the spectrum analyzer as RBW, VBW=1MHz, Span = 0 Hz,

11.2 TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 5.2
Conducted Method

11.3 MEASUREMENT EQUIPMENT USED

The same as described in section 5.3

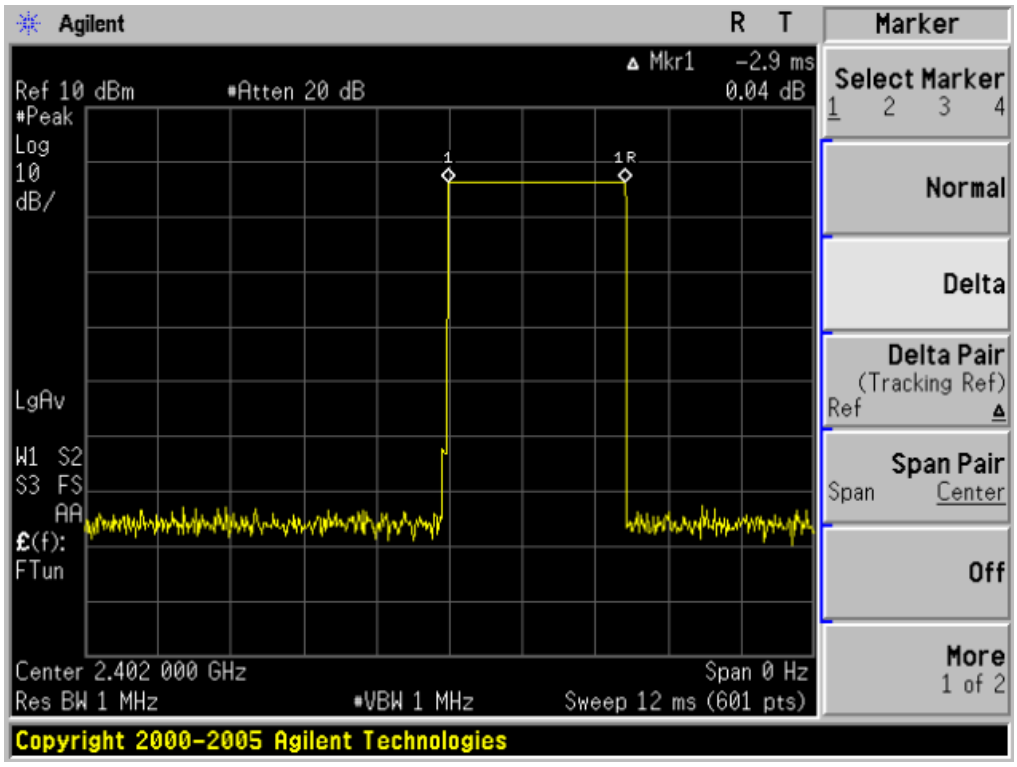
11.4 LIMITS AND MEASUREMENT RESULT

Bluetooth 1Mbps Test Result

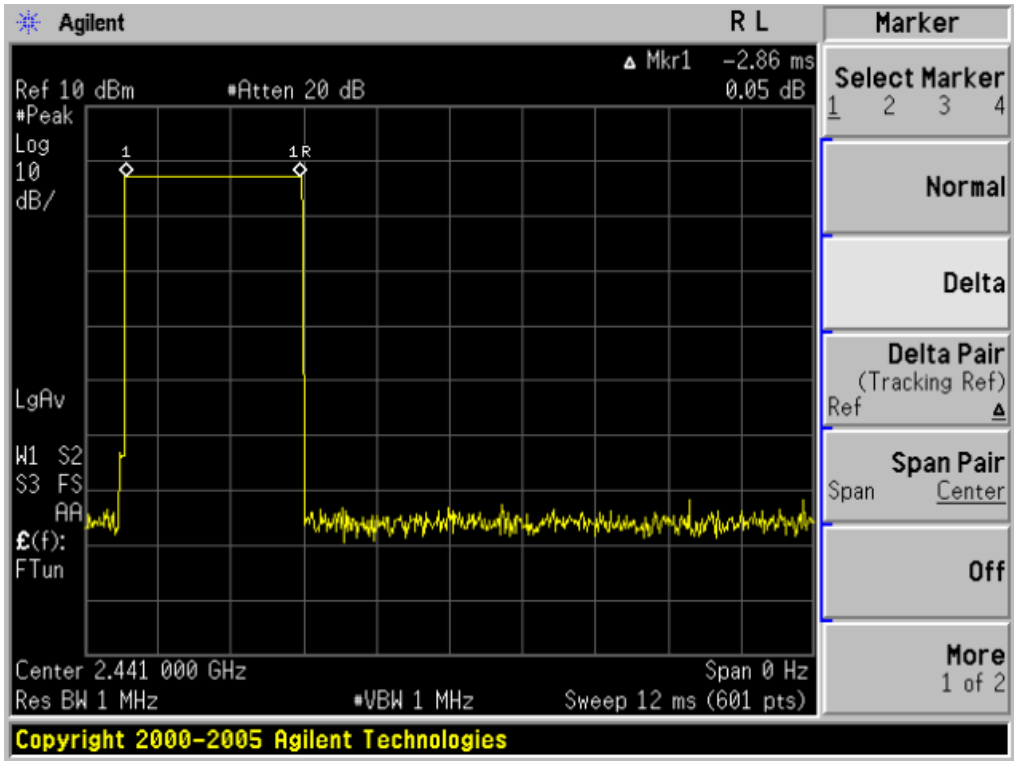
Channel	Time of Pulse for DH5 (ms)	Period Time (s)	Sweep Time (ms)	Limit (ms)
Low	2.90	31.6	309.33	400
Middle	2.86	31.6	305.07	400
High	2.88	31.6	307.20	400

Low Channel Time
2.90*(1600/6)/79*31.6=309.33ms
Middle Channel Time
2.86*(1600/6)/79*31.6=305.07ms
High Channel Time
2.88*(1600/6)/79*31.6=307.20ms

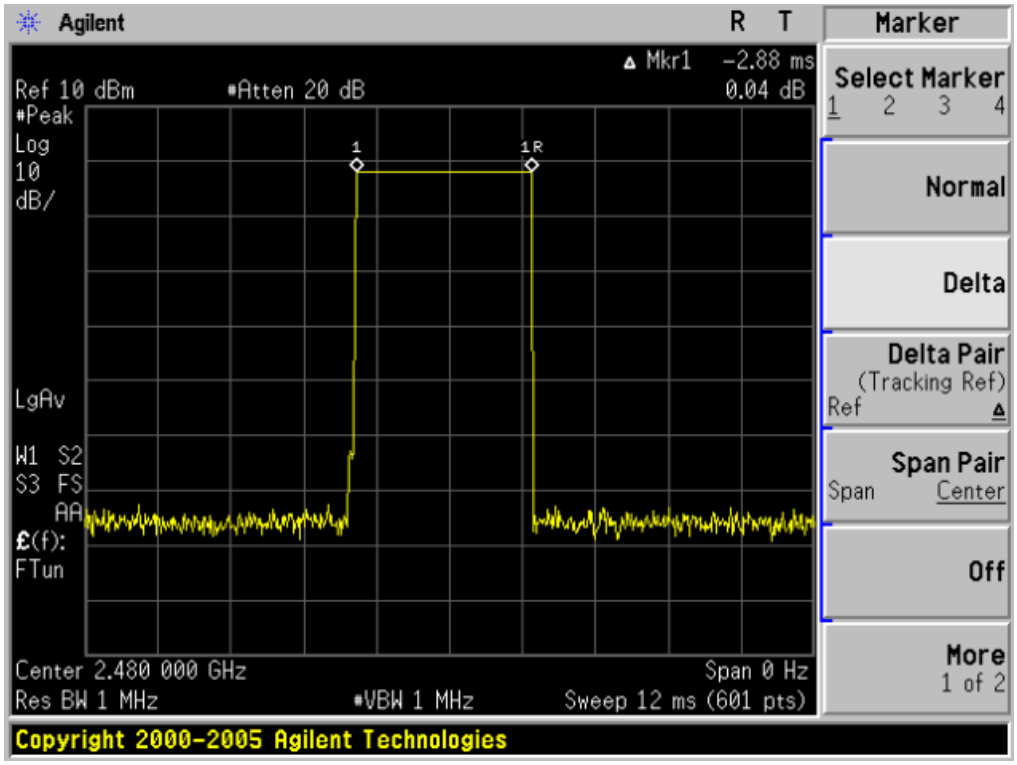
TEST PLOT OF LOW CHANNEL



TEST PLOT OF MIDDLE CHANNEL



TEST PLOT OF HIGH CHANNEL

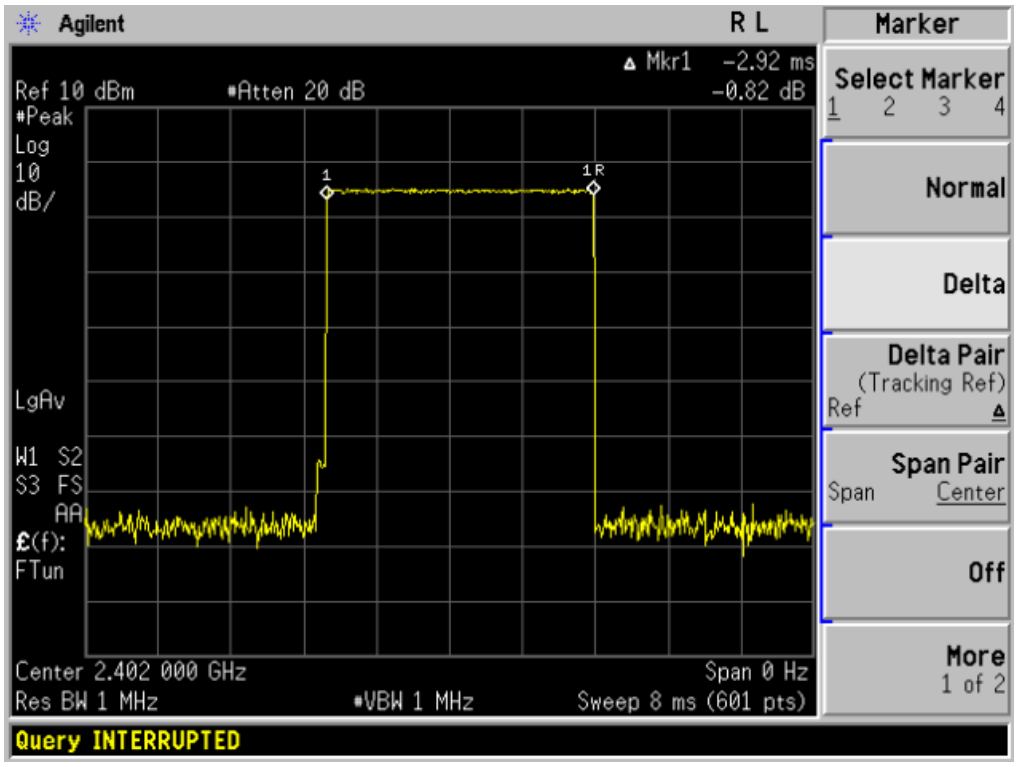


Bluetooth 2Mbps Test Result

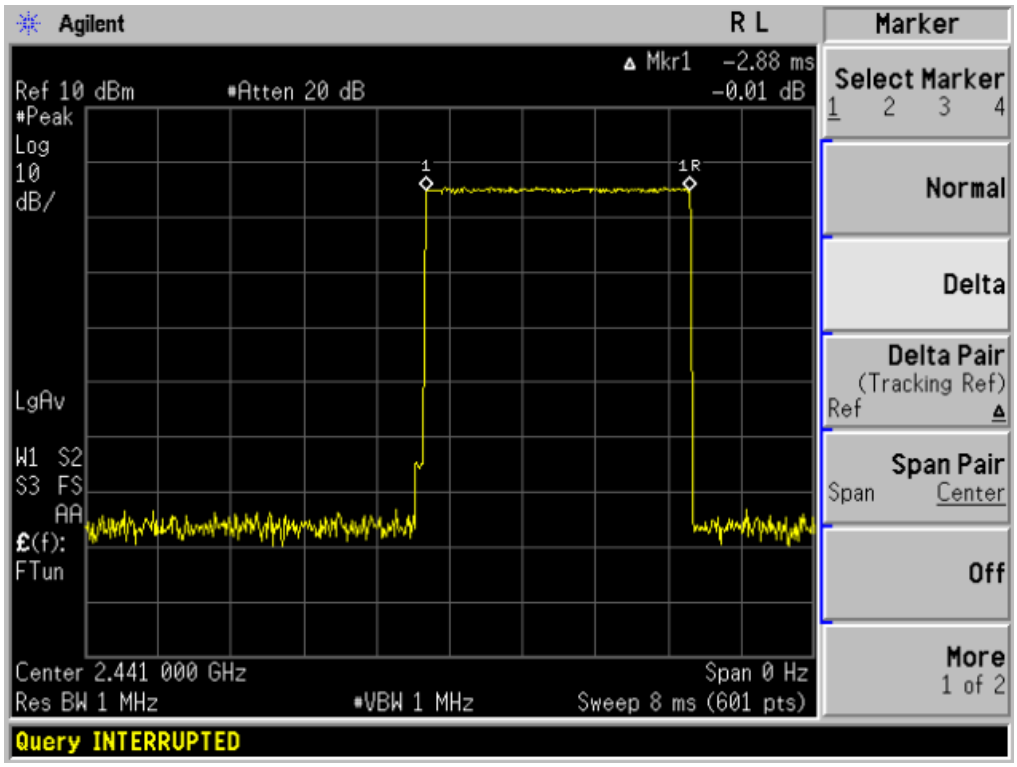
Channel	Time of Pulse for DH5 (ms)	Period Time (s)	Sweep Time (ms)	Limit (ms)
Low	2.92	31.6	311.47	400
Middle	2.88	31.6	307.20	400
High	2.893	31.6	308.59	400

Low Channel Time
2.92*(1600/6)/79*31.6=311.47ms
Middle Channel Time
2.88*(1600/6)/79*31.6=307.20ms
High Channel Time
2.893*(1600/6)/79*31.6=308.59ms

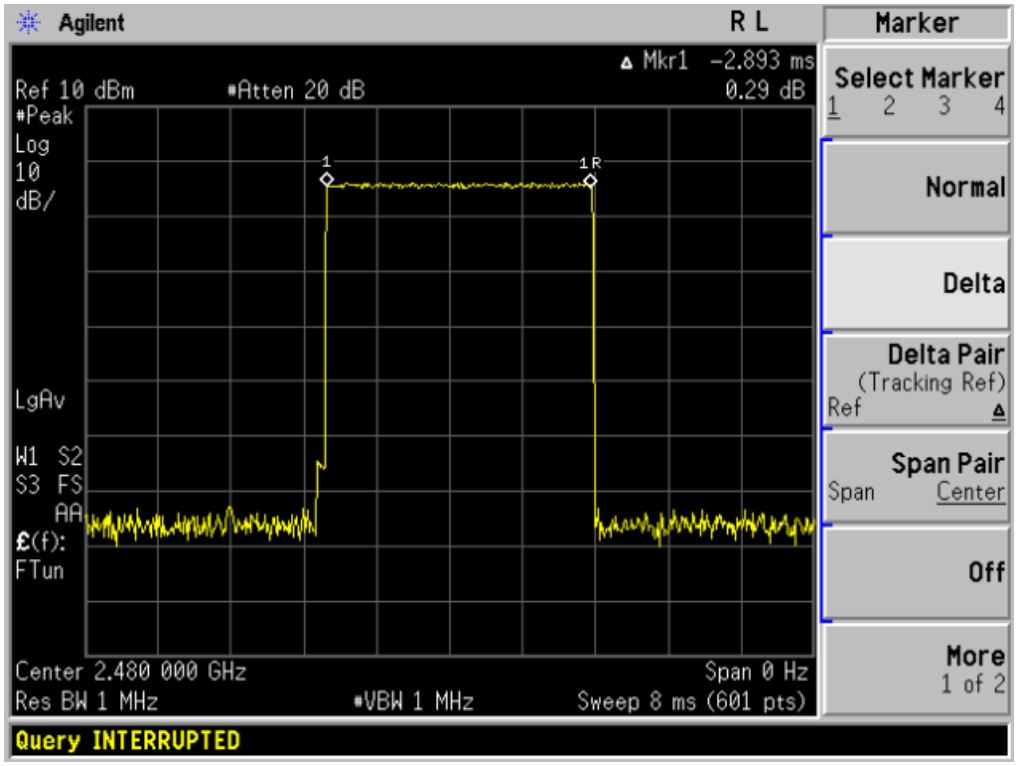
TEST PLOT OF LOW CHANNEL



TEST PLOT OF MIDDLE CHANNEL



TEST PLOT OF HIGH CHANNEL

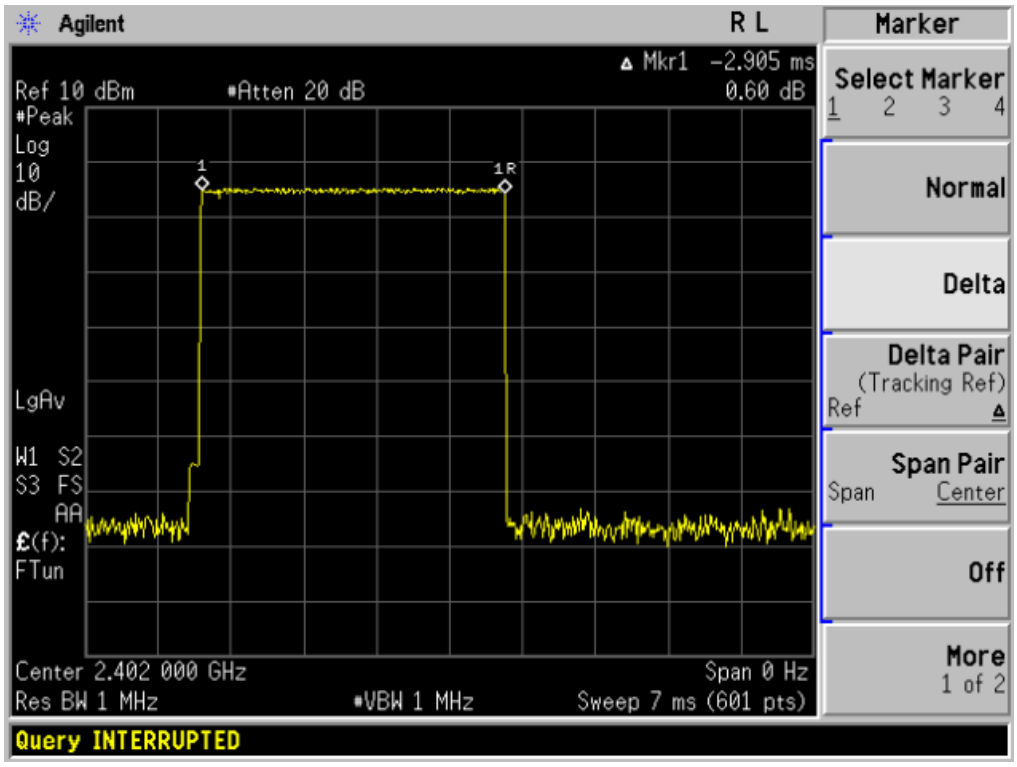


Bluetooth 3Mbps Test Result

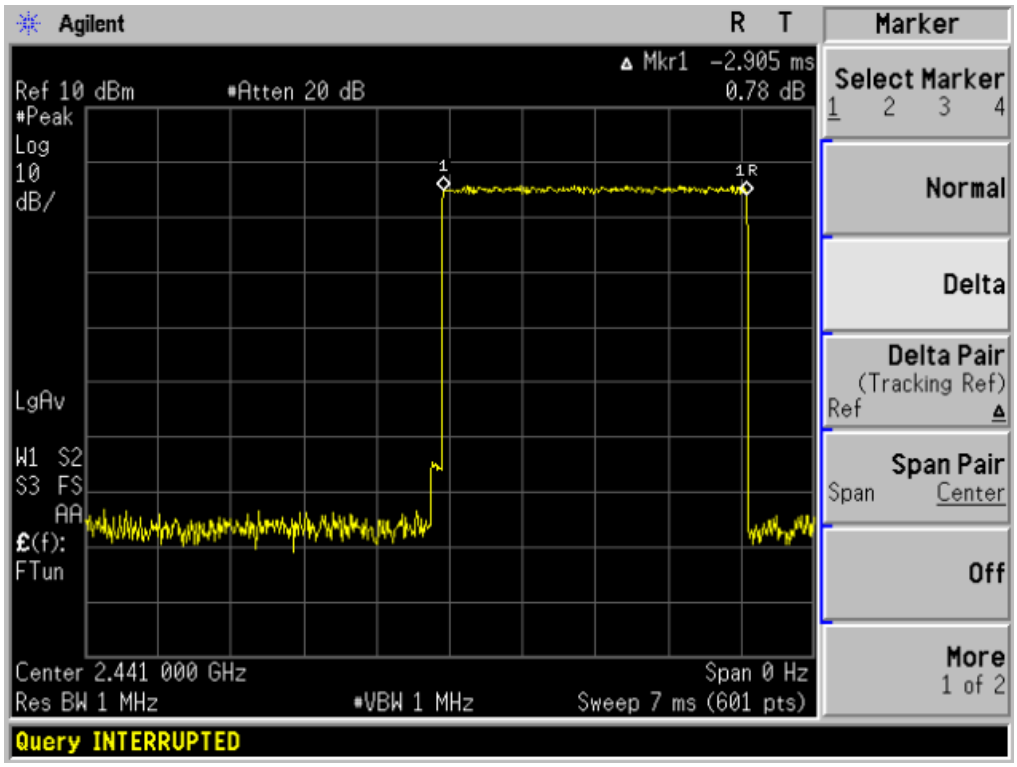
Channel	Time of Pulse for DH5 (ms)	Period Time (s)	Sweep Time (ms)	Limit (ms)
Low	2.905	31.6	309.87	400
Middle	2.905	31.6	309.87	400
High	2.917	31.6	311.15	400

Low Channel Time
2.905*(1600/6)/79*31.6=309.87ms
Middle Channel Time
2.905*(1600/6)/79*31.6=309.87ms
High Channel Time
2.917*(1600/6)/79*31.6=311.15ms

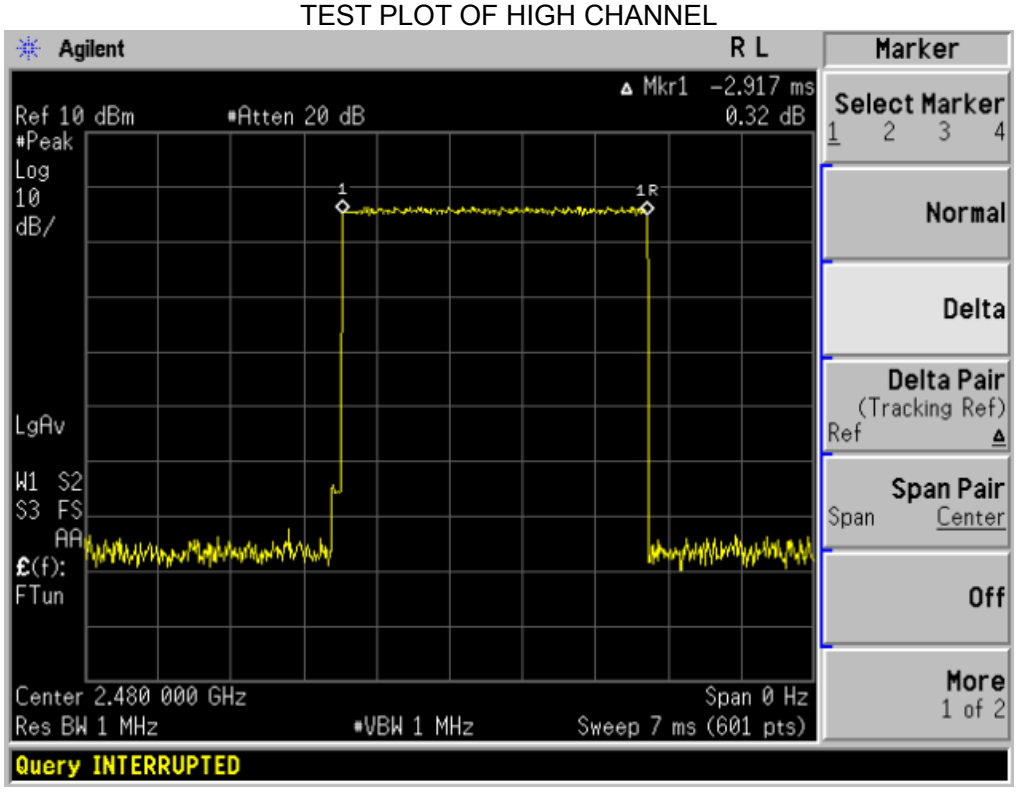
TEST PLOT OF LOW CHANNEL



TEST PLOT OF MIDDLE CHANNEL



TEST PLOT OF HIGH CHANNEL



12. FREQUENCY SEPARATION

12.1 MEASUREMENT PROCEDURE

1. Place the EUT on the table and set it in transmitting mode
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer
3. Set center frequency of spectrum analyzer = Middele of Operating frequency
4. Set the spectrum analyzer as RBW, VBW=100KHz, Span = 5 MHz,

12.2 TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 5.2

12.3 MEASUREMENT EQUIPMENT USED

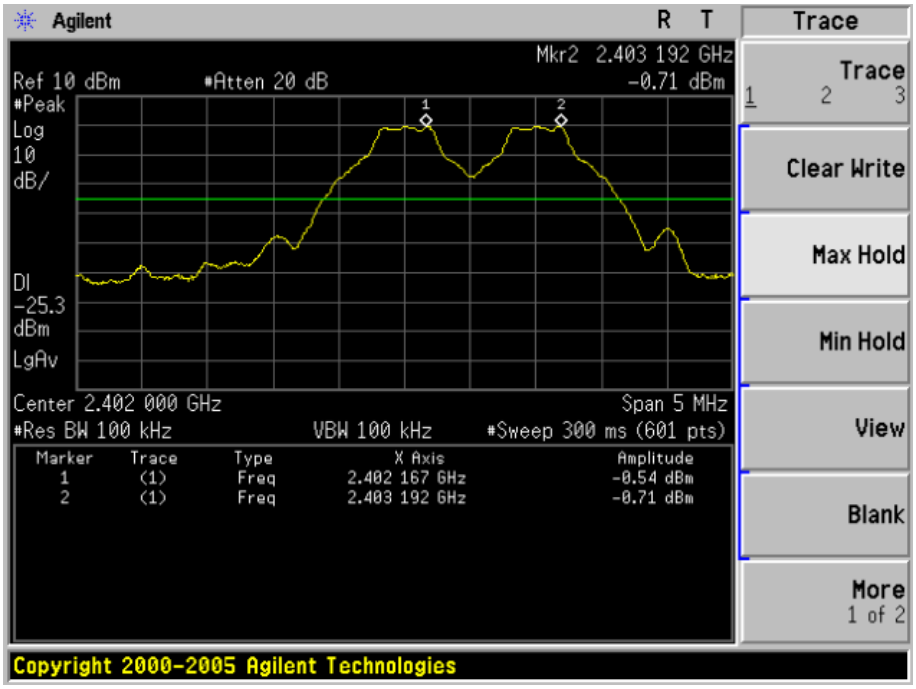
The same as described in section 5.3

12.4 LIMITS AND MEASUREMENT RESULT

BLUETOOTH 1MBPS TEST RESULT

CHANNEL	CHANNEL SEPARATION	LIMIT	RESULT
	KHz	KHz	Pass
CH00-CH01	1025	>=25 KHz or 2/3 20 dB BW	

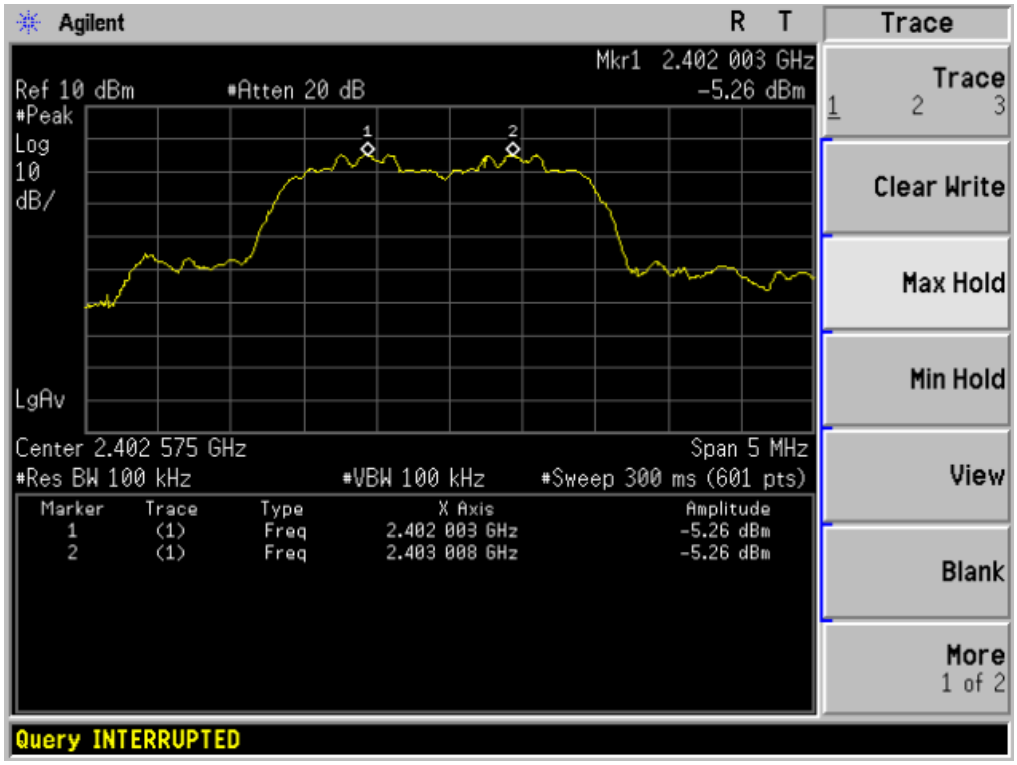
TEST PLOT FOR FREQUENCY SEPARATION



BLUETOOTH 2MBPS TEST RESULT

CHANNEL	CHANNEL SEPARATION	LIMIT	RESULT
	KHz	KHz	Pass
CH00-CH01	1005	>=25 KHz or 2/3 20 dB BW	

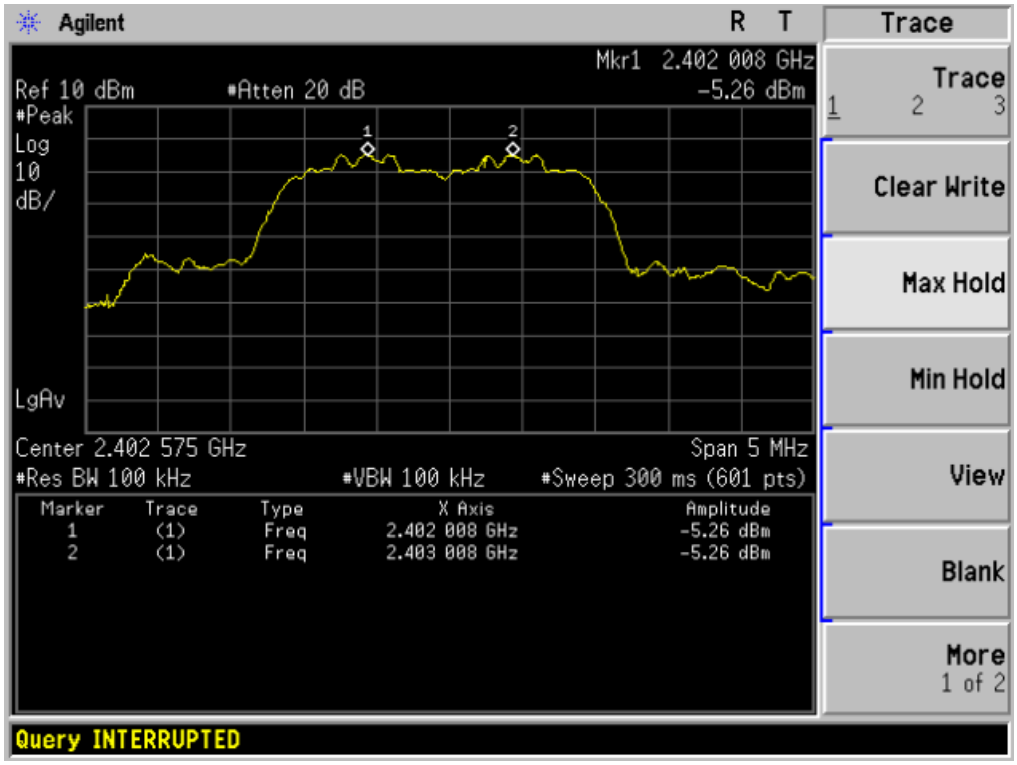
TEST PLOT FOR FREQUENCY SEPARATION



TEST PLOT FOR FREQUENCY SEPARATION

CHANNEL	CHANNEL SEPARATION	LIMIT	RESULT
	KHz	KHz	Pass
CH00-CH01	1000	>=25 KHz or 2/3 20 dB BW	

TEST PLOT FOR FREQUENCY SEPARATION



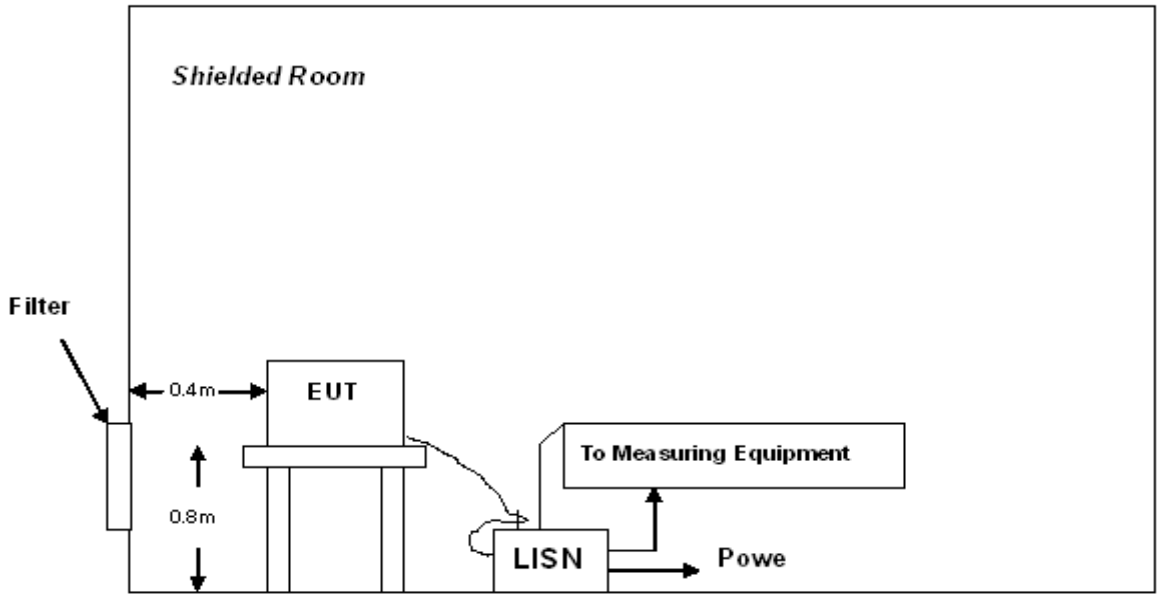
13 FCC LINE CONDUCTED EMISSION TEST

13.1 LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

**Note: 1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

13.2 BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



A: Powered through filter

13.3 PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2) Support equipment, if needed, was placed as per ANSI C63.4.
3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4) All support equipments received AC120V power from a LISN, if any.
5) The EUT received power by adapter.
6) The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7) Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8) During the above scans, the emissions were maximized by cable manipulation.
9) The following test mode(s) were scanned during the preliminary test:

   Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

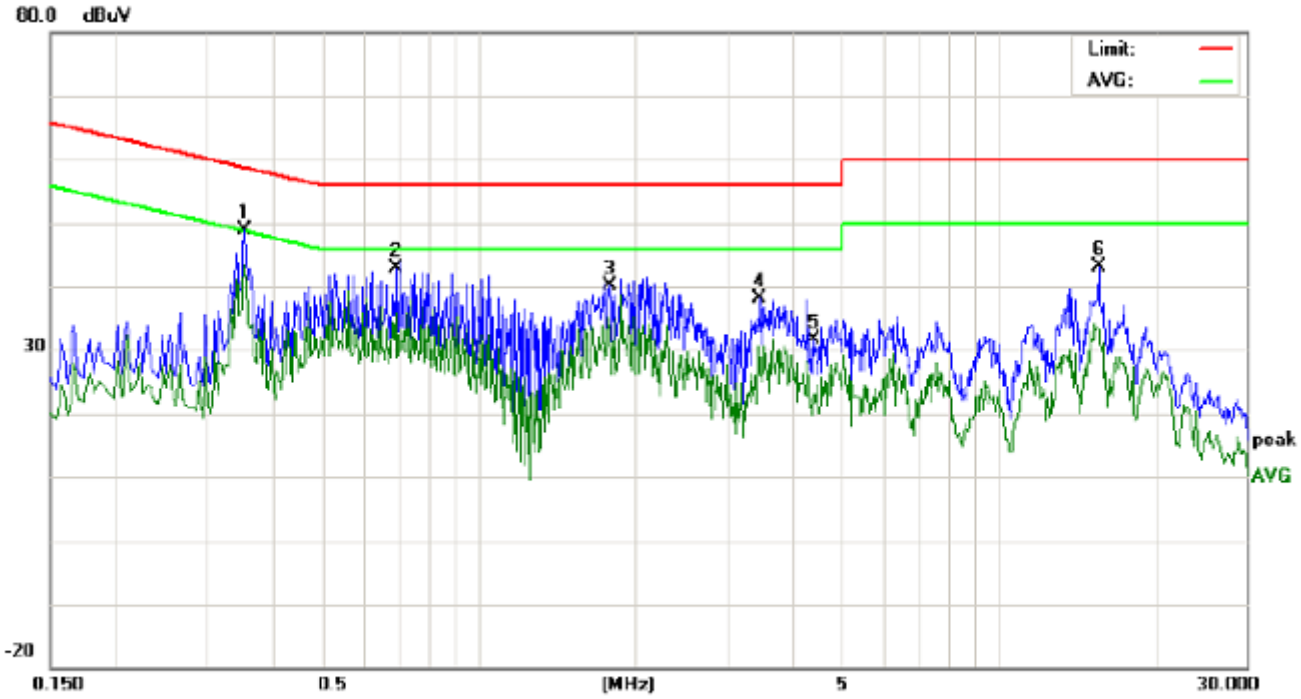
13.4 FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1) EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3) The test data of the worst case condition(s) was reported on the Summary Data page.

13.5 TEST RESULT OF LINE CONDUCTED EMISSION TEST

The worst mode: Bluetooth mode

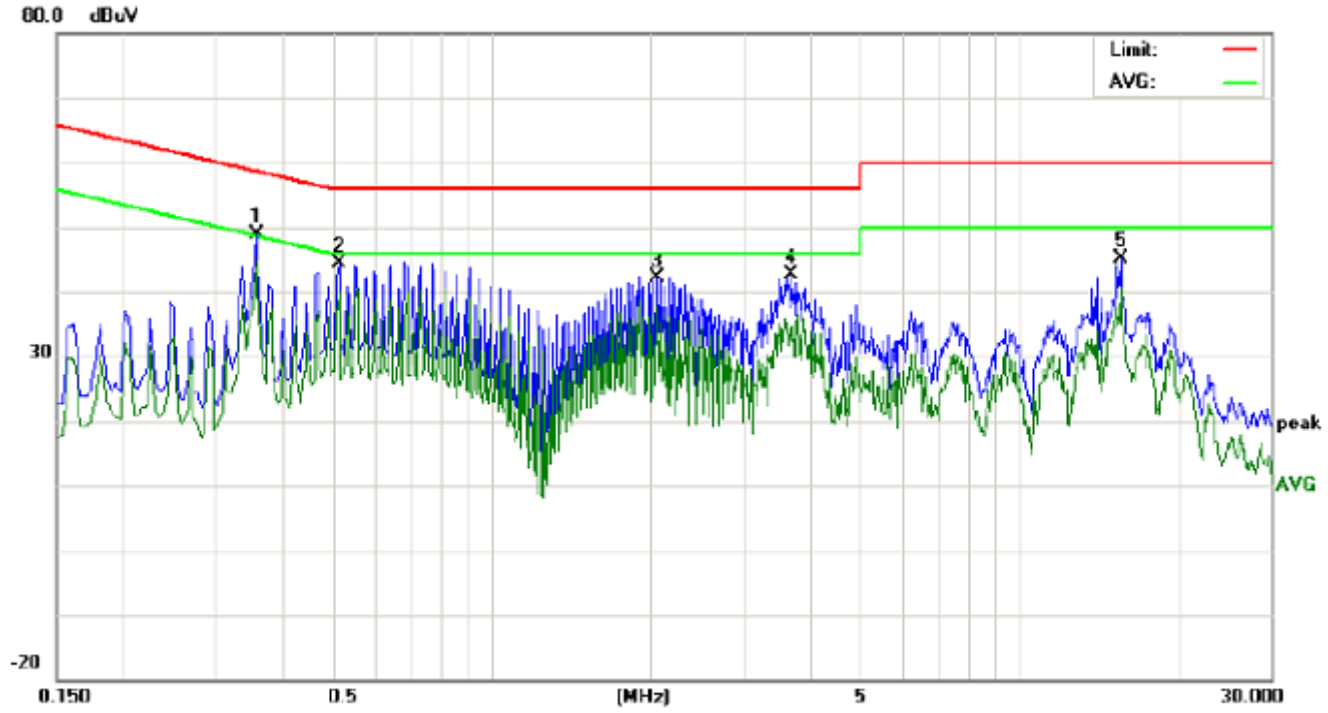
Line Conducted Emission Test Line 1-L



Site: Conduction | Phase: *L1* | Temperature: 26
Limit: FCC Class B Conduction(QP) | Power: | Humidity: 60 %

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.3540	38.55		33.20	10.28	48.83		43.48	58.87	48.87	-10.04	-5.39	P	
2	0.6940	32.43		25.49	10.50	42.93		35.99	56.00	46.00	-13.07	-10.01	P	
3	1.7860	28.91		21.66	11.22	40.13		32.88	56.00	46.00	-15.87	-13.12	P	
4	3.4860	26.50		14.84	11.61	38.11		26.45	56.00	46.00	-17.89	-19.55	P	
5	4.4100	19.74		11.16	11.96	31.70		23.12	56.00	46.00	-24.30	-22.88	P	
6	15.5780	28.93		19.06	14.17	43.10		33.23	60.00	50.00	-16.90	-16.77	P	

Line Conducted Emission Test Line 2-N



Site: Conduction
Limit: FCC Class B Conduction(QP)

Phase: N
Power: AC110V

Temperature: 26
Humidity: 60 %

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.3580	38.58		34.48	10.28	48.86		44.76	58.77	48.77	-9.91	-4.01	P	
2	0.5140	33.91		29.54	10.34	44.25		39.88	56.00	46.00	-11.75	-6.12	P	
3	2.0579	30.91		26.37	11.32	42.23		37.69	56.00	46.00	-13.77	-8.31	P	
4	3.7140	30.86		22.66	11.73	42.59		34.39	56.00	46.00	-13.41	-11.61	P	
5	15.3700	29.88		23.52	14.15	44.03		37.67	60.00	50.00	-15.97	-12.33	P	

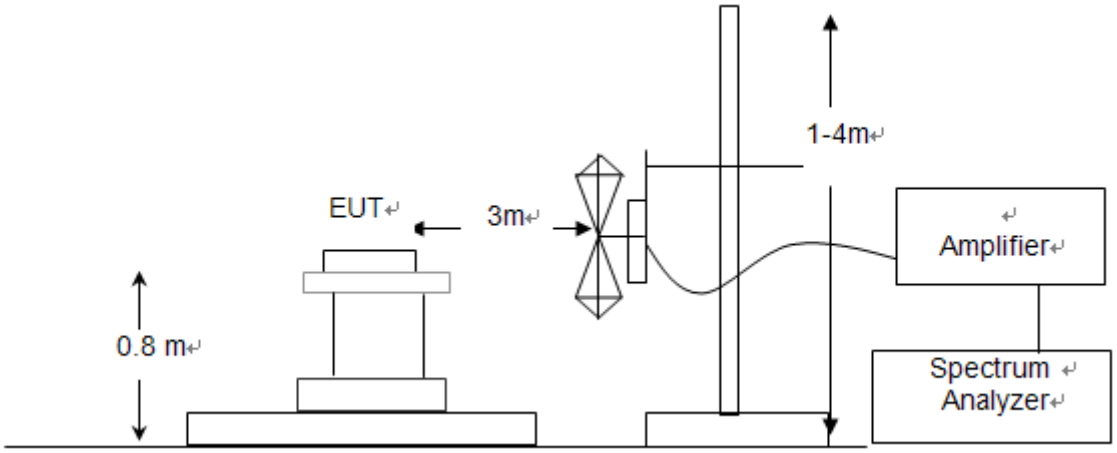
14 FCC RADIATED EMISSION TEST

14.1 LIMITS OF RADIATED EMISSION TEST

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBuV/m/ Q.P.)
30~88	3	40.0
88~216	3	43.5
216~960	3	46.0
Above 960	3	54.0

**Note: The lower limit shall apply at the transition frequency.

14.2 BLOCK DIAGRAM OF RADIATED EMISSION TEST



14.3 PRELIMINARY PROCEDURE OF RADIATED EMISSION TEST

1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used).
2) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
3) The EUT received DC 9V power.
4) The antenna was placed at 3 meter away from the EUT as stated in FCC Part 15. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
5) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
6) The test mode was scanned during the preliminary test.
   Then, the EUT and cable(s) configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for final testing.

   Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

14.4 FINAL PROCEDURE OF RADIATED EMISSION TEST

EUT and support equipment were set up on the turntable as per step 6 of the preliminary test.

The Analyzer / Receiver scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

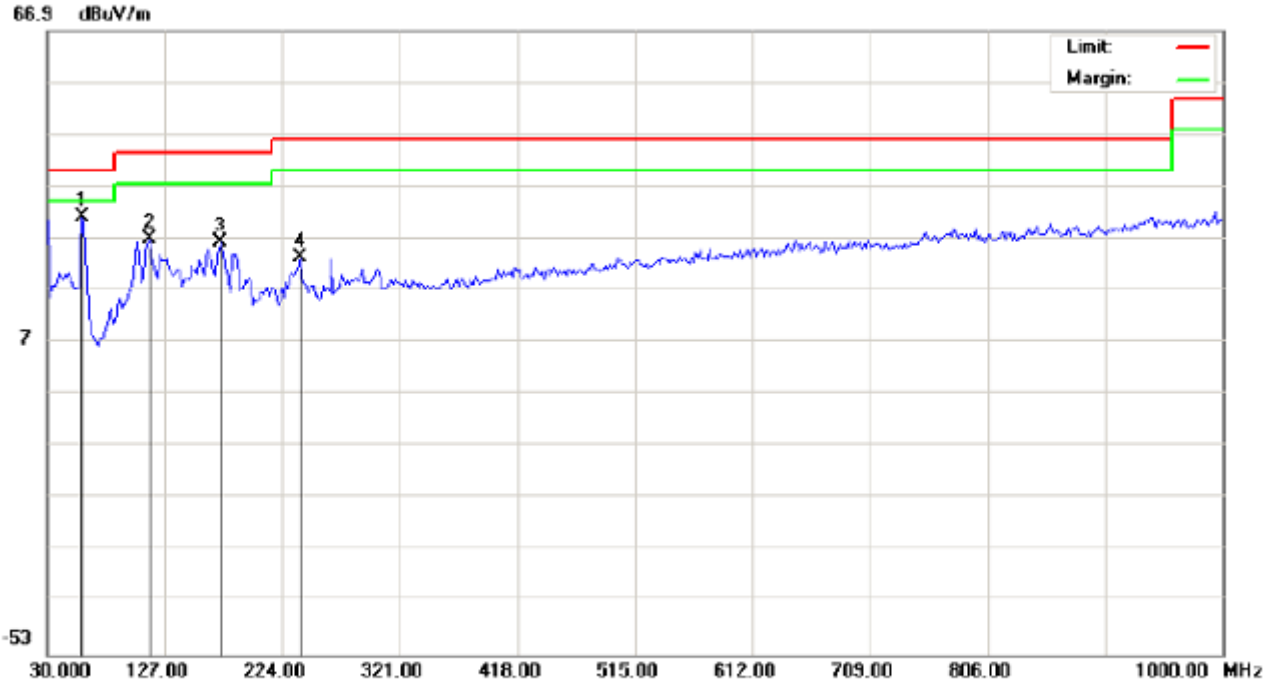
Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P/Peak. reading is presented.

The test data of the worst case condition(s) was reported on the Summary Data page.

14.5 TEST RESULT OF RADIATED EMISSION TEST

The worst mode: Bluetooth mode

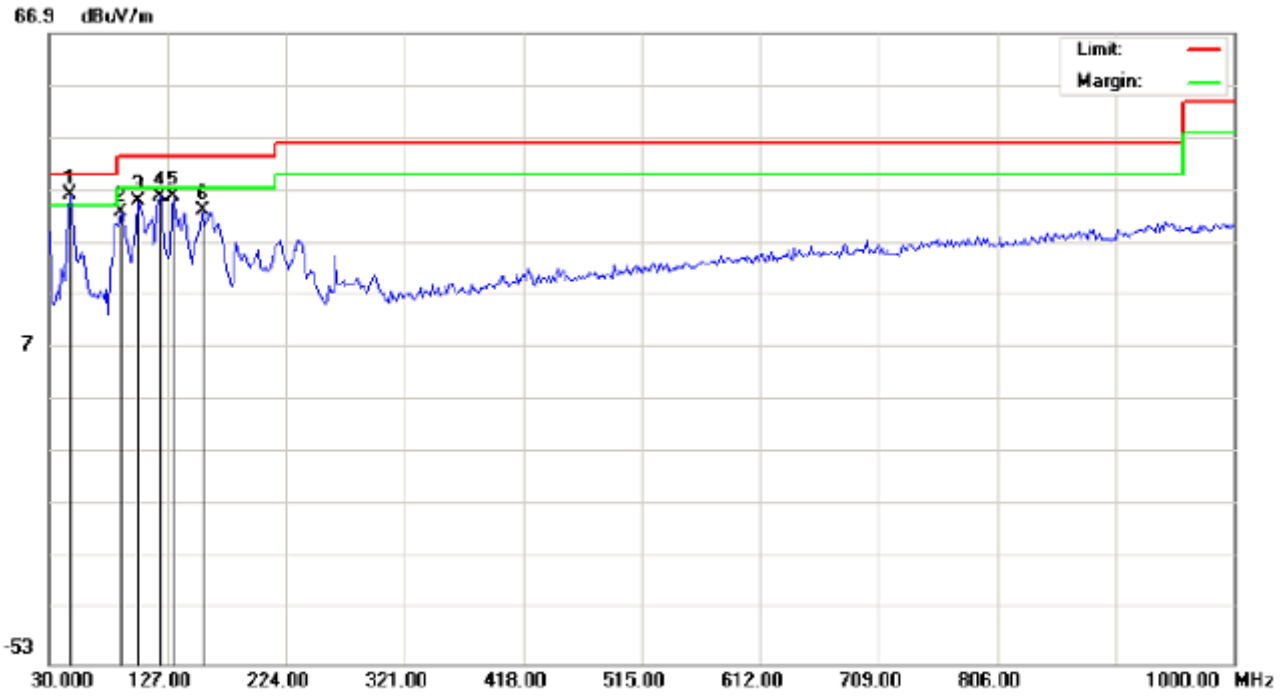
Test Result of Radiated Emission Test-Horizontal-3m



Site: site #1 Polarization: *Horizontal* Temperature: 26
Limit: FCC Class B 3M Radiation Power: Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	59.1000	23.11	7.94	31.05	40.00	-8.95	peak			
2		114.0667	9.41	17.52	26.93	43.50	-16.57	peak			
3		172.2667	6.48	19.80	26.28	43.50	-17.22	peak			
4		238.5500	7.26	15.97	23.23	46.00	-22.77	peak			

Test Result of Radiated Emission Test-Vertical-3m



Site: site #1 Polarization: *Vertical* Temperature: 26
Limit: FCC Class B 3M Radiation Power: Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	47.7833	22.59	11.62	34.21	40.00	-5.79	QP			
2		88.2000	21.03	11.95	32.98	43.50	-10.52	peak			
3		102.7500	18.76	16.08	34.84	43.50	-8.66	peak			
4		120.5333	17.36	18.35	35.71	43.50	-7.79	peak			
5		131.8500	16.42	19.31	35.73	43.50	-7.77	peak			
6		156.1000	12.84	20.19	33.03	43.50	-10.47	peak			

APPENDIX I
PHOTOGRAPHS OF THE EUT

ALL VIEW OF EUT

VIEW OF EUT -1

VIEW OF EUT -2

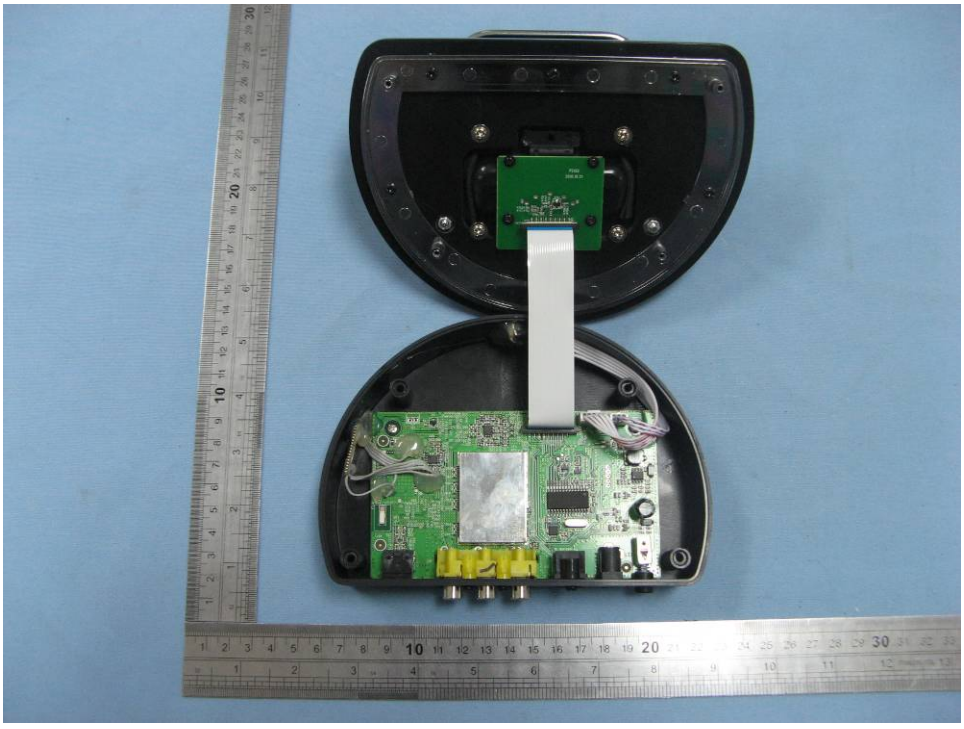
VIEW OF EUT -3

VIEW OF EUT -4

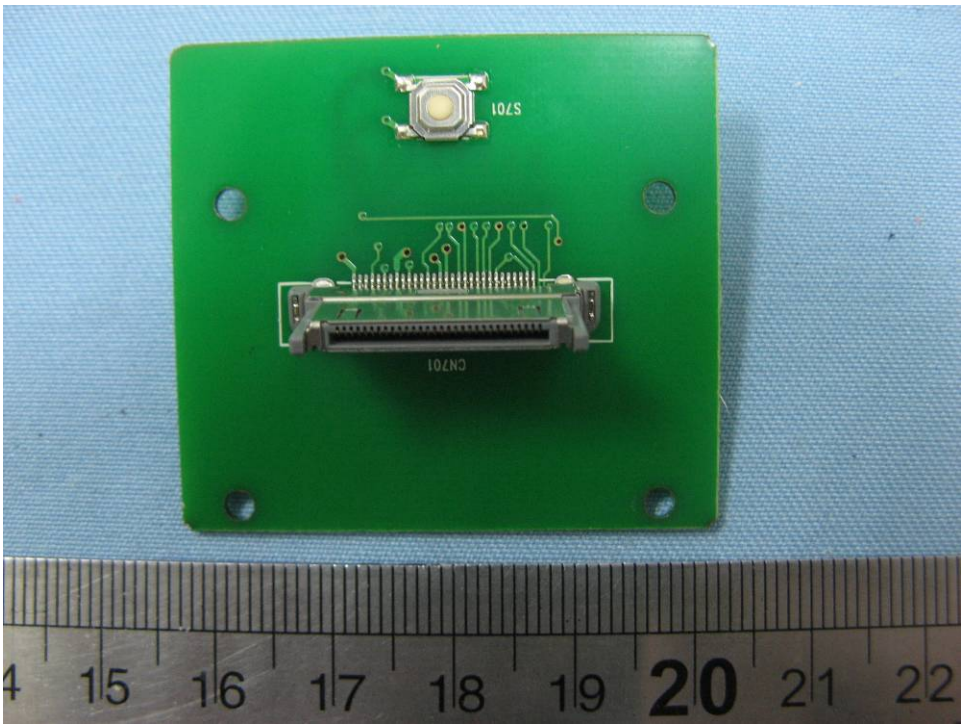
VIEW OF EUT -5

VIEW OF EUT -6

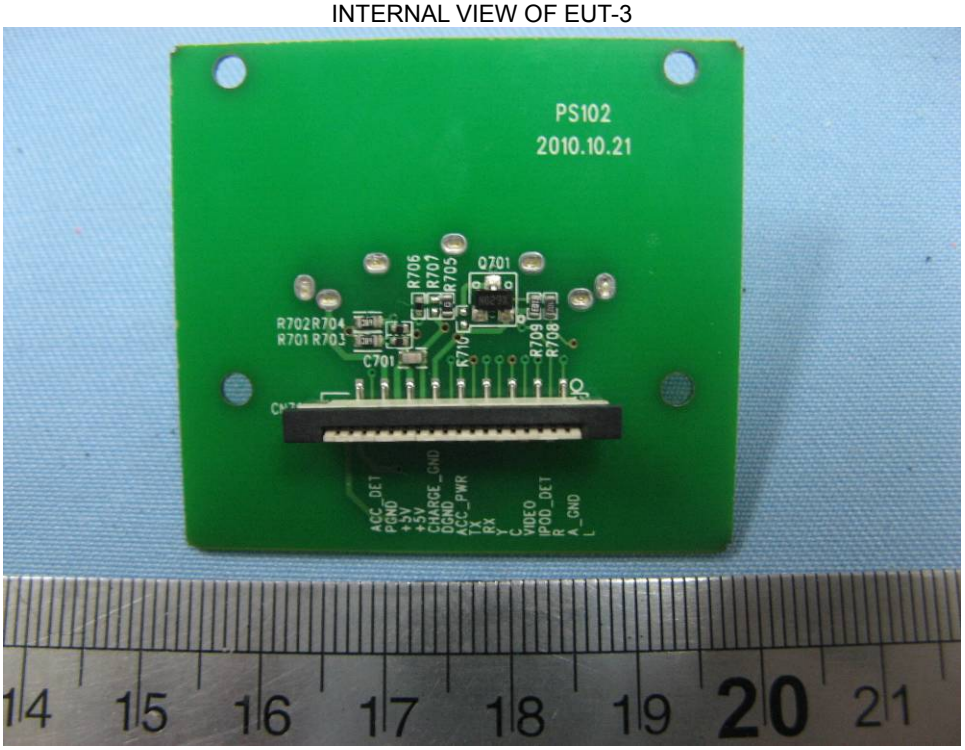
INTERNAL VIEW OF EUT-1



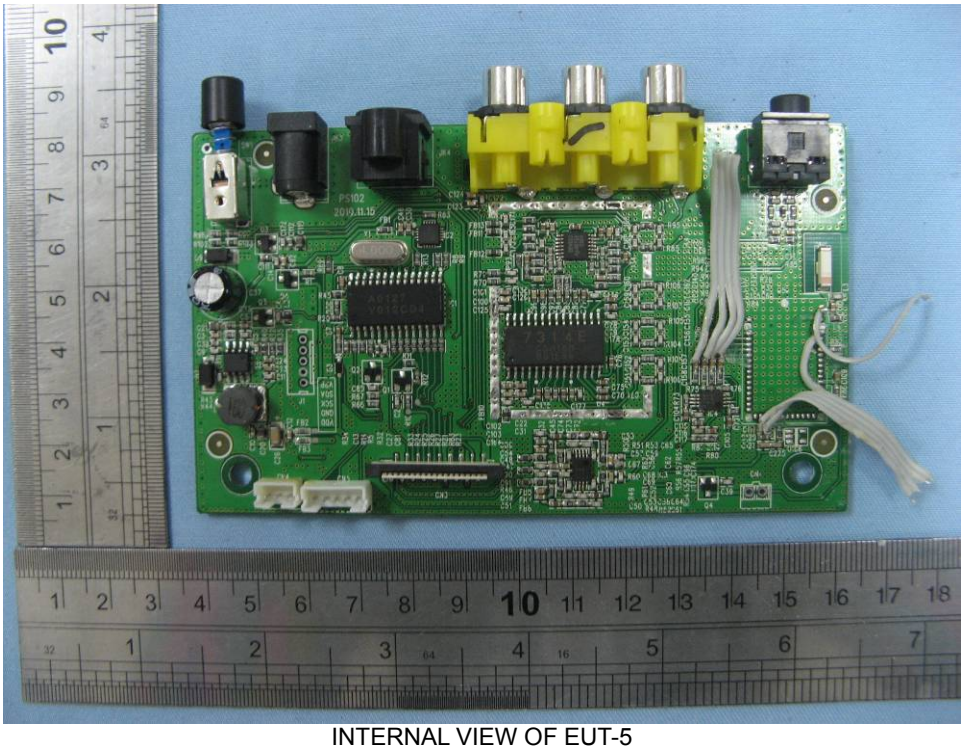
INTERNAL VIEW OF EUT-2



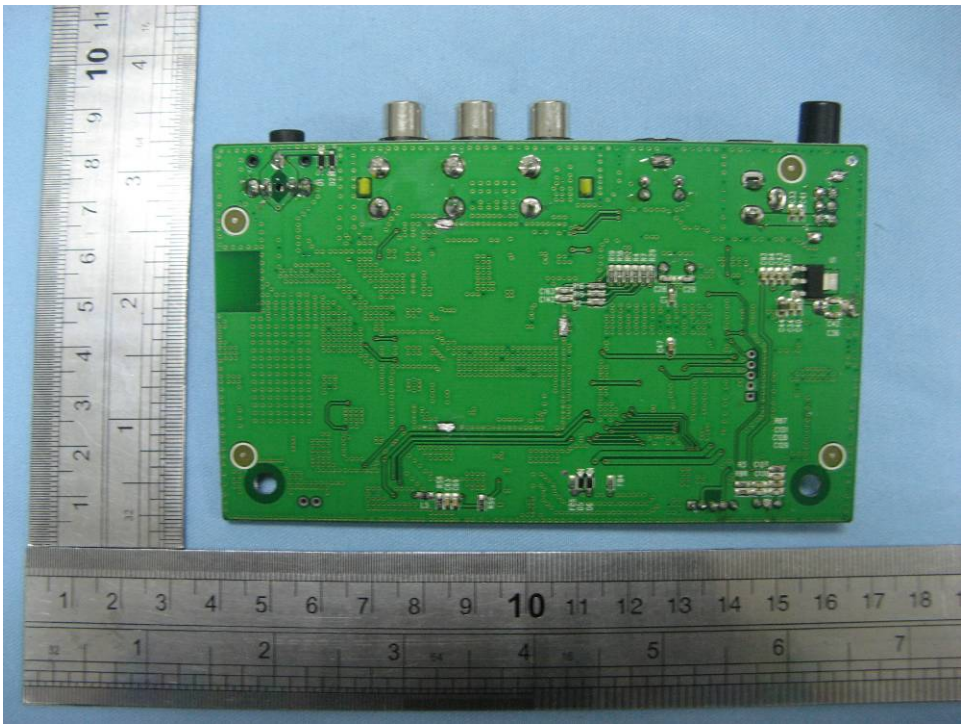
INTERNAL VIEW OF EUT-3



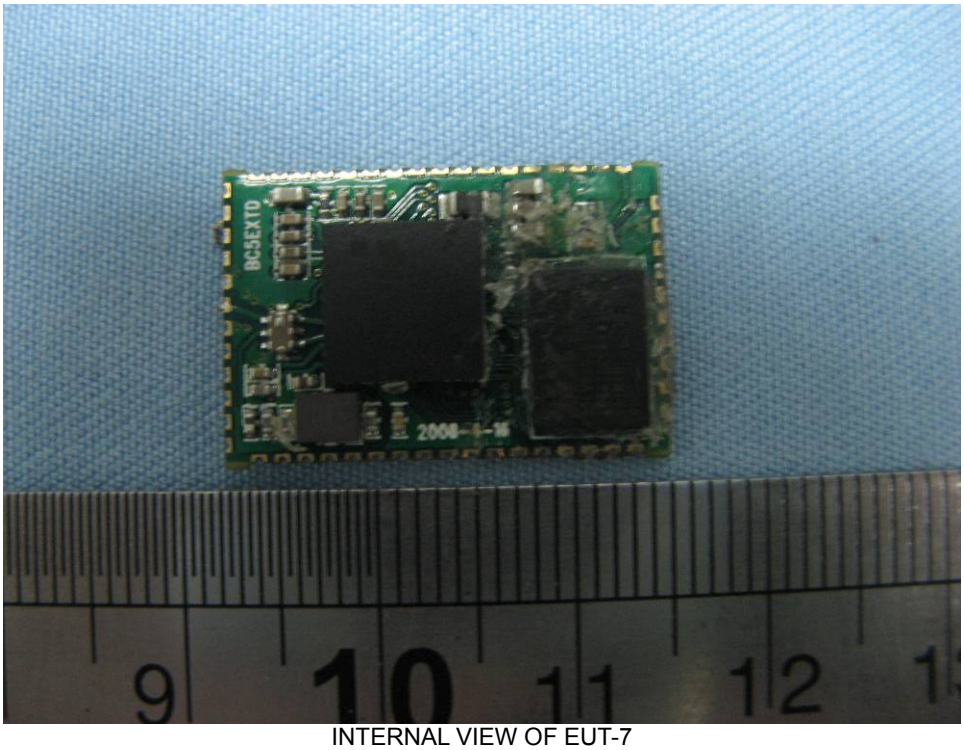
INTERNAL VIEW OF EUT-4



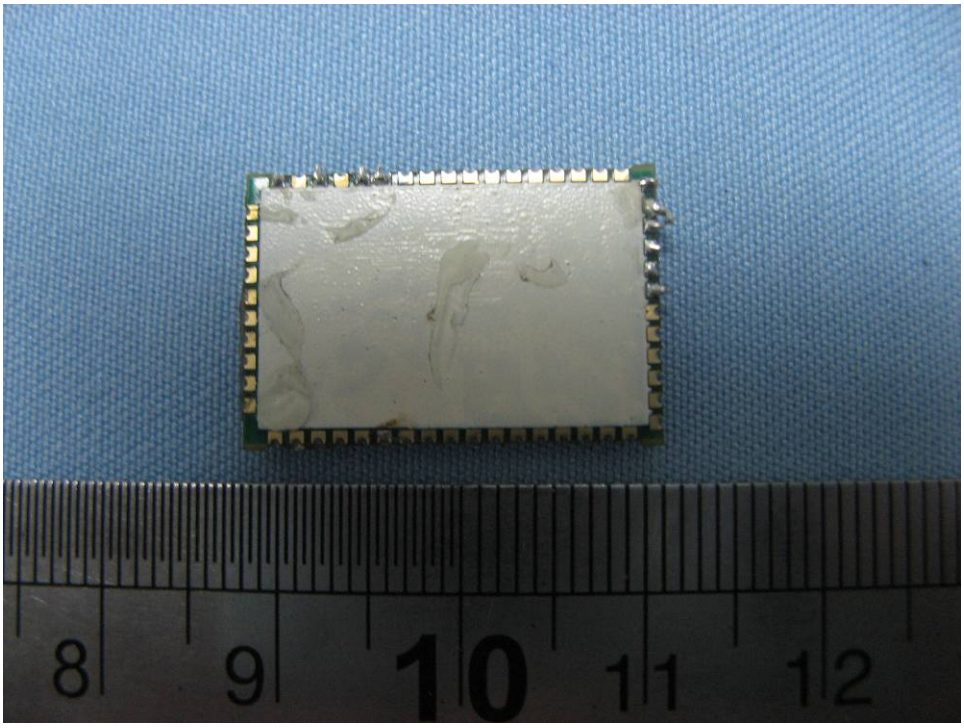
INTERNAL VIEW OF EUT-5



INTERNAL VIEW OF EUT-6



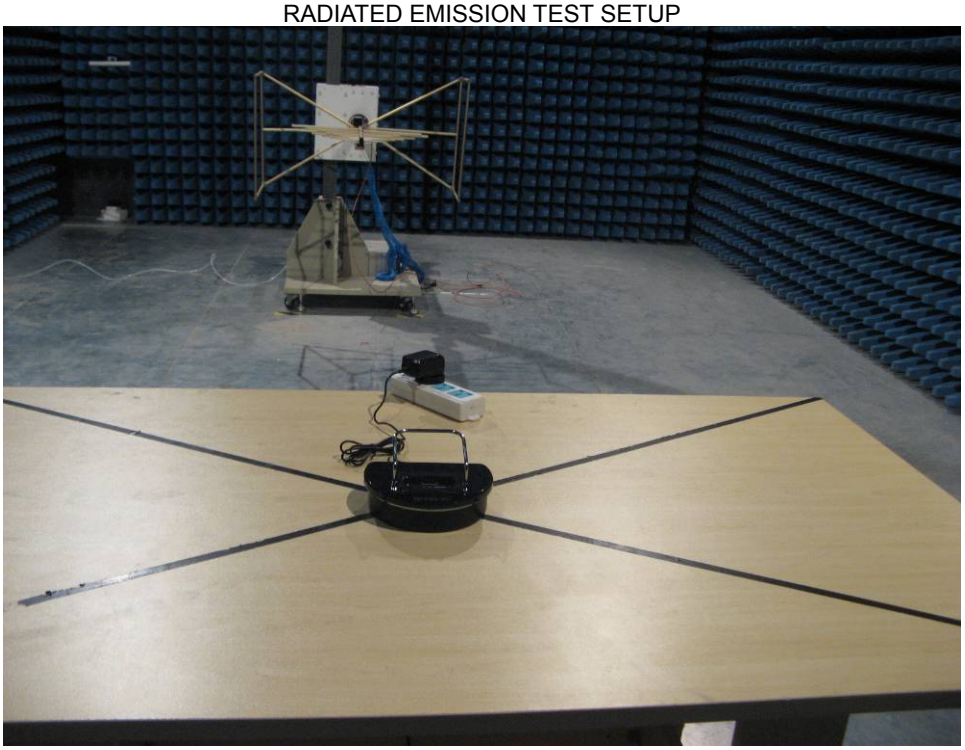
INTERNAL VIEW OF EUT-7



APPENDIX II
PHOTOGRAPHS OF THE TEST SETUP

LINE COMDUCTED EMISSION TEST SETUP

RADIATED EMISSION TEST SETUP



----END OF REPORT----