

Prüfbericht-Nr.: <i>Test report No.:</i>	50084596 002	Auftrags-Nr.: <i>Order No.:</i>	164088664	Seite 1 von 28 <i>Page 1 of 28</i>	
Kunden-Referenz-Nr.: <i>Client reference No.:</i>	N/A	Auftragsdatum: <i>Order date.:</i>	22.03.2017		
Auftraggeber: <i>Client:</i>	Lightcomm Technology Co., Ltd. RM 1808 18/F, FO TAN INDUSTRIAL CENTRE, NOS. 26-28 AU PUI WAN STREET, FO TAN SHATIN NEW TERRITORIES HONG KONG				
Prüfgegenstand: <i>Test item:</i>	Tablet PC				
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	MID7006-L, DL7006, MID7006A-L, DL7006-KB, DL7006KB, DL70XXXXXX (X can be 0~9, A~Z) (DIGILAND)				
Auftrags-Inhalt: <i>Order content:</i>	FCC approval				
Prüfgrundlage: <i>Test specification:</i>	CFR47 FCC Part 15: Subpart C Section 15.247 CFR47 FCC Part 15: Subpart C Section 15.207 CFR47 FCC Part 15: Subpart C Section 15.209				
Wareneingangsdatum: <i>Date of receipt:</i>	03.04.2017	Refer to photo documents			
Prüfmuster-Nr.: <i>Test sample No.:</i>	A000520683-002 A000520683-003				
Prüfzeitraum: <i>Testing period:</i>	10.04.2017 - 18.05.2017				
Ort der Prüfung: <i>Place of testing:</i>	SHENZHEN ALPHA PRODUCT TESTING CO., LTD.				
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.				
Prüfergebnis*: <i>Test result*:</i>	Pass				
geprüft von / tested by:		kontrolliert von / reviewed by:			
 01.06.2017 Andy Yan / Project Manager		 01.06.2017 Owen Tian / Technical Certifier			
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>
Sonstiges / Other:					
Only the Bluetooth (Dual mode) functions are reported in this test report. FCC ID: XMF-MID7006 For model difference information refer to clause 3.1					
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>			Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged:</i>		
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legende: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specifications(s) F(ail) = failed a.m. test specifications(s) N/A = not applicable N/T = not tested					
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>					

V04

Test Summary

5.1.1 ANTENNA REQUIREMENT*RESULT: Pass***5.1.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER***RESULT: Pass***5.1.3 CONDUCTED POWER SPECTRAL DENSITY***RESULT: Pass***5.1.4 6dB BANDWIDTH***RESULT: Pass***5.1.5 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 kHz BANDWIDTH***RESULT: Pass***5.1.6 RADIATED SPURIOUS EMISSION***RESULT: Pass***5.1.7 20dB BANDWIDTH***RESULT: Pass***5.1.8 CARRIER FREQUENCY SEPARATION***RESULT: Pass***5.1.9 NUMBER OF HOPPING FREQUENCY***RESULT: Pass***5.1.10 TIME OF OCCUPANCY***RESULT: Pass***5.1.11 CONDUCTED EMISSION ON AC MAINS***RESULT: Pass*

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1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Test Results of Bluetooth 4.2 (Dual mode) of Conducted Testing

Appendix B: Test Results of Bluetooth 4.2 (Dual mode) of Radiated Spurious Emission and Conducted Emission on AC Mains

2 Test Sites

2.1 Test Facilities

SHENZHEN ALPHA PRODUCT TESTING CO., LTD.

Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen City, Guangdong Province, P.R. China

FCC Registration No.: 203110

The tests at the test sites have been conducted under the supervision of a TÜV engineer.

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

SHENZHEN ALPHA PRODUCT TESTING CO., LTD.

Radio Spectrum Test				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Signal Analyzer	Agilent	N9020A	MY499100060	2017.09.28
Conducted Emission				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Test Receiver	ROHDE&SCHWARZ	ESCI	101165	2017.09.28
L.I.S.N.	SCHWARZBECK	NSLK8126	8126-466	2017.09.28
L.I.S.N.	ROHDE&SCHWARZ	ENV216	101043	2017.09.28
Pulse Limiter	SCHWARZBECK	9516F	9618	2017.09.28
Spurious Emission				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2018.09.28
Bilog Antenna	SCHWARZBECK	VULB 9168	9168#627	2018.09.29
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2018.09.29
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA 9170 D(1432)	2019.01.20
PreAmplifier	Agilent	8449B	3008A02664	2017.09.28
Test Receiver	ROHDE&SCHWARZ	ESR	1316.3003K03- 102082-Wa	2017.09.28
Spectrum analyzer	Agilent	E4407B	MY49510055	2017.09.28

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table

Item	Extended Uncertainty
Conducted Emission	± 2.74 dB
Radiated Emission (up to 1GHz)	± 3.80 dB
Radiated Emission (above 1GHz)	± 4.16 dB
Antenna Port Emission	± 0.56 dB
Temperature	± 0.5 °C
Humidity	± 3.0 %

2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The SHENZHEN ALPHA PRODUCT TESTING CO., LTD. Test facility located at Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen City, Guangdong Province, P.R. China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The EUT is a 'Tablet PC' device. It supports Bluetooth 4.2 (Dual mode) and 2.4GHz Wi-Fi 802.11 a/b/g/n wireless technology. This report is only for Bluetooth functions (DTS and DSS).

Model difference description:

All the models in this reports are identical in the PCBA, Drivers, Enclosure etc. electronic aspects, the detail as below.

Model No.	Detail
MID7006A-L, DL7006-KB	Excepting with Micro USB Port to connect the keyboard, with DC jack. All other electronic aspects are identical with the models.
MID7006-L, DL7006, DL70XXXXXX	Excepting without Micro USB Port to connect the keyboard, without DC jack. All other electronic aspects are identical with the other models.

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 2: Technical Specification of EUT

Technical Specification	Value
Kind of Equipment	Tablet PC
Type Designation	MID7006A-L, DL7006-KB, MID7006-L, DL7006, DL70XXXXXX
Trade Mark	DIGILAND
FCC ID	XMF-MID7006
Operating Frequency	2402 - 2480 MHz
Operating Temperature Range	0 °C ~ +40 °C
Operating Voltage	DC 3.7V 2100mAh via internal rechargeable Li-Poly battery DC 5.0V 1.5A via AC/DC adapter for charging
Testing Voltage	Fully charged DC 3.7V internal rechargeable Li-Poly battery DC 5.0V 1.5A via AC/DC adapter with 120V/60Hz input
Type of Modulation	GFSK, $\pi/4$ DQPSK, 8DPSK
Channel Number	BDR & EDR mode:79 channels; Low Energy mode:40 channels
Channel Separation	BDR & EDR mode:1MHz; Low Energy mode:2MHz
Wireless Technology	Bluetooth 4.2 (Dual mode)
Antenna Type	Integral PIFA Antenna
Antenna Gain	3.79 dBi

Table 3: RF Channel and Frequency of Bluetooth

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
00	2402.00	20	2422.00	40	2442.00	60	2462.00
01	2403.00	21	2423.00	41	2443.00	61	2463.00
02	2404.00	22	2424.00	42	2444.00	62	2464.00
03	2405.00	23	2425.00	43	2445.00	63	2465.00
04	2406.00	24	2426.00	44	2446.00	64	2466.00
05	2407.00	25	2427.00	45	2447.00	65	2467.00
06	2408.00	26	2428.00	46	2448.00	66	2468.00
07	2409.00	27	2429.00	47	2449.00	67	2469.00
08	2410.00	28	2430.00	48	2450.00	68	2470.00
09	2411.00	29	2431.00	49	2451.00	69	2471.00
10	2412.00	30	2432.00	50	2452.00	70	2472.00
11	2413.00	31	2433.00	51	2453.00	71	2473.00
12	2414.00	32	2434.00	52	2454.00	72	2474.00
13	2415.00	33	2435.00	53	2455.00	73	2475.00
14	2416.00	34	2436.00	54	2456.00	74	2476.00
15	2417.00	35	2437.00	55	2457.00	75	2477.00
16	2418.00	36	2438.00	56	2458.00	76	2478.00
17	2419.00	37	2439.00	57	2459.00	77	2479.00
18	2420.00	38	2440.00	58	2460.00	78	2480.00
19	2421.00	39	2441.00	59	2461.00	--	--

Table 4: RF Channel and Frequency of Bluetooth Low Energy

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
00	2402.00	10	2422.00	20	2442.00	30	2462.00
01	2404.00	11	2424.00	21	2444.00	31	2464.00
02	2406.00	12	2426.00	22	2446.00	32	2466.00
03	2408.00	13	2428.00	23	2448.00	33	2468.00
04	2410.00	14	2430.00	24	2450.00	34	2470.00
05	2412.00	15	2432.00	25	2452.00	35	2472.00
06	2414.00	16	2434.00	26	2454.00	36	2474.00
07	2416.00	17	2436.00	27	2456.00	37	2476.00
08	2418.00	18	2438.00	28	2458.00	38	2478.00
09	2420.00	19	2440.00	29	2460.00	39	2480.00

Table 5: Frequency Hopping Information

Technical Specification	Description
Hopping Range	Hereby we declare that the maximum frequency of this device is: 2402-2480MHz. This is according the Bluetooth Core Specification for devices which will be operated in the USA. This was checked during the Bluetooth Qualification tests (Test Case: TRM/CA/04-E).
Hopping Sequence	Example of a 79 hopping sequence in data mode: 33,04,21,44,23,42,53,46,55,48,40,59,72,29,76,31,08,73,07,75,09,45,60,39,58,13,47,11,77,52,35,50,65,54,67,56,69,62,71,64, 7,25,27,66,57,70,74,61,78,63,10,41,05,43,15,44,64,68,02,70,06,01,51,03,55,05,03,66,53,49,36,47,
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 the 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 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 packer 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.

3.3 Independent Operation Modes

The basic operation modes are:

- A. On
 - 1. Bluetooth Transmitting mode (BDR & EDR mode)
 - 1) Low Channel
 - 2) Middle Channel
 - 3) High Channel
 - 2. Bluetooth Transmitting mode (Low Energy mode)
 - 1) Low Channel
 - 2) Middle Channel
 - 3) High Channel
- B. On, Transmitting on Hopping channel
- C. On, Bluetooth connecting mode
- D. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- | | |
|------------------------------|-------------------------|
| - Application Form | - Parts List |
| - Block Diagram | - Schematics |
| - ID Label and Location Info | - Photo Document |
| - User Manual | - Operation Description |

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All testing were performed according to the procedures in ANSI C63.10: 2013.

According to clause 3.1, all tests were performed on model MID7006A-L in this report.

4.3 Special Accessories and Auxiliary Equipment

Table 6: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	Rating
Adapter	TEKA	TEKA006-0501500UKC	Input: AC100~240V 50/60Hz 0.3A, Output: DC 5V/1.5A

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

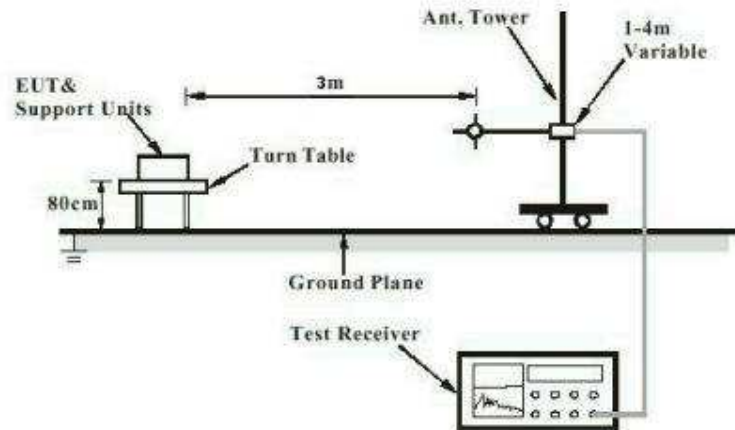


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

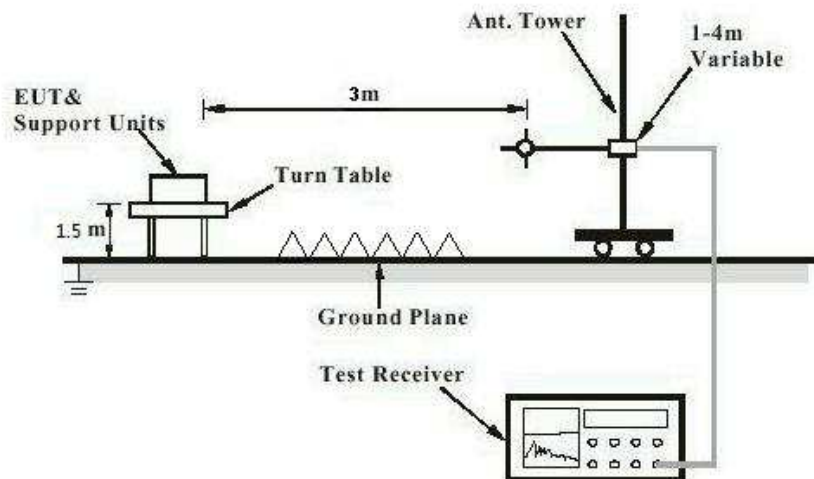


Diagram of Measurement Configuration for Mains Conduction Measurement

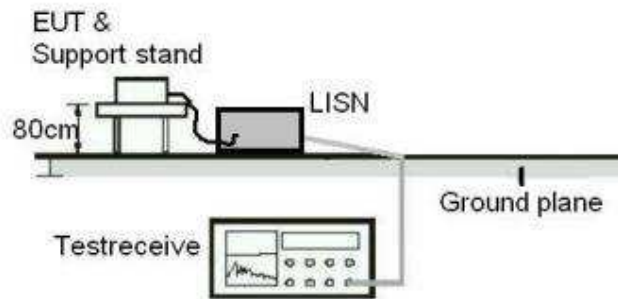
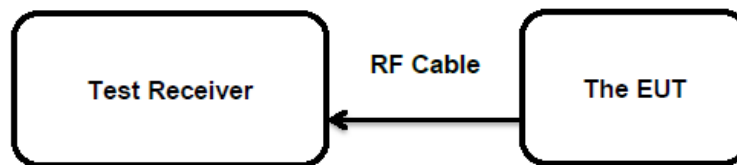


Diagram of Measurement Configuration for Conducted Transmitter Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Pass**

Test Specification

Test standard : FCC Part 15.247(b)(4) and Part 15.203

According to the manufacturer declared, the EUT has an internal antenna, the directional gain of antenna is 3.79dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

5.1.2 Maximum Peak Conducted Output Power

RESULT:
Pass
Test Specification

Test standard : FCC Part 15.247(b)(1)&(3)
 Basic standard : ANSI C63.10: 2013
 Limits : FHSS < 0.125 Watts, DSSS < 1.0 Watts
 Kind of test site : Shielded Room

Test Setup

Date of testing : 10.04.2017
 Input voltage : Fully charged DC 3.7V internal rechargeable Li-Poly battery
 Operation mode : A.1, A.2
 Test channel : Low / Middle / High
 Ambient temperature : 24 °C
 Relative humidity : 50 %
 Atmospheric pressure : 101 kPa

Table 7: Test Result of Maximum Peak Conducted Output Power

Test Mode	Channel Frequency (MHz)	Measured Peak Output Power		Limit (W)
		(dBm)	(W)	
BDR	2402	3.7	0.0023	< 0.125
	2441	4.2	0.0026	
	2480	4.3	0.0027	
EDR	2402	2.9	0.0019	< 0.125
	2441	3.4	0.0022	
	2480	3.5	0.0022	
Low Energy	2402	-4.2	0.0004	< 1.0
	2440	-3.7	0.0004	
	2480	-3.7	0.0004	
Maximum Measured Value		4.3	0.0027	/

Note: The cable loss is taken into account in results.

For the measurement records, refer to the appendix A.

5.1.3 Conducted Power Spectral Density

RESULT:
Pass
Test Specification

Test standard : FCC Part 15.247(e)
 Basic standard : ANSI C63.10: 2013
 Limits : 8 dBm/3kHz
 Kind of test site : Shielded Room

Test Setup

Date of testing : 10.04.2017
 Input voltage : Fully charged DC 3.7V internal rechargeable Li-Poly battery
 Operation mode : A.2
 Test channel : Low / Middle / High
 Ambient temperature : 24 °C
 Relative humidity : 50 %
 Atmospheric pressure : 101 kPa

Table 8: Test Result of Power Spectral Density, Low Energy

Test Mode	Test Channel (MHz)	Power Spectrum Density(dBm/3kHz)	Limit (dBm/3kHz)
Low Energy	2402	-21.8	< 8.0
	2440	-21.8	
	2480	-21.5	
Maximum Measured Value		-21.5	

Note: The cable loss is taken into account in results.

For the measurement records, refer to the appendix A.

5.1.4 6dB Bandwidth**RESULT:****Pass****Test Specification**

Test standard : FCC Part 15.247(a)(2)
Basic standard : ANSI C63.10: 2013
Limits : More than 500 KHz
Kind of test site : Shielded Room

Test Setup

Date of testing : 10.04.2017
Input voltage : Fully charged DC 3.7V internal rechargeable Li-Poly battery
Operation mode : A.2
Test channel : Low / Middle / High
Ambient temperature : 24 °C
Relative humidity : 50 %
Atmospheric pressure : 101 kPa

Table 9: Test Result of 6dB Bandwidth, Low Energy

Test Mode	Test Channel (MHz)	-6dB Bandwidth (kHz)	Limit (kHz)
Low Energy	2402	688.5	> 500
	2440	687.8	
	2480	697.9	
Minimum Measured Value		697.9	

Note: The cable loss is taken into account in results.

For the measurement records, refer to the appendix A.

5.1.5 Conducted Spurious Emissions Measured in 100 kHz Bandwidth**RESULT:****Pass****Test Specification**

Test standard : FCC Part 15.247(d)
Basic standard : ANSI C63.10: 2013
Limits : 20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power);

Kind of test site : Shielded Room

Test Setup

Date of testing : 10.05.2017
Input voltage : Fully charged DC 3.7V internal rechargeable Li-Poly battery
Operation mode : A.1, A.2
Test channel : Low / Middle / High
Ambient temperature : 24 °C
Relative humidity : 50 %
Atmospheric pressure : 101 kPa

For the measurement records, refer to the appendix A.

5.1.6 Radiated Spurious Emission

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.247(d) & FCC Part 15.205
Basic standard	: ANSI C63.10: 2013
Limits	: Refer to 15.209(a) of FCC part 15.247(d)
Kind of test site	: 3m Semi-anechoic Chamber

Test Setup

Date of testing	: 13.04.2017~09.05.2017
Input voltage	: Fully charged DC 3.7V internal rechargeable Li-Poly battery DC 5.0V 2.5A via AC/DC adapter with 120V/60Hz input
Operation mode	: A.1, A.2
Test channel	: Low / Middle / High
Ambient temperature	: 23.5 °C
Relative humidity	: 51 %
Atmospheric pressure	: 101 kPa

Remark:

During the pretest the EUT was rotated through three orthogonal axes to determine the attitude that maximizes the emissions. After that the EUT was manually handled to find the orientation that has the maximum emission, which is the orientation shown in the test set-up photos.

Pre-test the EUT in continuous transmitting mode at the low, middle and high channel with different data packet. Compliance test in continuous transmitting mode with EDR mode (DH5) as the worst case was found.

Testing was carried out within frequency range 9kHz to the tenth harmonics.

For the measurement records, refer to the appendix B.

5.1.7 20dB Bandwidth

RESULT:
Pass
Test Specification

Test standard : FCC Part 15.247(a)(1)
Basic standard : ANSI C63.10: 2013
Kind of test site : Shielded Room

Test Setup

Date of testing : 10.04.2017
Input voltage : Fully charged DC 3.7V internal rechargeable Li-Poly battery
Operation mode : A.1
Test channel : Low / Middle / High
Ambient temperature : 24 °C
Relative humidity : 50 %
Atmospheric pressure : 101 kPa

Table 10: Test Result of 20dB Bandwidth

Test Mode	Channel Frequency (MHz)	20dB Bandwidth (kHz)	2/3 of 20dB Bandwidth (kHz)	Limit (MHz)
BDR	2402	834	556	Within the frequency band 2400 - 2483.5MHz
	2441	829	553	
	2480	828	552	
EDR	2402	1110	740	
	2440	1109	739	
	2480	1164	776	
Maximum Measured Value		1164	776	/

For the measurement records, refer to the appendix A.

5.1.8 Carrier Frequency Separation

RESULT:
Pass
Test Specification

Test standard : FCC Part 15.247(a)(1)
 Basic standard : ANSI C63.10: 2013
 Limits : $\geq 25\text{kHz}$ or $2/3$ of 20dB bandwidth, whichever is greater
 Kind of test site : Shielded Room

Test Setup

Date of testing : 10.04.2017
 Input voltage : Fully charged DC 3.7V internal rechargeable Li-Poly battery
 Operation mode : B
 Test channel : Low / Middle / High
 Ambient temperature : 24 °C
 Relative humidity : 50 %
 Atmospheric pressure : 101 kPa

Table 11: Test Result of Carrier Frequency Separation

Channel	Channel Frequency (MHz)	Measured Channel Separation (KHz)	Limit (kHz)	Result
Low Channel	2402	1002	≥ 25kHz or 2/3 of 20dB bandwidth	Pass
Adjacency Channel	2403			
Middle Channel	2441	993		Pass
Adjacency Channel	2442			
High Channel	2480	1020		Pass
Adjacency Channel	2479			

Note:

The limit is maximum $2/3$ of the 20 dB bandwidth: 776KHz.

For the measurement records, refer to the appendix A.

5.1.9 Number of Hopping Frequency

RESULT:**Pass****Test Specification**

Test standard : FCC part 15.247(a)(1)(iii)
Basic standard : ANSI C63.10: 2013
Limits : ≥ 15 non-overlapping channels
Kind of test site : Shielded Room

Test Setup

Date of testing : 10.04.2017
Input voltage : Fully charged DC 3.7V internal rechargeable Li-Poly battery
Operation mode : B
Ambient temperature : 24 °C
Relative humidity : 50 %
Atmospheric pressure : 101 kPa

Table 12: Test Result of Number of Hopping Frequency

Frequency Range	Measured Quantity of Hopping Channel	Limit	Result
2402 to 2480 MHz	79	≥ 15	Pass

For the measurement records, refer to the appendix A.

5.1.10 Time of Occupancy**RESULT:****Pass****Test Specification**

Test standard : FCC part 15.247(a)(1)(iii)
Basic standard : ANSI C63.10: 2013
Limits : < 0.4s
Kind of test site : Shielded Room

Test Setup

Date of testing : 18.05.2017
Input voltage : Fully charged DC 3.7V internal rechargeable Li-Poly battery
Operation mode : B
Test channel : Low / Middle / High
Ambient temperature : 24 °C
Relative humidity : 50 %
Atmospheric pressure : 101 kPa

Table 13: Test Result of Time of Occupancy

Test Mode	Test Channel	Data Packet	Pulse width (ms)	Measured Dwell time(s)	Limit (s)
BDR mode	2402	DH1	0.358	0.115	< 0.4s
		DH3	1.617	0.259	
		DH5	2.850	0.304	
	2441	DH1	0.342	0.109	
		DH3	1.625	0.260	
		DH5	2.850	0.304	
	2480	DH1	0.367	0.117	
		DH3	1.617	0.259	
		DH5	2.842	0.303	
EDR mode	2402	3DH1	0.342	0.109	
		3DH3	1.600	0.256	
		3DH5	2.867	0.306	
	2440	3DH1	0.367	0.117	
		3DH3	1.617	0.259	
		3DH5	2.867	0.306	
	2480	3DH1	0.358	0.115	
		3DH3	1.617	0.259	
		3DH5	2.850	0.304	
Maximum Measured Value			2.867	0.306	

Note:

Dwell time = Pulse width x (Hopping rate / Number of channels) x Period

Period = 0.4 (seconds/ channel) x 79 (channel) = 31.6 seconds

For the measurement records, refer to the appendix A.

5.1.11 Conducted Emission on AC Mains**RESULT:****Pass****Test Specification**

Test standard	: FCC Part 15.207(a)
Basic standard	: ANSI C63.10: 2013
Frequency range	: 0.15 – 30MHz
Limits	: FCC Part 15.207(a)
Kind of test site	: Shielded Room

Test Setup

Date of testing	: 06.05.2017
Operation mode	: B
Earthing	: Not connected
Ambient temperature	: 23.6 °C
Relative humidity	: 54 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix B.

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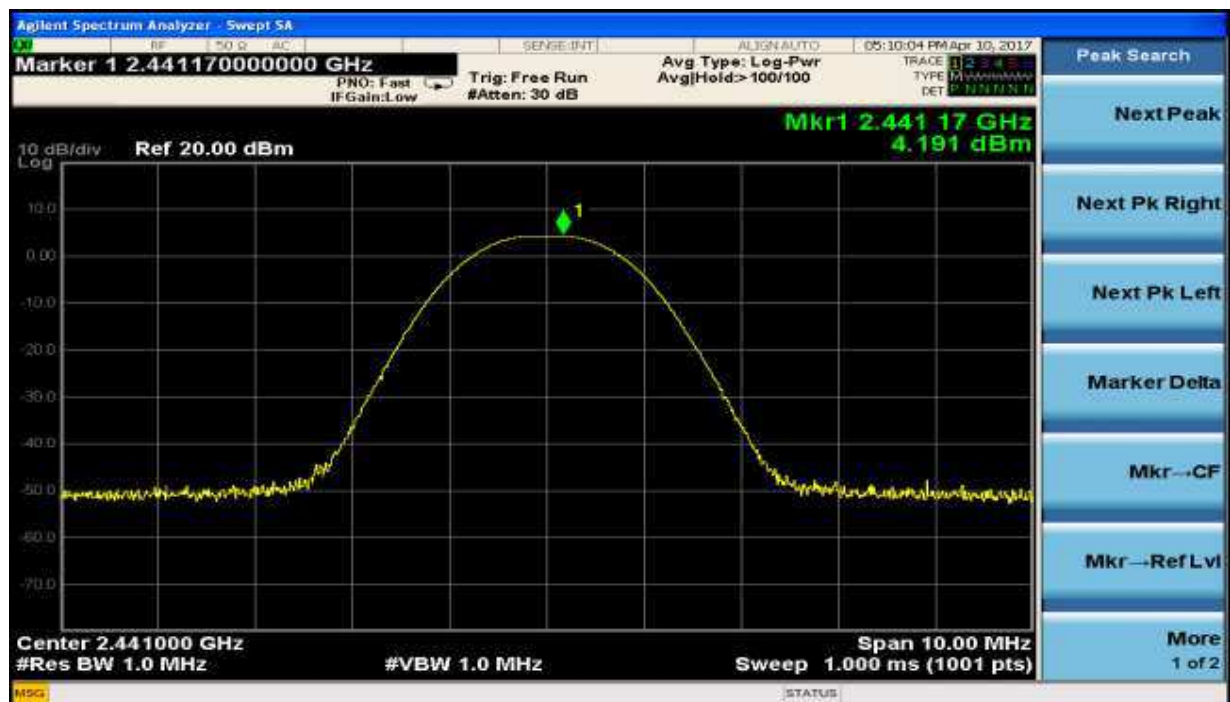
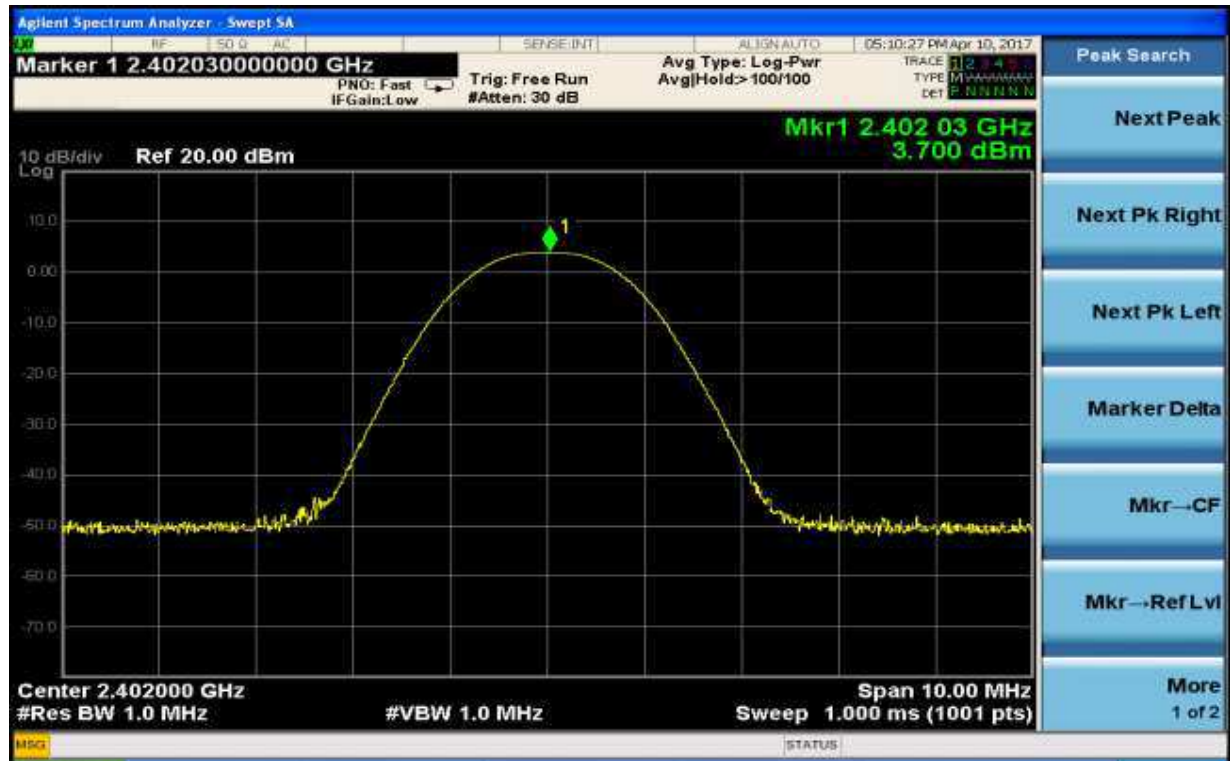
Appendix A

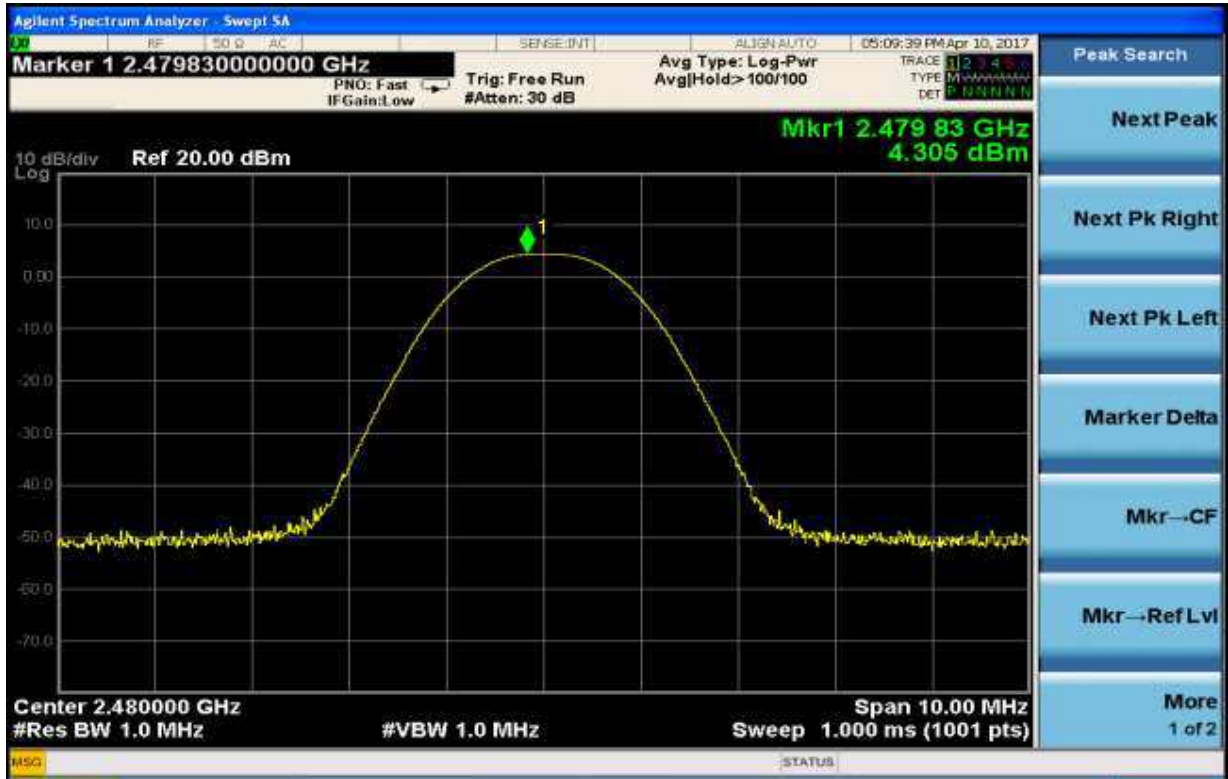
Test Results of Bluetooth 4.2 (Dual mode) of Conducted Testing

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Appendix A.1: Test Plots of Maximum Peak Conducted Output Power

BDR Mode, DH1





EDR Mode, 3DH1





Low Energy Mode





Appendix A.2: Test Plots of Conducted Power Spectral Density

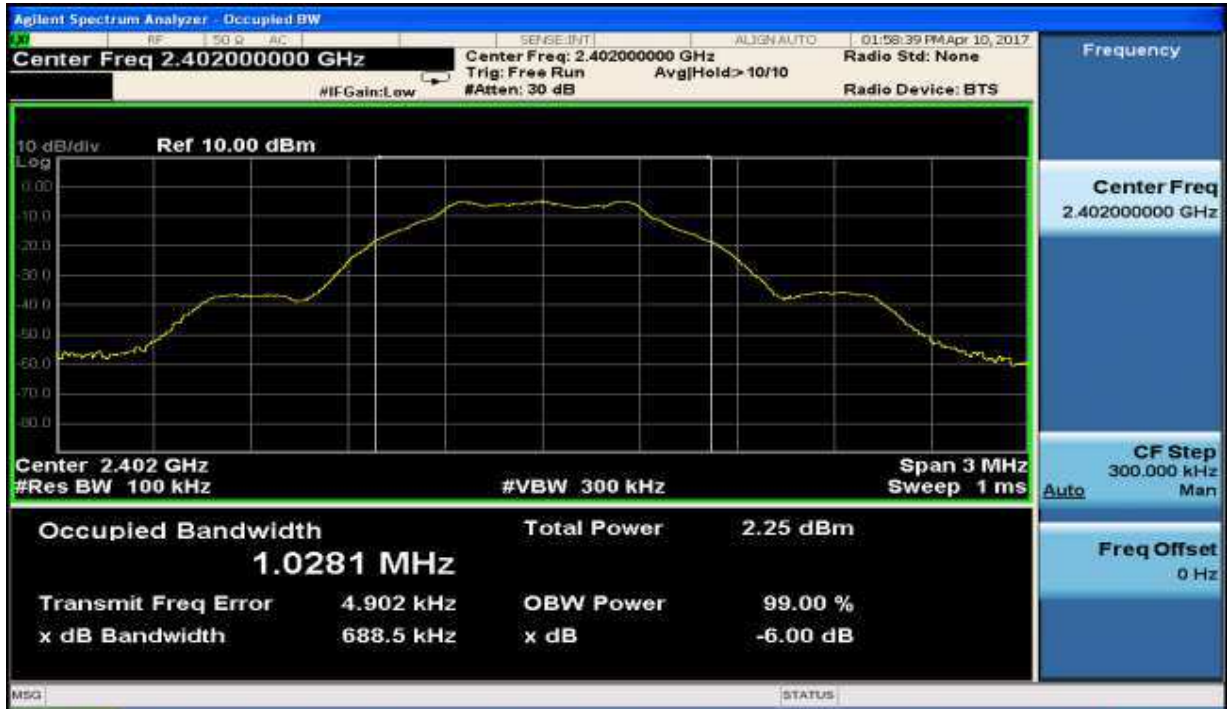
Low Energy Mode





Appendix A.3: Test Plots of 6dB Bandwidth

Low Energy Mode





Appendix A.4: Test Plots of 20dB Bandwidth

BDR Mode, DH1





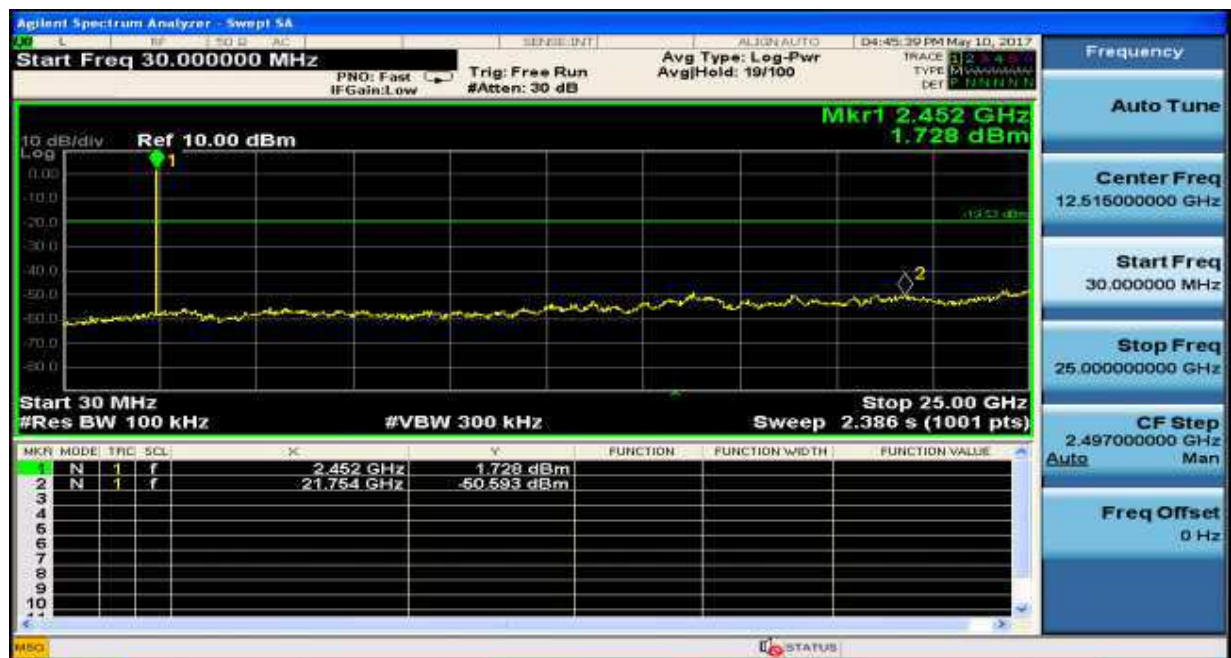
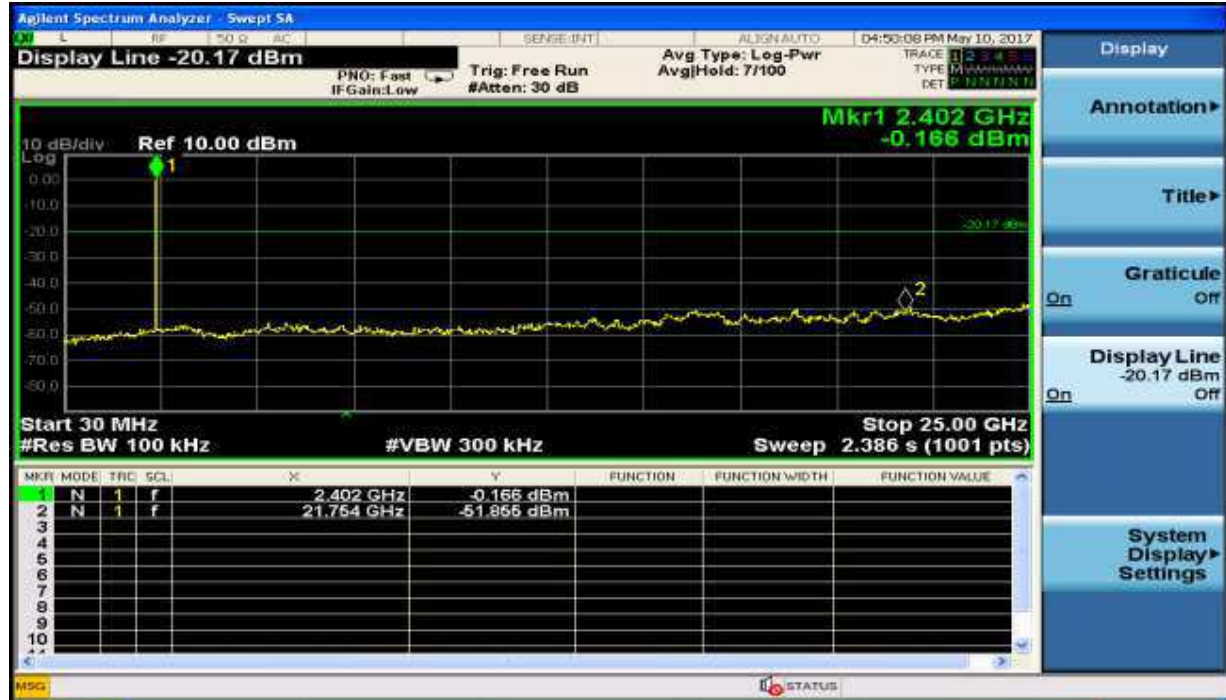
EDR Mode, 3DH1

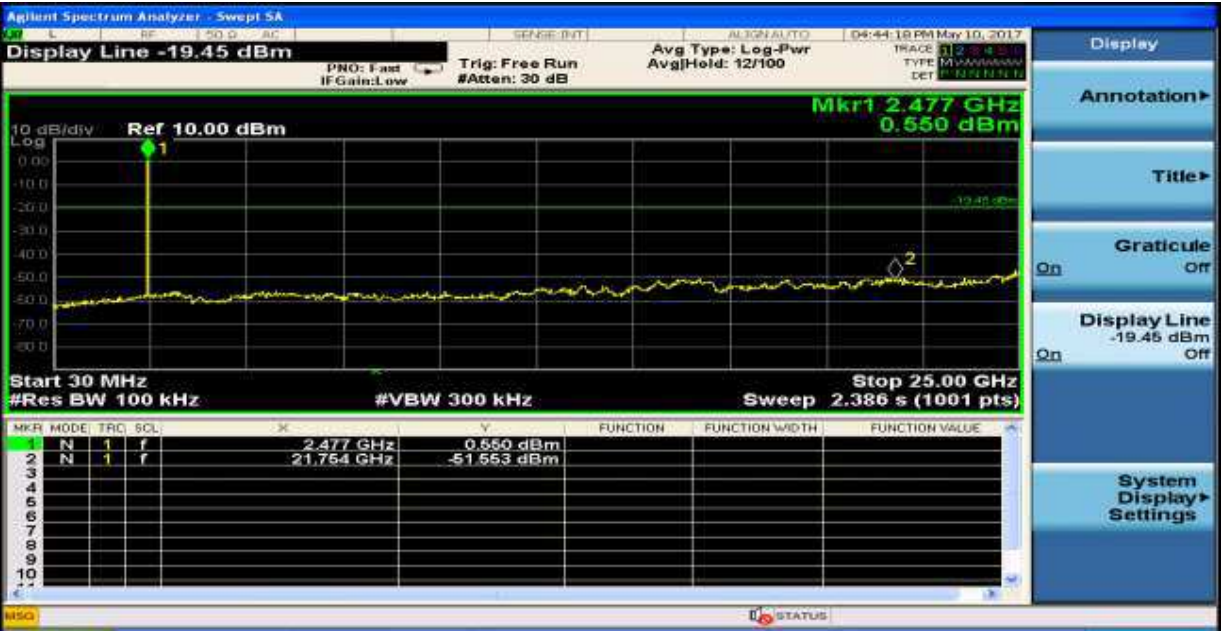




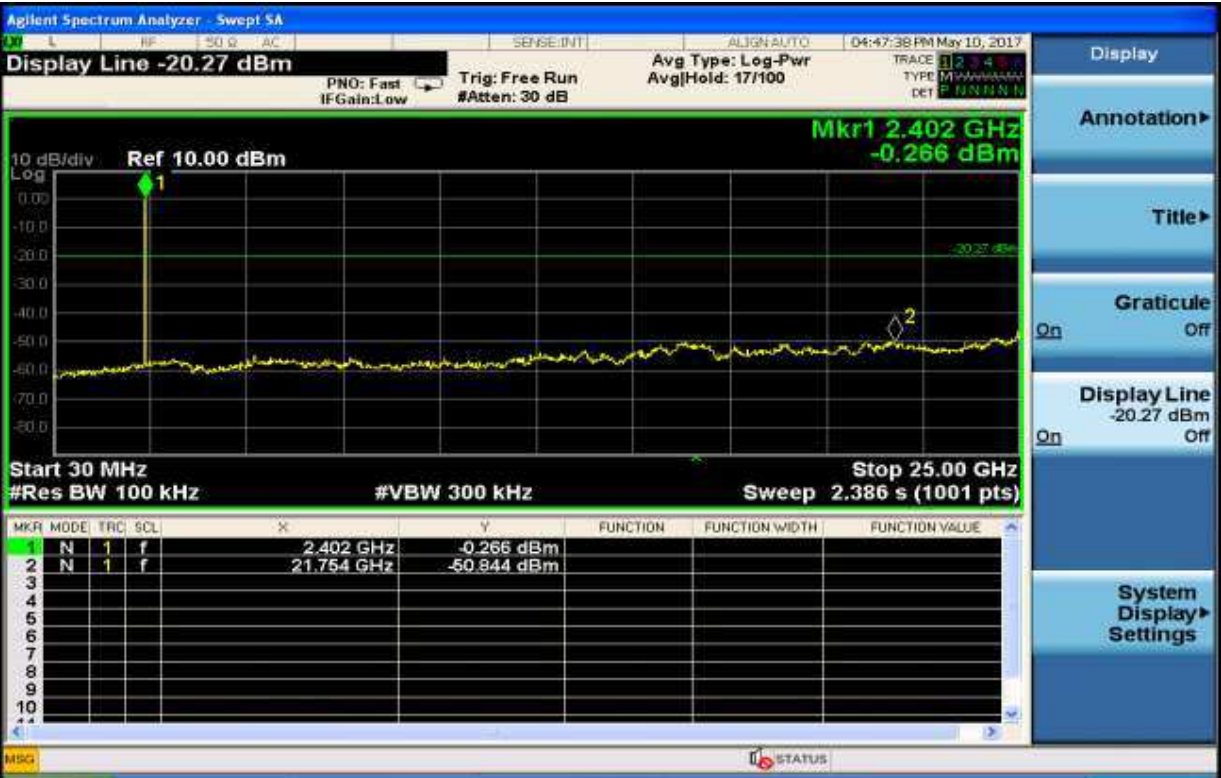
Appendix A.5: Test Plots of Conducted Spurious Emissions Measured in 100 kHz Bandwidth

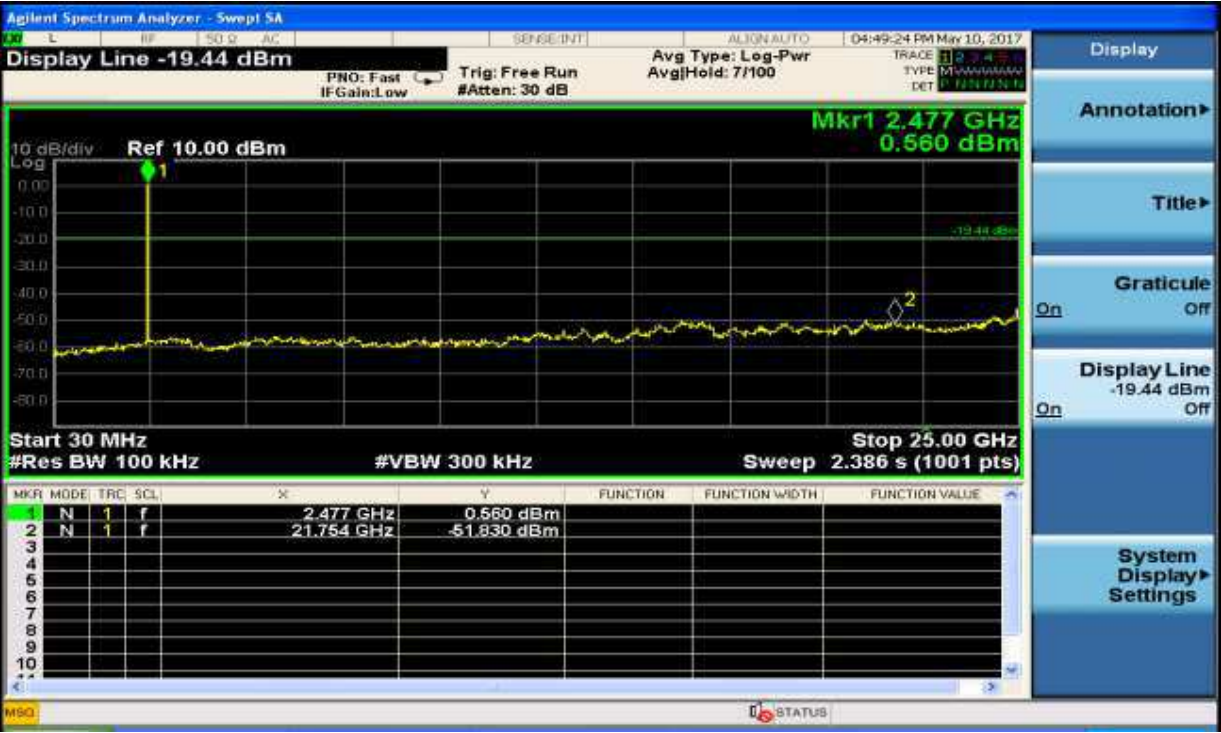
BDR Mode, DH1



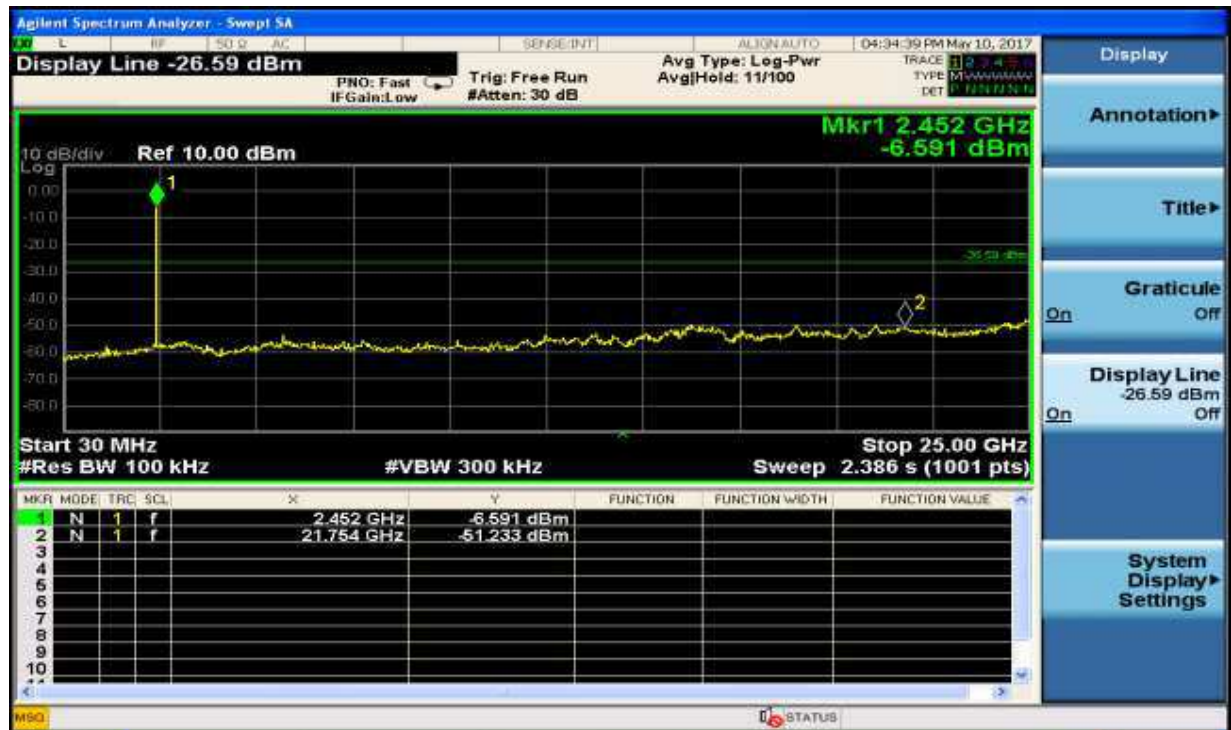
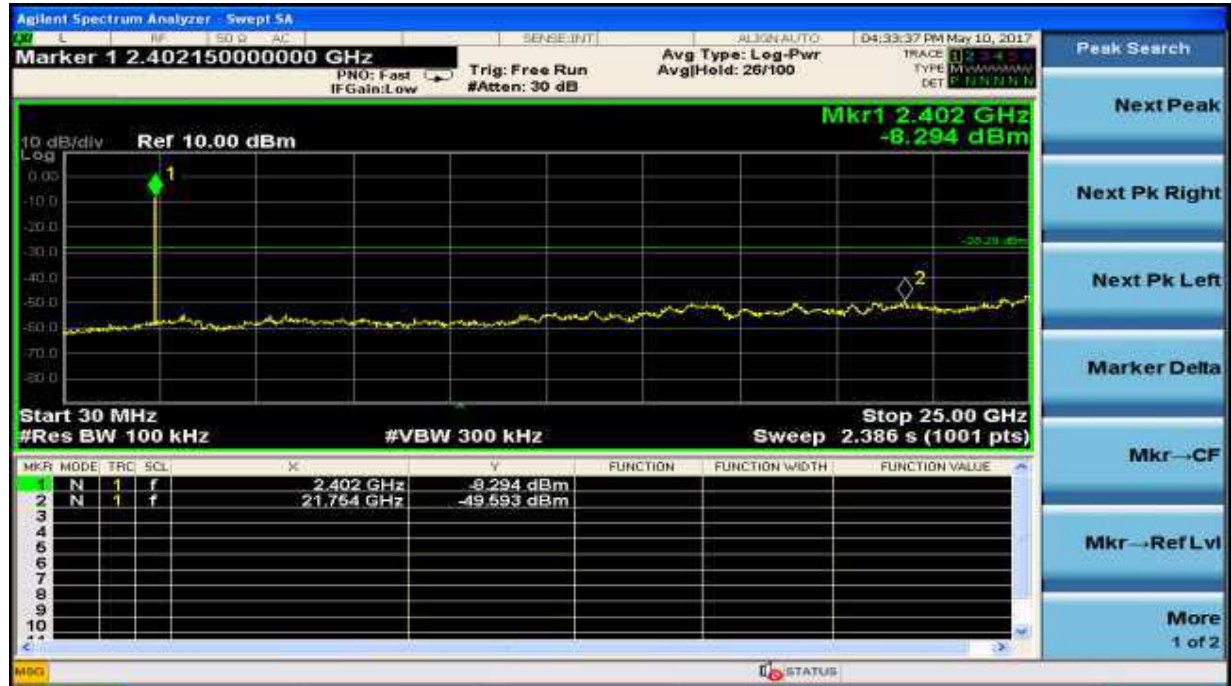


EDR Mode, 3DH1



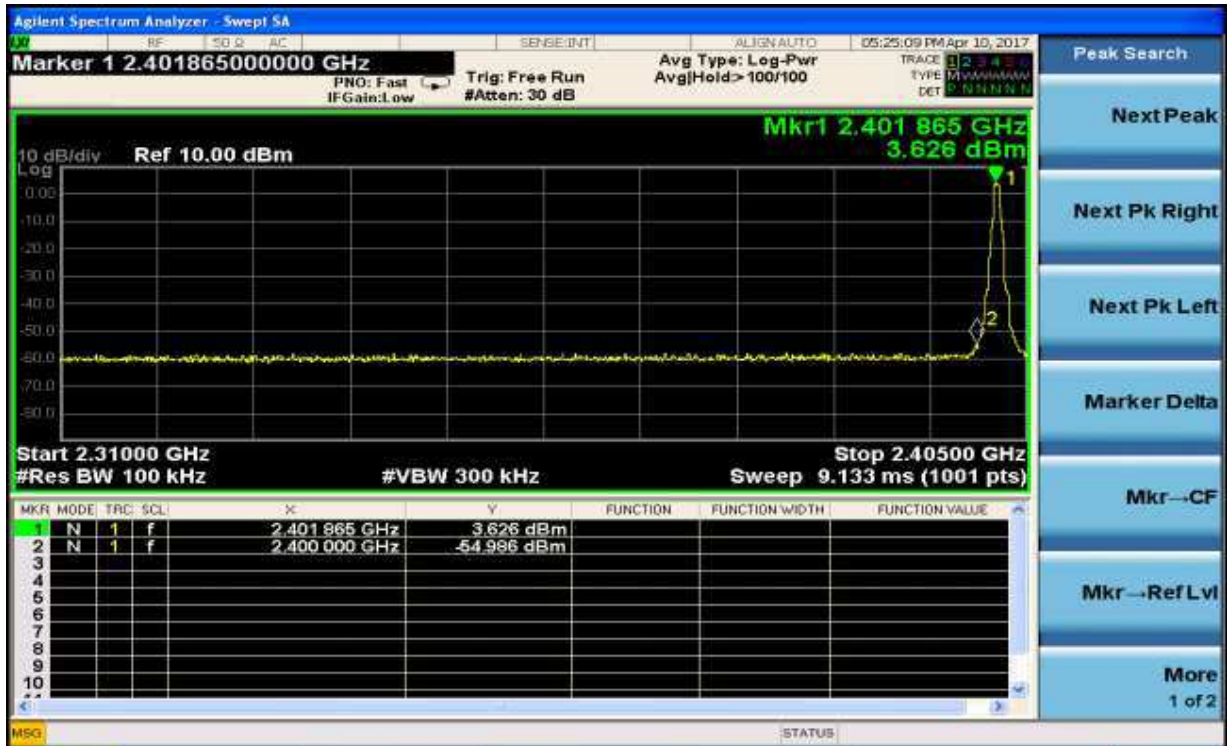


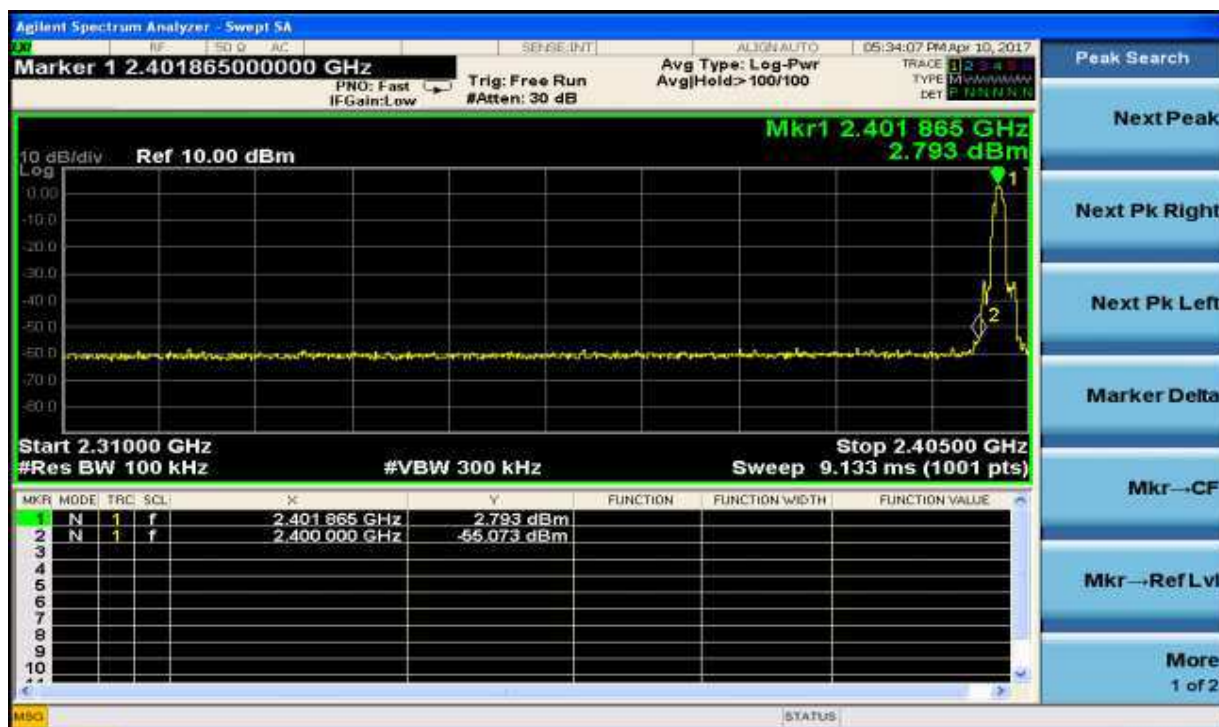
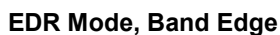
Low Energy Mode

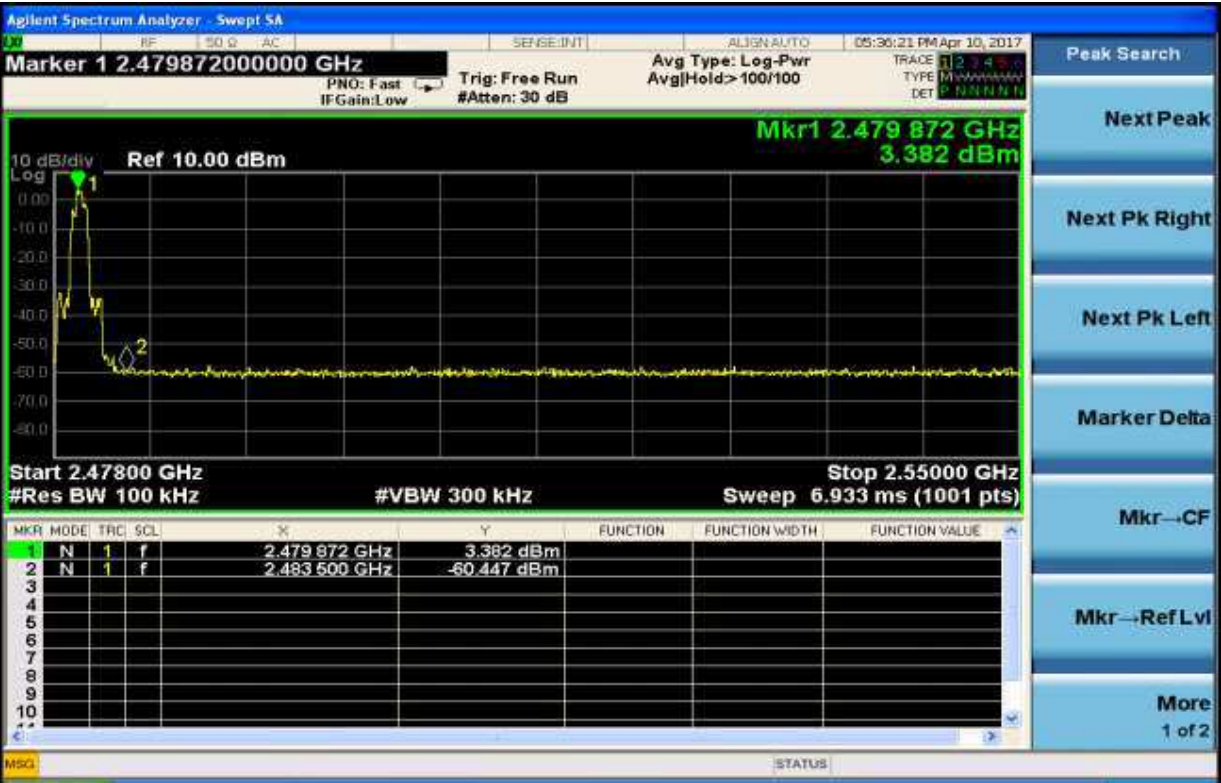




BDR Mode, Band Edge







Low Energy Mode, Band Edge

Reder to Appendix B Bandedge

Appendix A.6: Test Plots of Carrier Frequency Separation

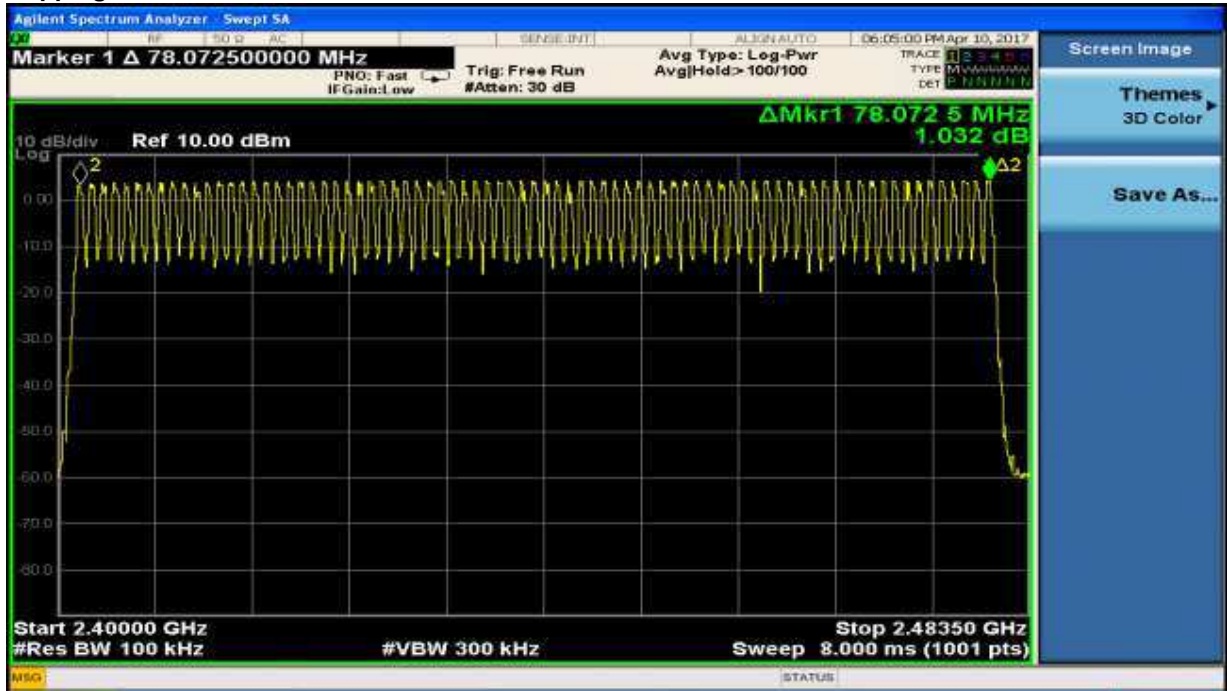
Hopping Mode





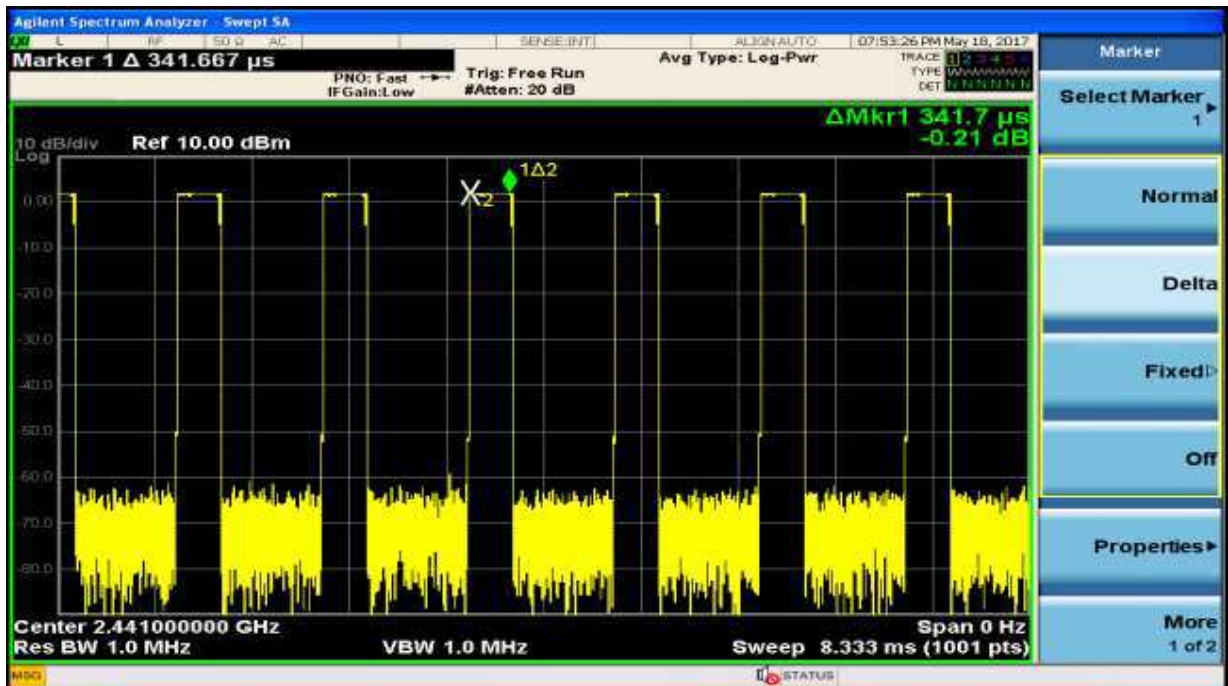
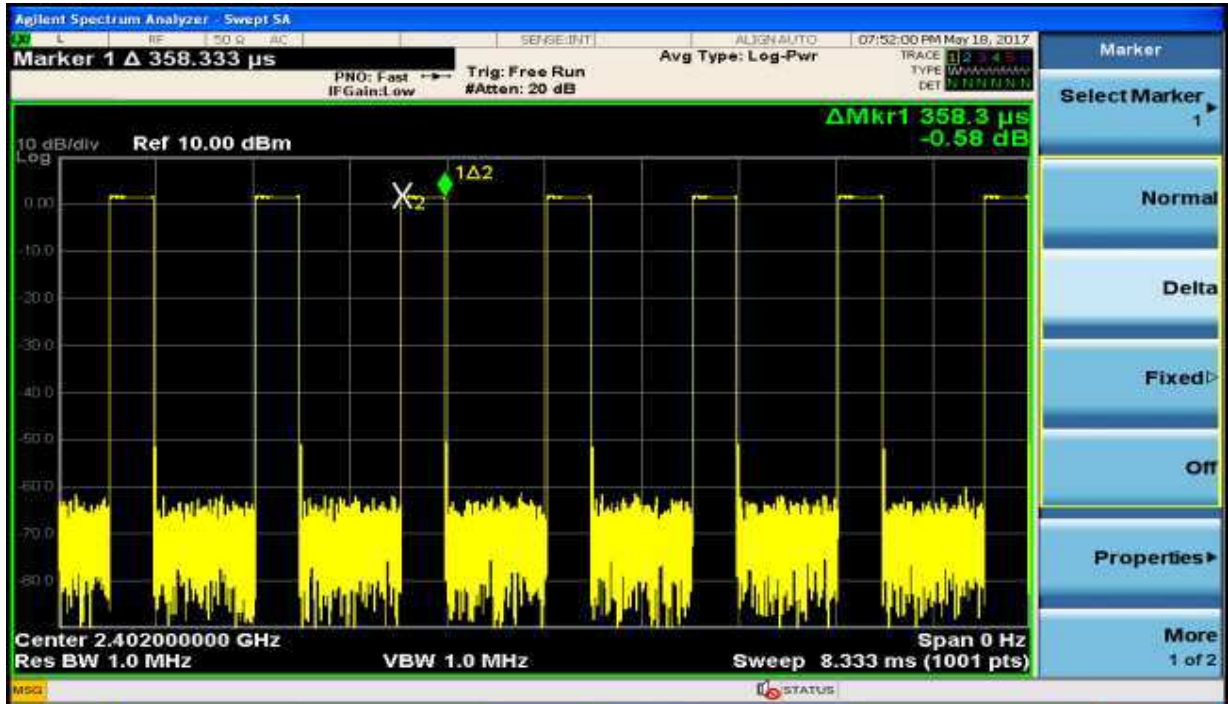
Appendix A.7: Test Plots of Number of Hopping Frequency

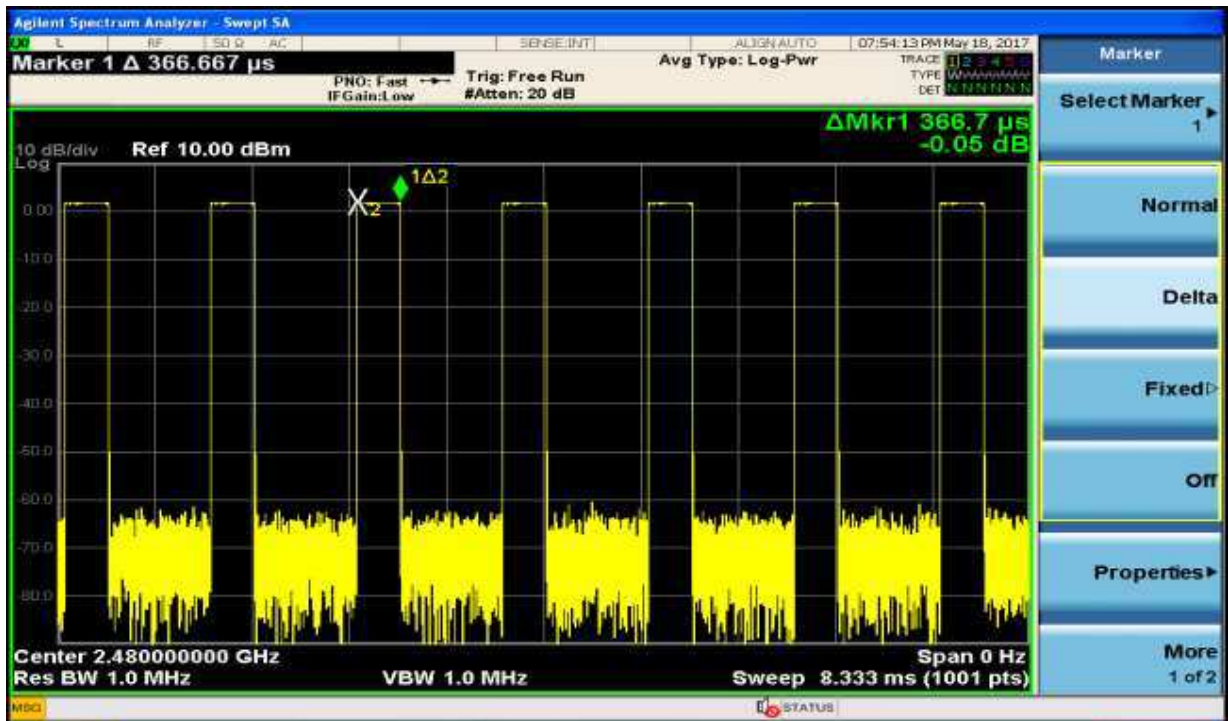
Hopping Mode



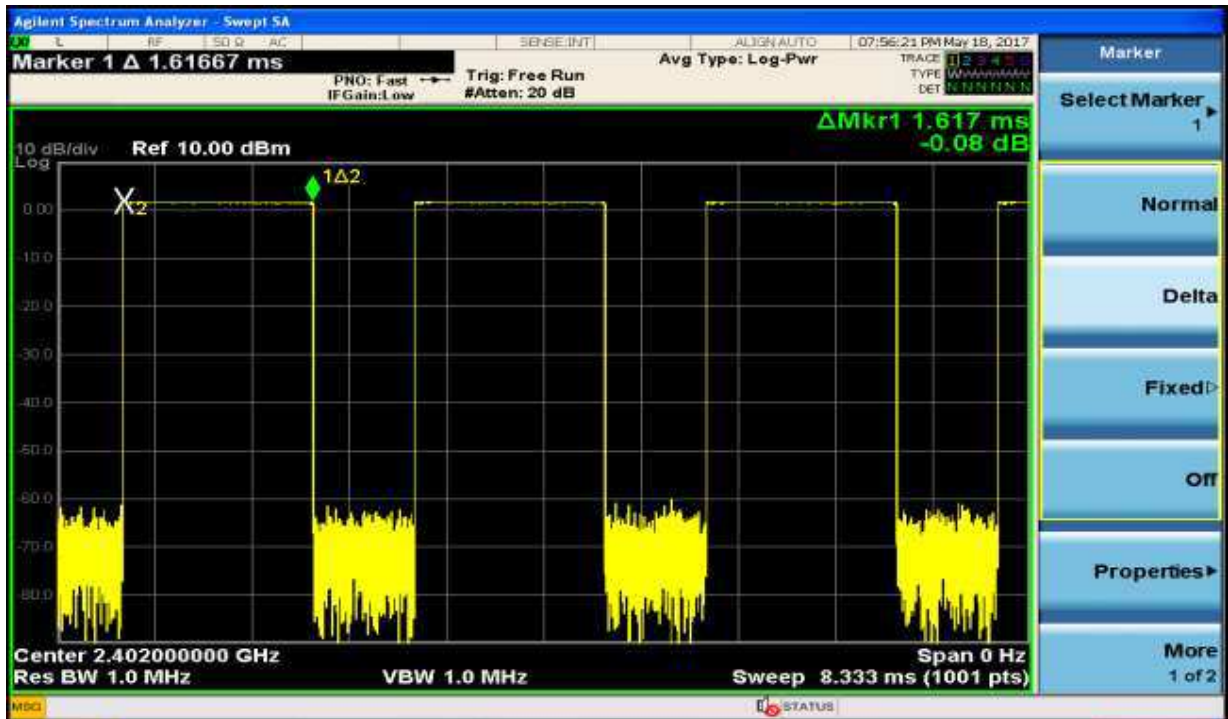
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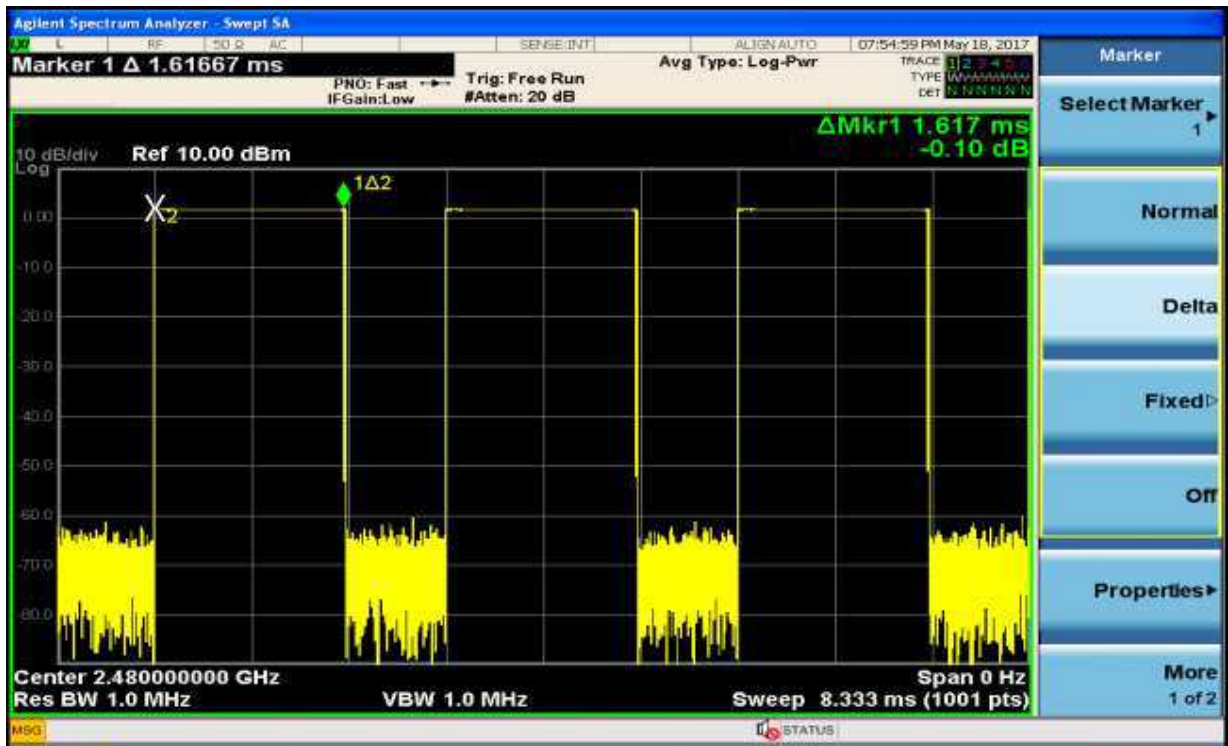
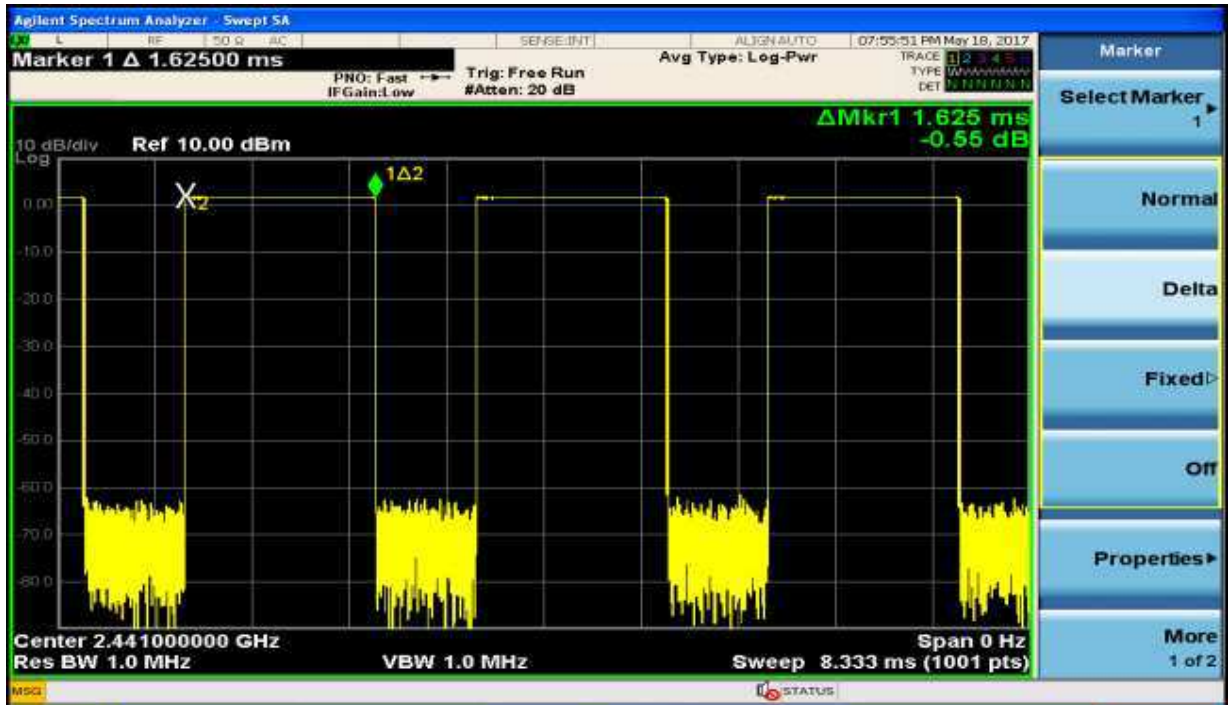
BDR Mode, DH1



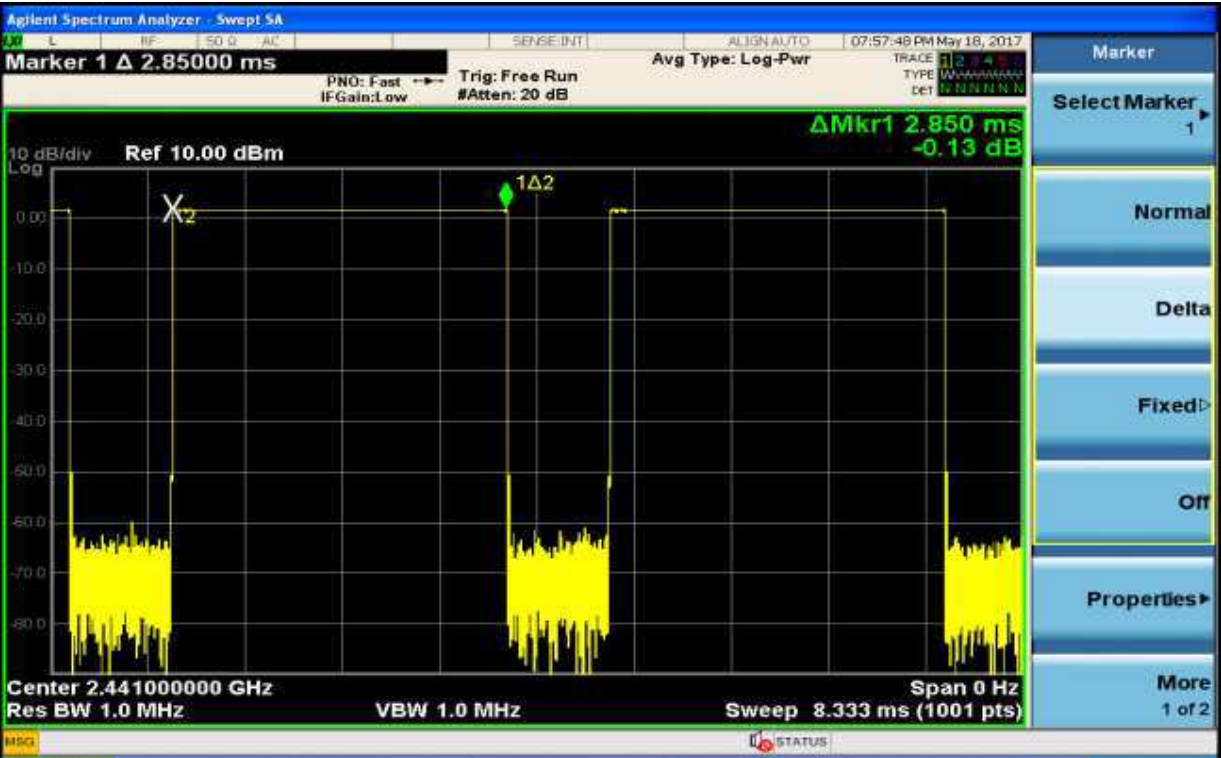
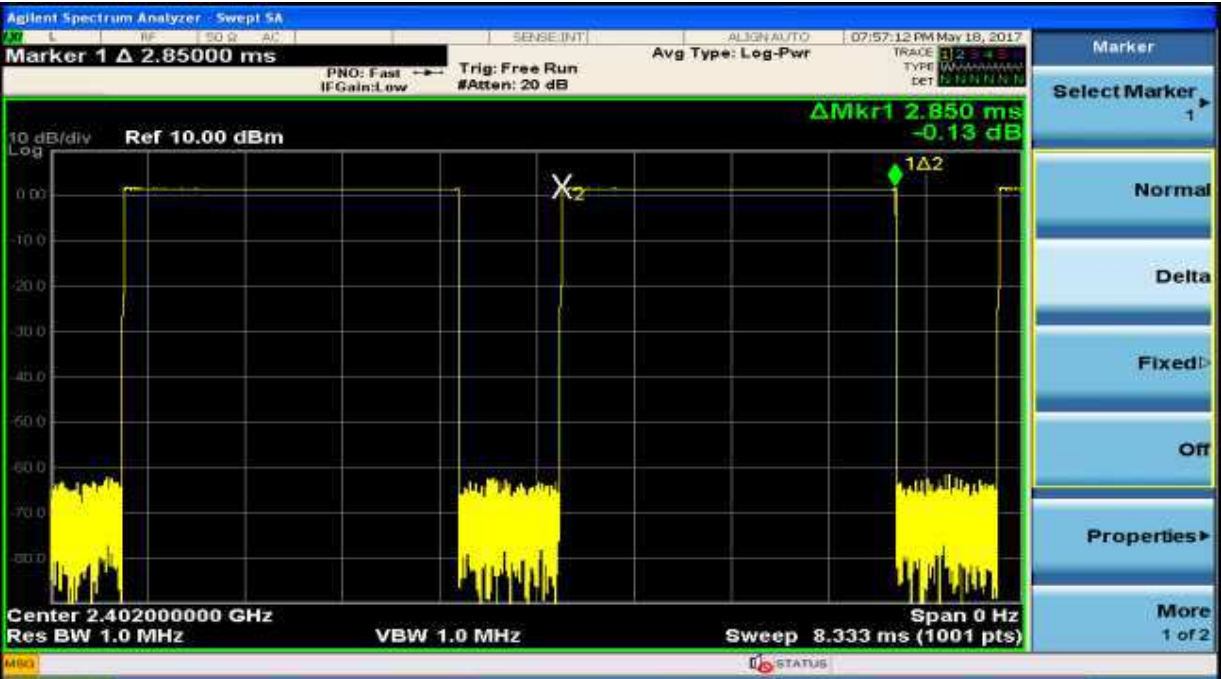


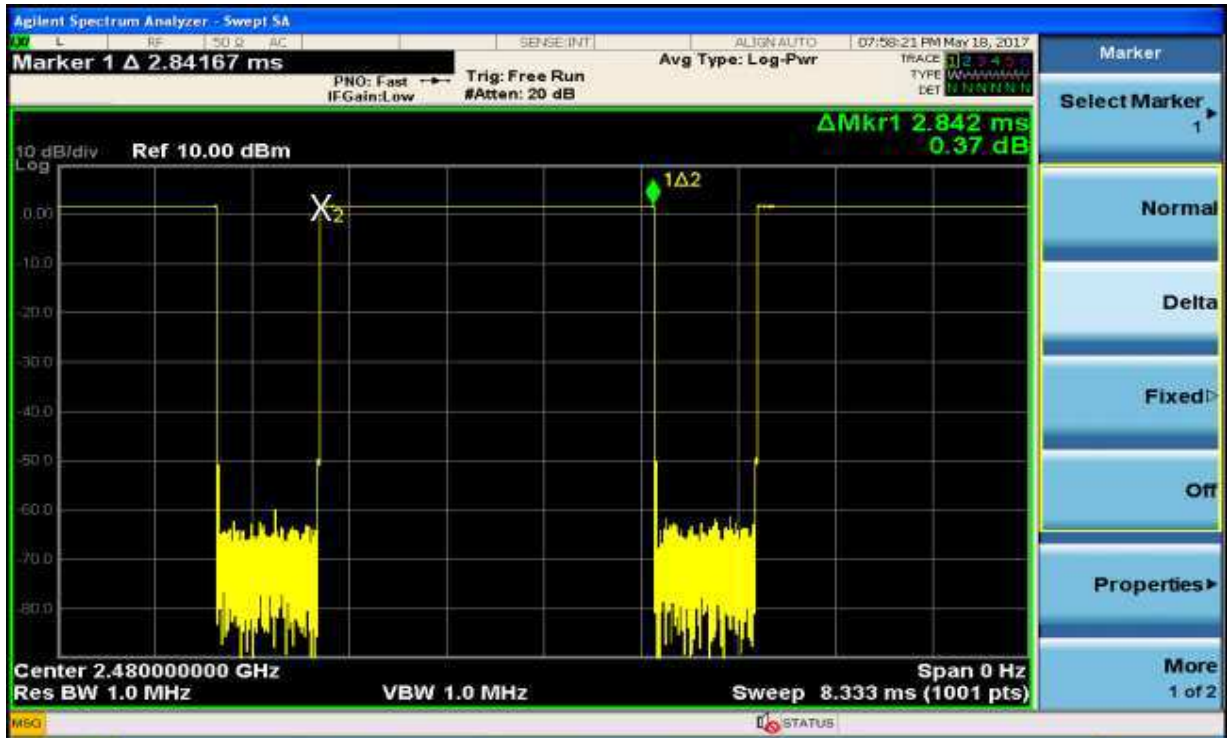
BDR Mode, DH3



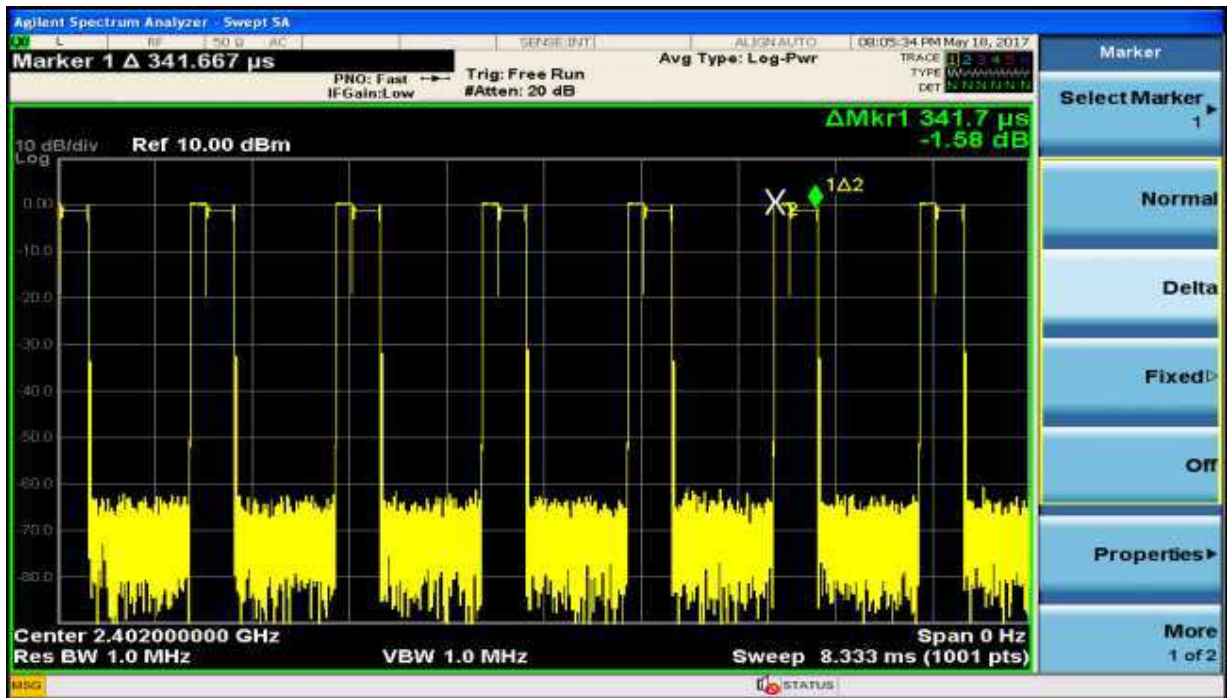


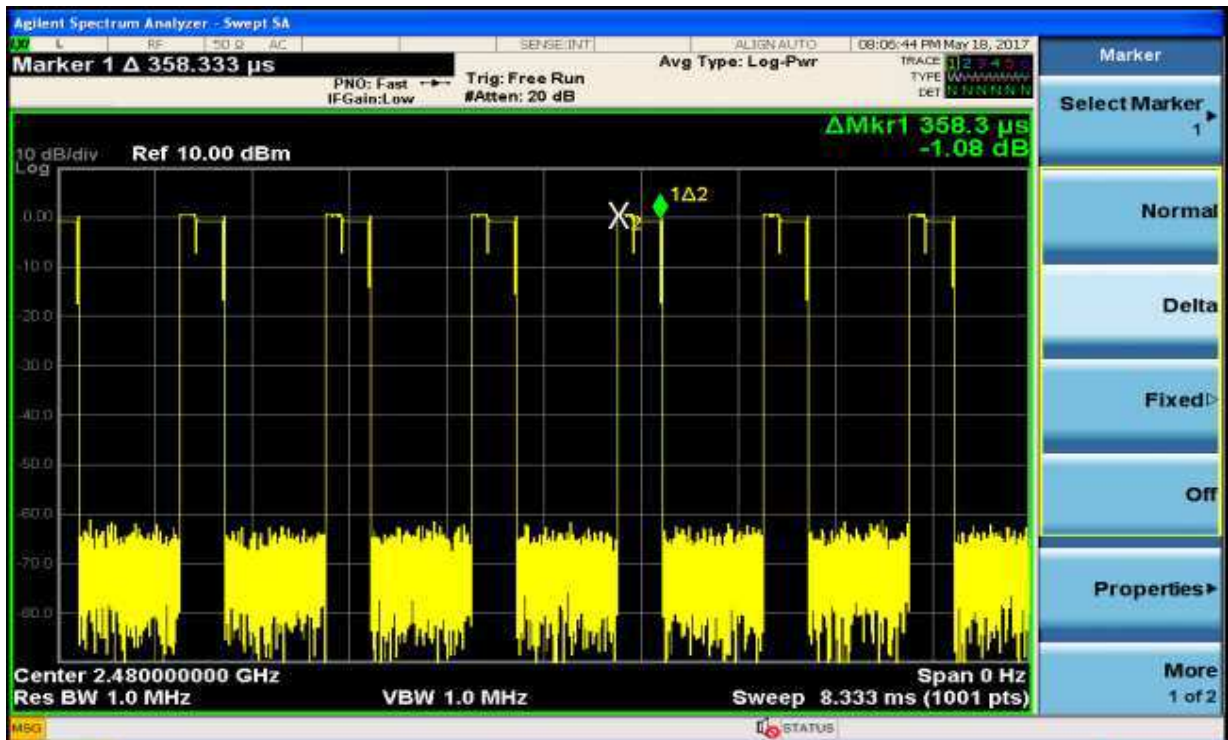
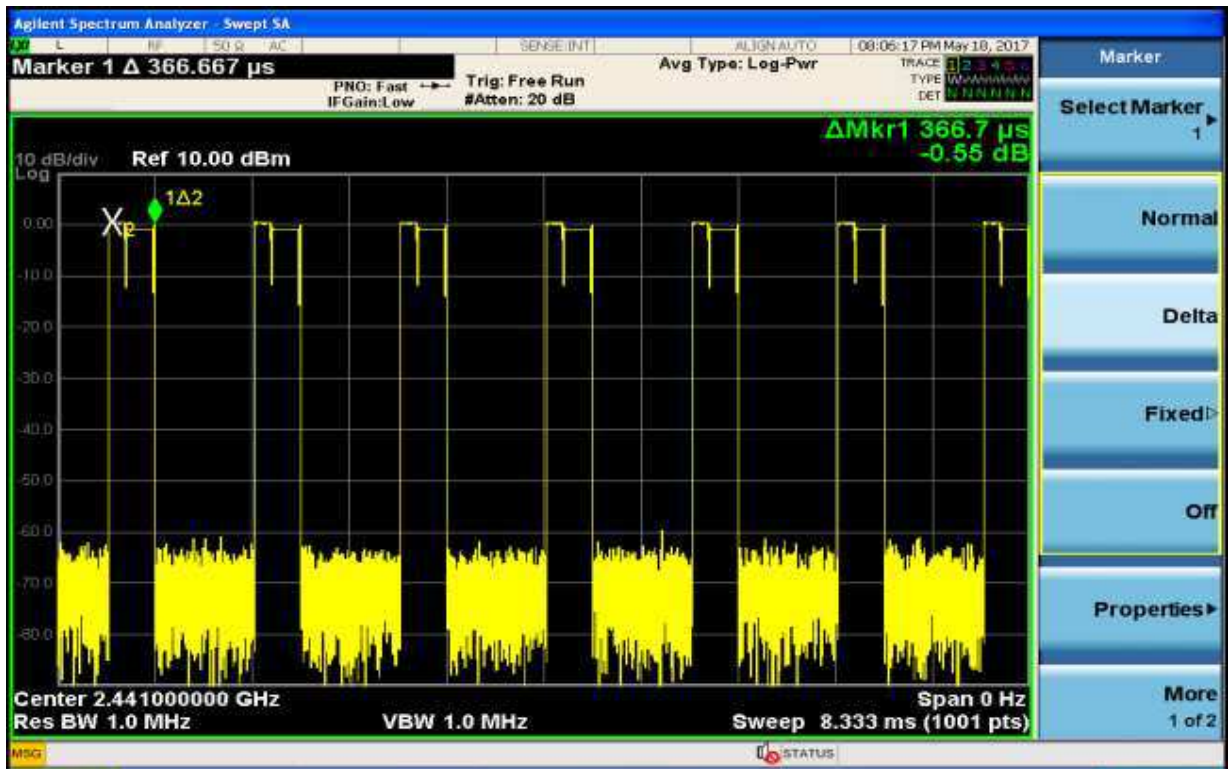
BDR Mode, DH5



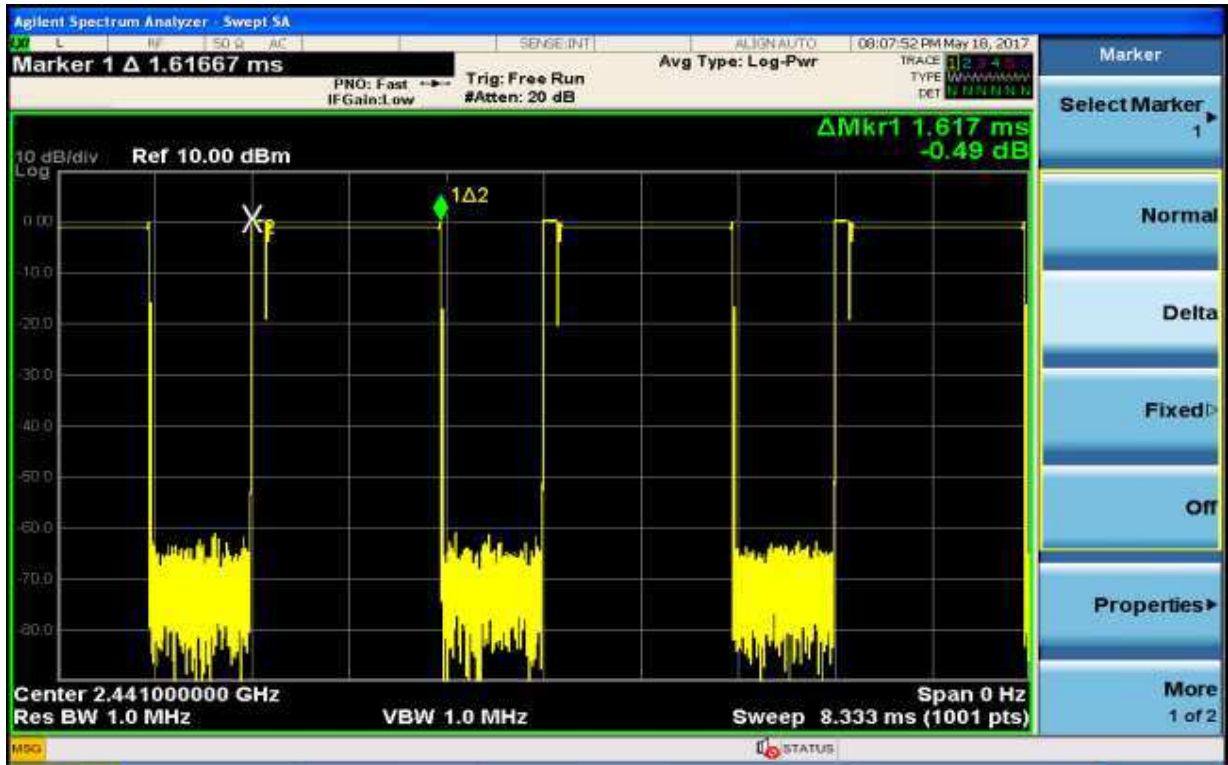
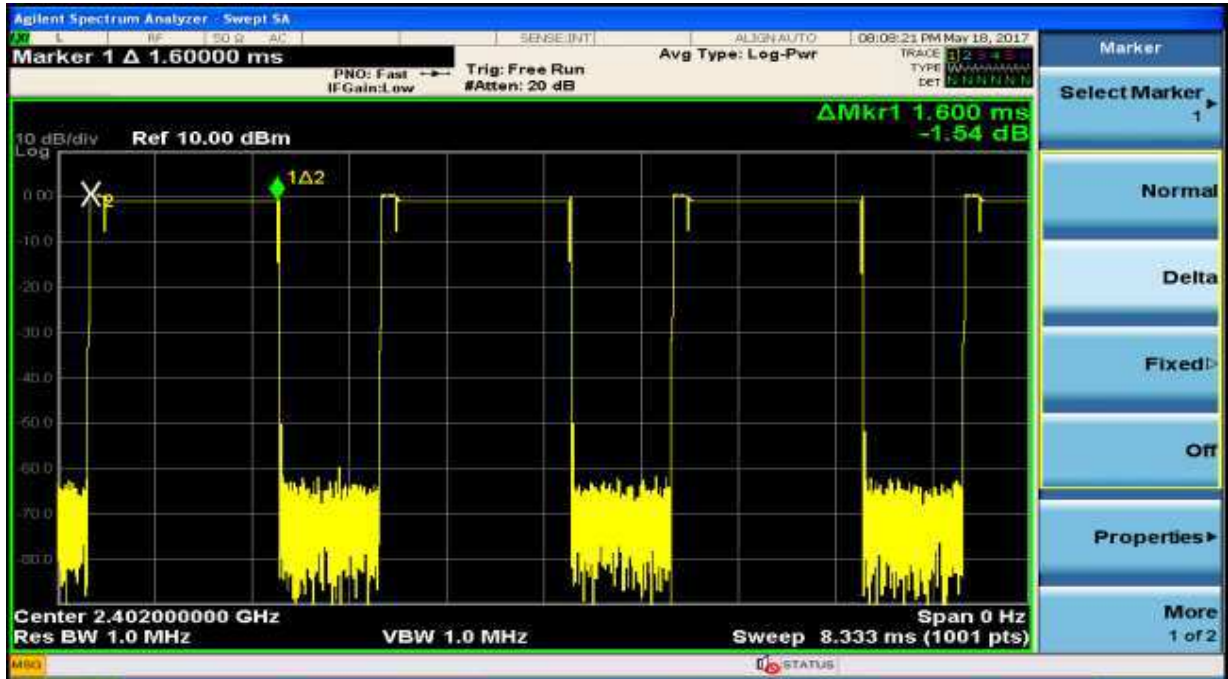


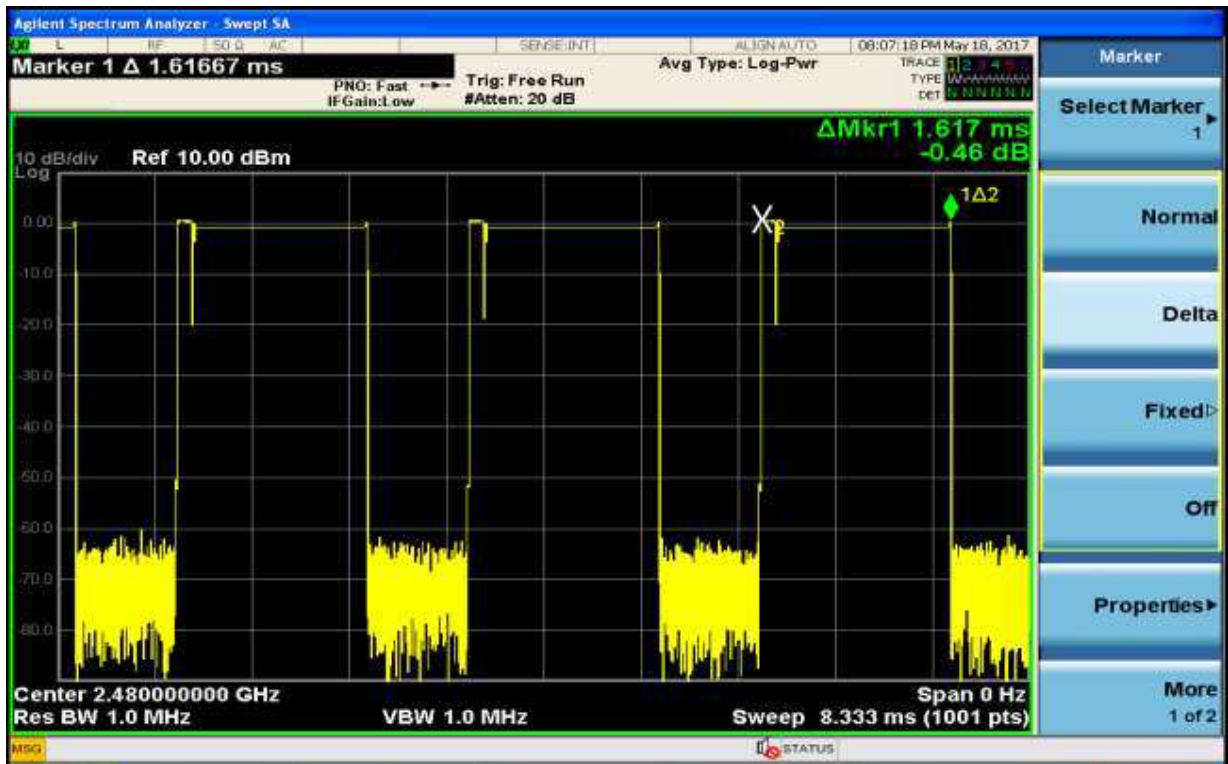
EDR Mode, 3DH1



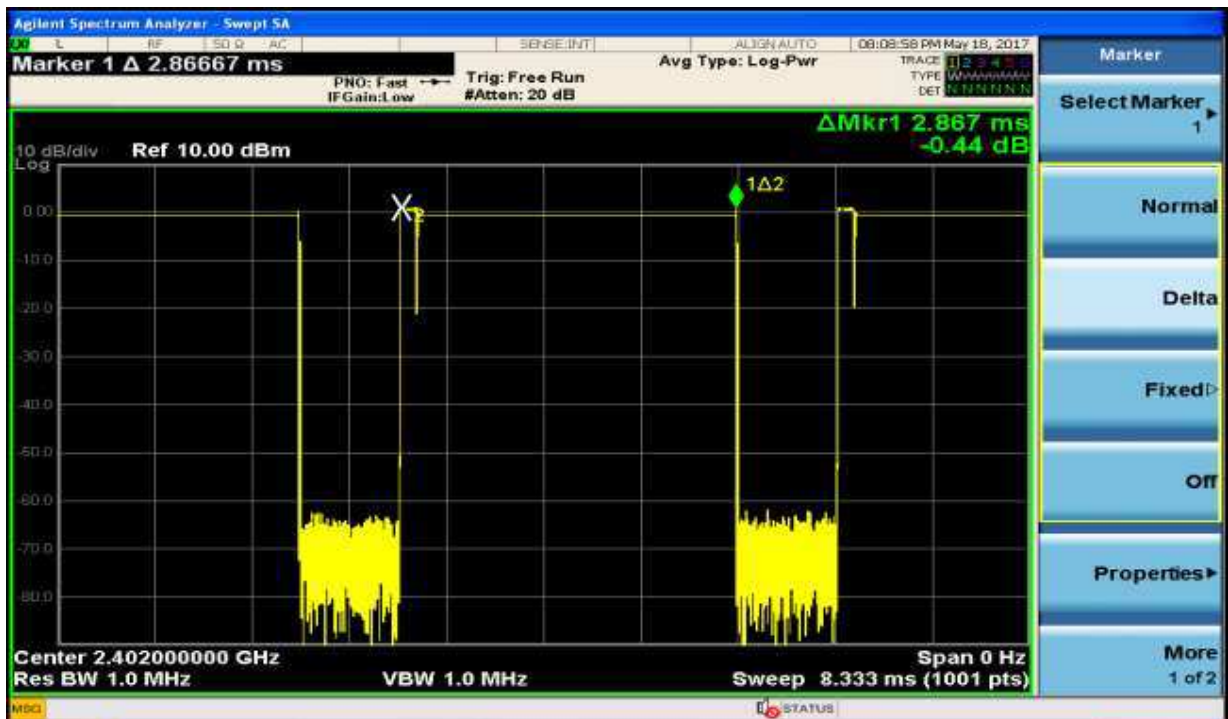


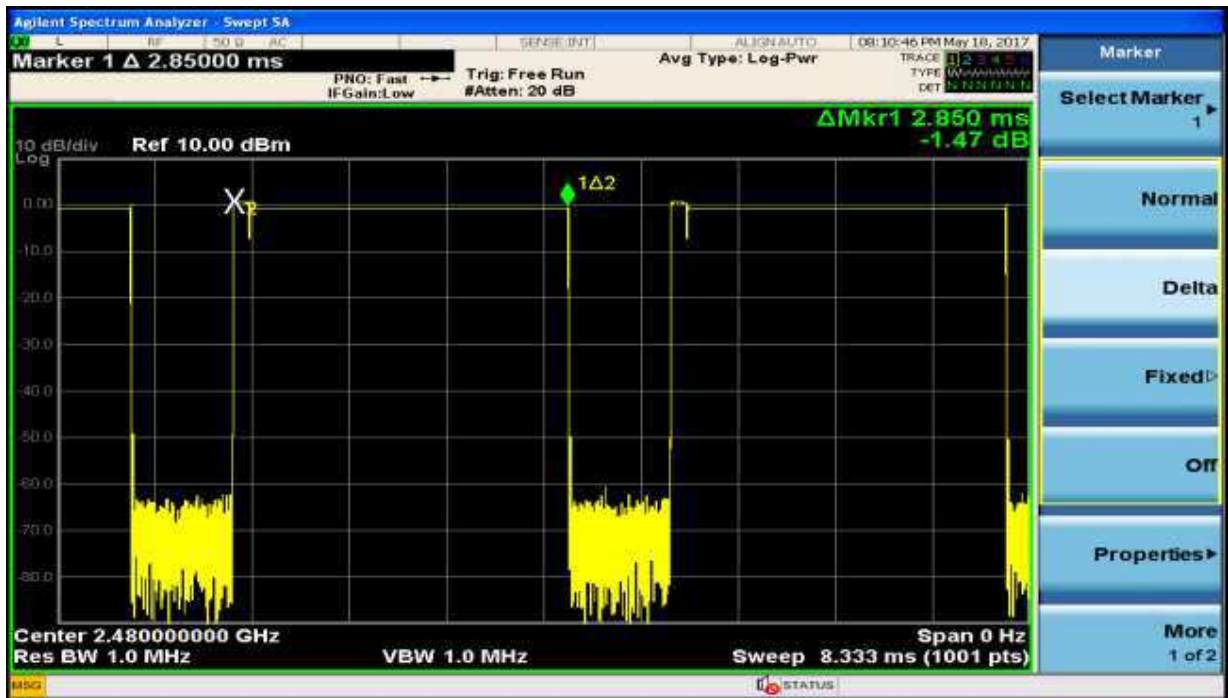
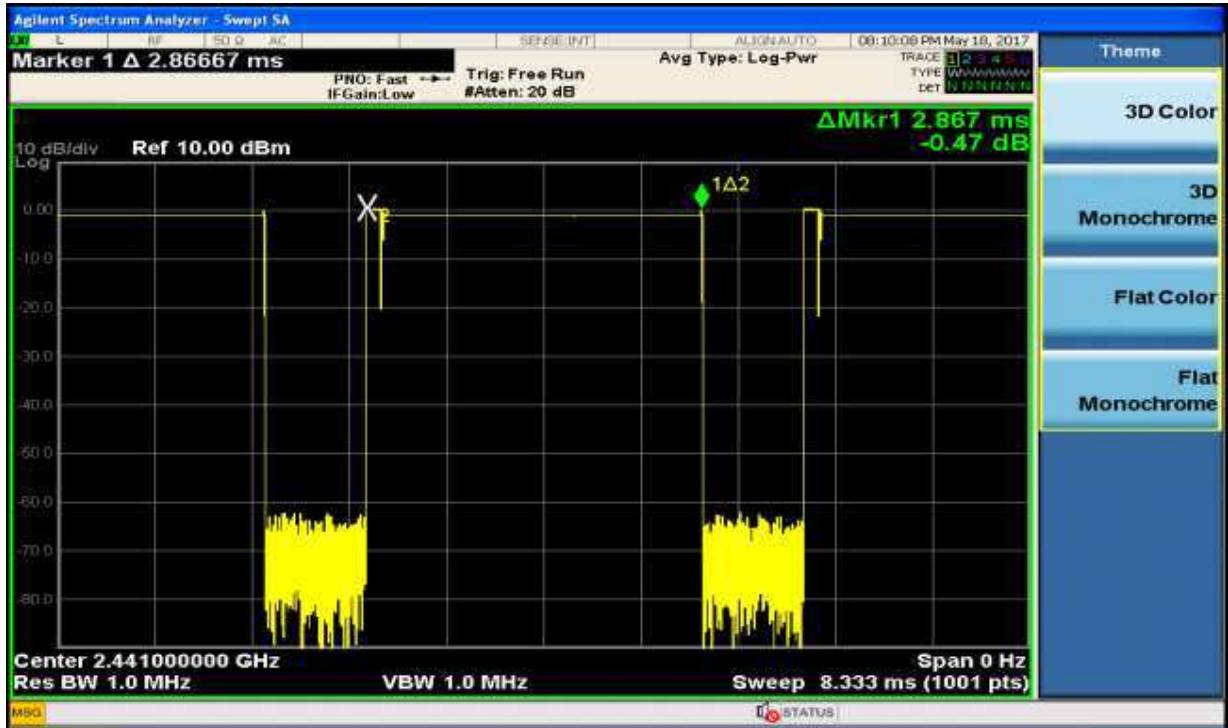
EDR Mode, 3DH3





EDR Mode, 3DH5





Appendix B

Test Results of Bluetooth 4.2 (Dual mode) of Conducted and Radiated Emission Testing

APPENDIX B 1

APPENDIX B.1: TEST PLOTS OF RADIATED SPURIOUS EMISSION 4

BDR mode, 30MHz - 1GHz..... 4

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BDR mode, High Channel 31

Low Energy mode, Low Channel..... 33

Low Energy mode, High Channel 35

APPENDIX B.3: TEST PLOTS OF CONDUCTED EMISSION..... 37

C Mode 37

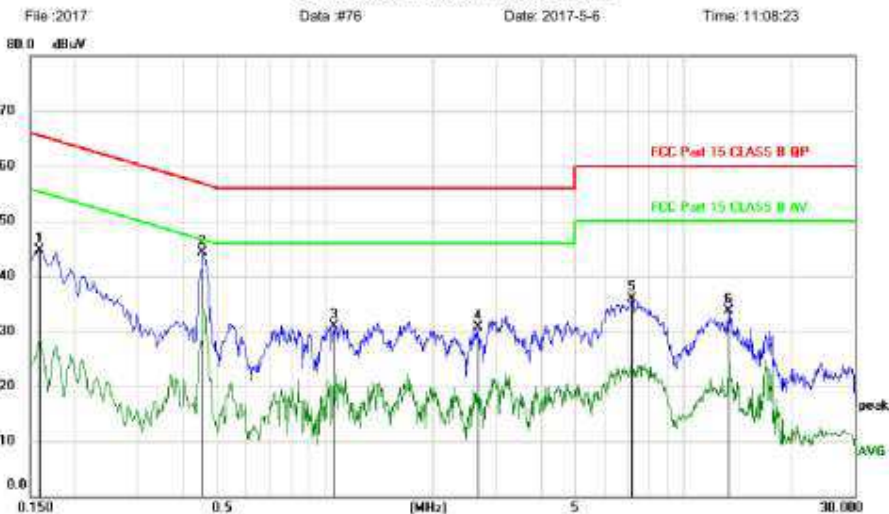


Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB
Limit: FCC Part 15 CLASS B QP
EUT: MID
M/N:
Mode: Bluetooth Link
Note:

Phase: N
Power: AC 120V/60Hz
Temperature: 23.6
Humidity: 54 %

Conducted Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1590	35.06	9.73	44.79	65.52	-20.73	peak	
2	*	0.4560	34.45	9.78	44.23	56.77	-12.54	peak	
3		1.0545	21.11	9.84	30.95	56.00	-25.05	peak	
4		2.6700	20.69	10.01	30.70	56.00	-25.30	peak	
5		7.2105	25.65	10.28	35.93	60.00	-24.07	peak	
6		13.3575	23.32	10.34	33.66	60.00	-26.34	peak	

*:Maximum data x:Over limit l:over margin (Reference Only)

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

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Page: 1

Engineer Signature:



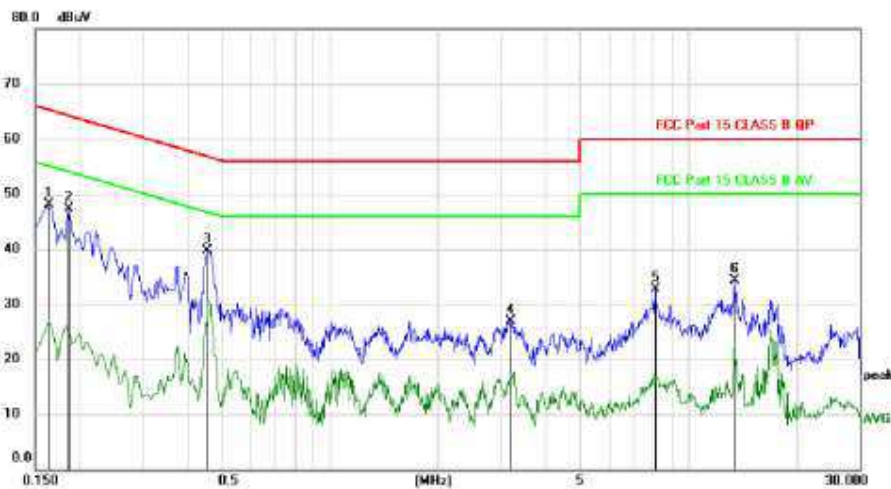
Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB
Limit: FCC Part 15 CLASS B QP
EUT: MID
M/N:
Mode: Bluetooth Link
Note:

Phase: L1
Power: AC 120V/60Hz
Temperature: 23.6
Humidity: 54 %

Conducted Emission Measurement

File: 2017 Data: #77 Date: 2017-5-6 Time: 11:09:58



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1635	38.47	9.73	48.20	65.28	-17.08	peak	
2	*	0.1860	37.59	9.74	47.33	64.21	-16.88	peak	
3		0.4560	30.01	9.78	39.79	56.77	-16.98	peak	
4		3.2055	16.94	10.06	27.00	56.00	-29.00	peak	
5		8.0655	22.36	10.30	32.66	60.00	-27.34	peak	
6		13.4205	24.05	10.34	34.39	60.00	-25.61	peak	

*:Maximum data x:Over limit l:over margin

(Reference Only)

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

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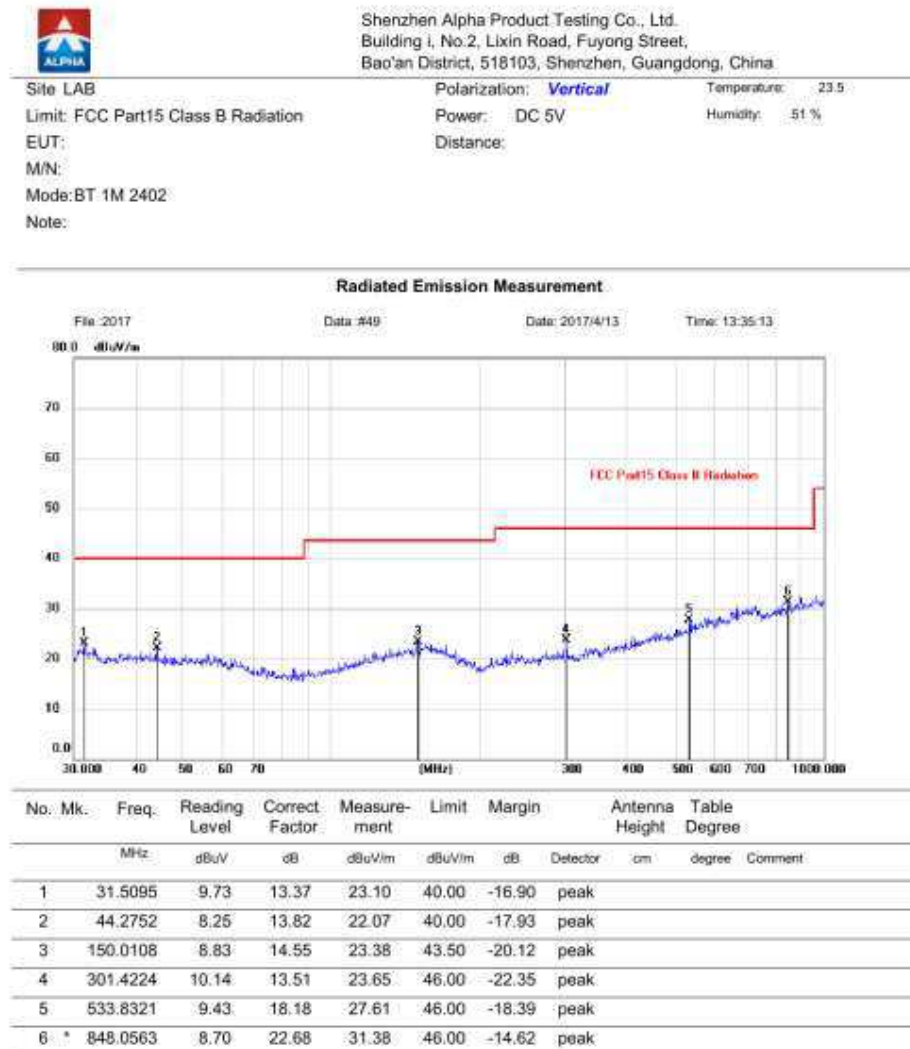
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Engineer Signature:

Note: The measurements of radiated spurious emission from 9KHz~30MHz and 18-26GHz were greater than 20dB below the limit, so Radiated Spurious Emissions from 9kHz – 30MHz and 18-26GHz tests were not reported.

Appendix B.1: Test Plots of Radiated Spurious Emission

BDR mode, 30MHz - 1GHz



Note: 1. *: Maximum data; x: Over limit; !: over margin.
2. Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB

Polarization: **Horizontal**

Temperature: 23.5

Limit: FCC Part15 Class B Radiation

Power: DC 5V

Humidity: 51 %

EUT:

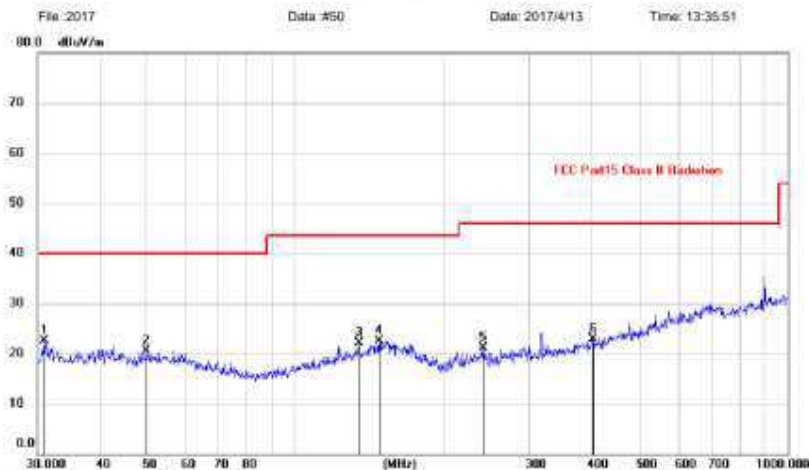
Distance:

M/N:

Mode: BT 1M 2402

Note:

Radiated Emission Measurement



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	dBuV	Factor	ment	dBuV/m	dB	Height	Degree	Comment
1	*	30.9619	9.06	13.35	22.41	40.00	-17.59	peak		
2		49.8814	6.77	13.71	20.48	40.00	-19.52	peak		
3		135.0319	8.63	13.53	22.16	43.50	-21.34	peak		
4		147.9214	8.09	14.40	22.49	43.50	-21.01	peak		
5		240.8304	9.20	11.99	21.19	46.00	-24.81	peak		
6		401.8385	7.38	15.52	22.90	46.00	-23.10	peak		

Note: 1. *: Maximum data; x: Over limit; !: over margin.

2. Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

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Page: 1

Engineer Signature:



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB

Polarization: **Horizontal**

Temperature: 23.5

Limit: FCC Part15 Class B Radiation

Power: DC 5V

Humidity: 51 %

EUT:

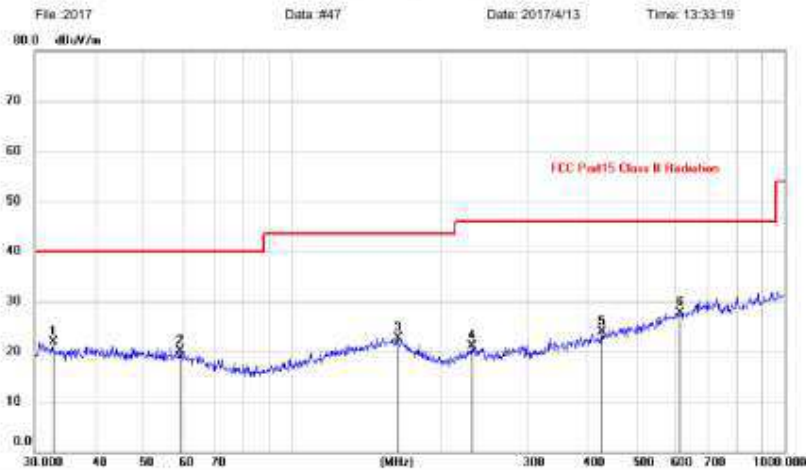
Distance:

M/N:

Mode: BT 1M 2441

Note:

Radiated Emission Measurement



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	dBuV	Factor	ment	dBuV/m	dB	Height	Degree	
1	*	32.6340	8.53	13.42	21.95	40.00	-18.05	peak		
2		59.2325	7.00	13.05	20.05	40.00	-19.95	peak		
3		163.7550	8.48	14.28	22.76	43.50	-20.74	peak		
4		231.7179	9.38	11.82	21.20	46.00	-24.80	peak		
5		426.5210	7.70	16.15	23.85	46.00	-22.15	peak		
6		612.0642	7.90	19.75	27.65	46.00	-18.35	peak		

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

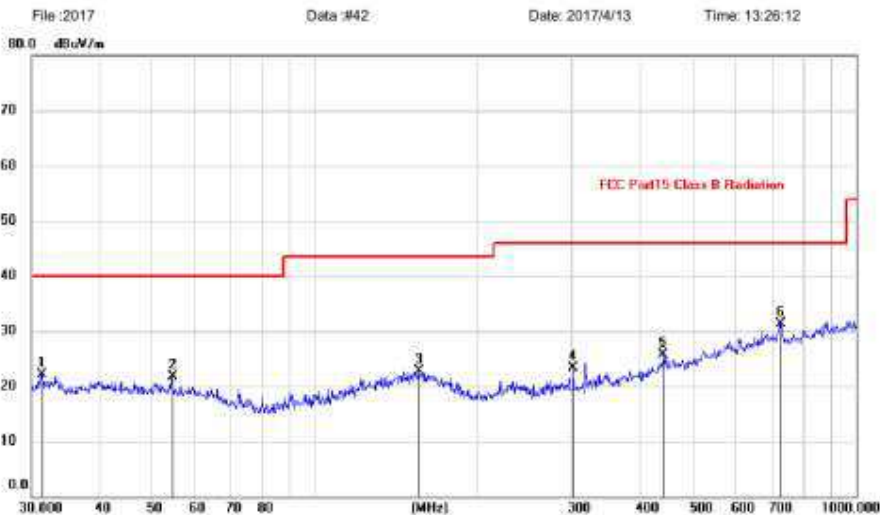


Shenzhen Alpha Product Testing Co., Ltd.
Building i, No 2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB
Limit: FCC Part15 Class B Radiation
EUT:
M/N:
Mode: BT 1M 2441
Note:

Polarization: Vertical
Power: DC 5V
Distance:
Temperature: 23.5
Humidity: 51 %

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree
1		31.3992	8.81	13.37	22.18	40.00	-17.82	peak	
2		54.6429	8.36	13.31	21.67	40.00	-18.33	peak	
3		155.9101	8.11	14.57	22.68	43.50	-20.82	peak	
4		301.4224	9.85	13.51	23.36	46.00	-22.64	peak	
5		441.7426	8.95	16.67	25.62	46.00	-20.38	peak	
6	*	724.2611	10.14	21.25	31.39	46.00	-14.61	peak	

Note:1: *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

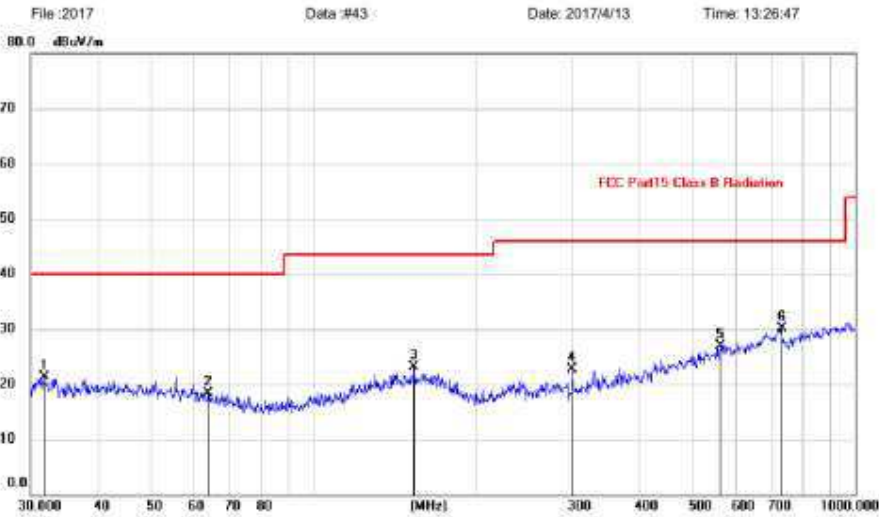


Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB
Limit: FCC Part15 Class B Radiation
EUT:
M/N:
Mode: BT 1M 2480
Note:

Polarization: **Vertical**
Power: DC 5V
Distance:
Temperature: 23.5
Humidity: 51 %

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		31.7313	7.99	13.38	21.37	40.00	-18.63	peak		
2		63.7588	6.19	12.21	18.40	40.00	-21.60	peak		
3		153.2004	8.55	14.56	23.11	43.50	-20.39	peak		
4		301.4224	9.15	13.51	22.66	46.00	-23.34	peak		
5		566.6223	8.01	18.95	26.96	46.00	-19.04	peak		
6	*	731.9203	8.75	21.38	30.13	46.00	-15.87	peak		

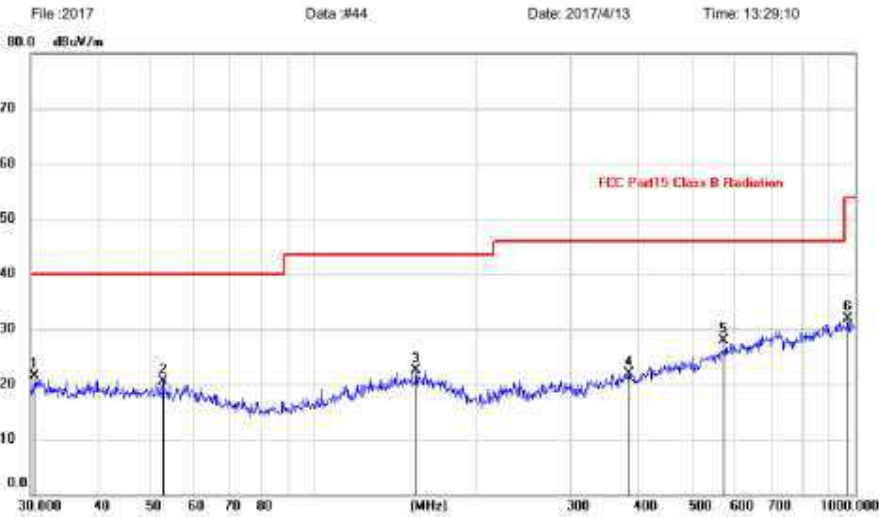
Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB
Limit: FCC Part15 Class B Radiation
EUT:
M/N:
Mode: BT 1M 2480
Note:
Polarization: **Horizontal**
Power: DC 5V
Distance:
Temperature: 23.5
Humidity: 51 %

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree
1		30.5306	8.16	13.30	21.46	40.00	-18.54	peak	
2		52.5753	6.95	13.52	20.47	40.00	-19.53	peak	
3		154.2786	7.96	14.56	22.52	43.50	-20.98	peak	
4		382.5879	6.43	15.39	21.82	46.00	-24.18	peak	
5	*	572.6144	8.89	19.09	27.98	46.00	-18.02	peak	
6		972.3374	8.11	23.77	31.88	54.00	-22.12	peak	

Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

BDR mode, 1GHz - 18GHz



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB	Polarization: Horizontal	Temperature: 23.5
Limit: FCC Part 15_Above 1G_Peak	Power: DC 5V	Humidity: 51 %
EUT:	Distance: 3m	
M/N:		
Mode: BT 3.0 1M 2402		
Note:		

Radiated Emission Measurement



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table
		MHz	dBuV	Factor	ment	dBuV/m	dB	Height	Degree
1		1381.044	48.94	-7.06	41.88	74.00	-32.12	peak	
2	*	2876.006	46.24	-2.66	43.58	74.00	-30.42	peak	
3		4804.000	41.13	-2.93	38.20	74.00	-35.80	peak	

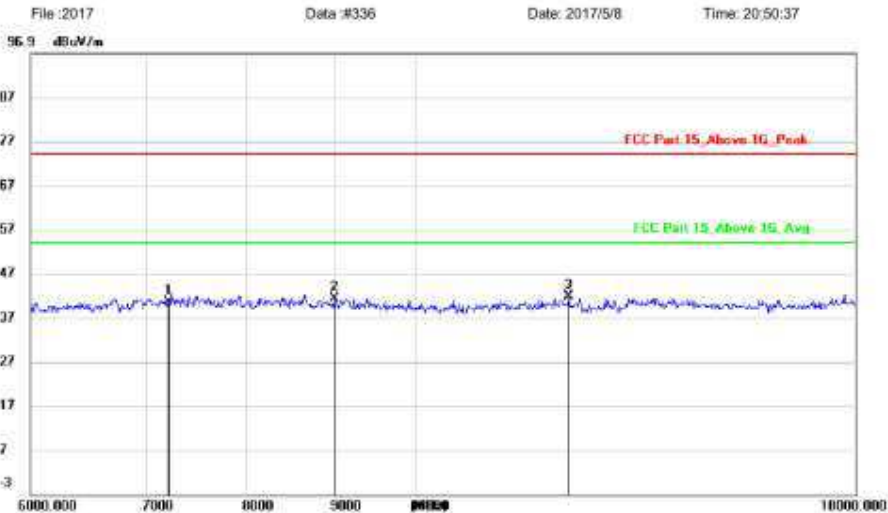
Note: 1. *-Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB
Limit: FCC Part 15_Above 1G_Peak
EUT:
M/N:
Mode: BT 3.0 1M 2402
Note:
Polarization: Horizontal
Power: DC 5V
Distance: 3m
Temperature: 23.5
Humidity: 51 %

Radiated Emission Measurement



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	Comment
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	
1		7206.000	37.18	3.46	40.64	74.00	-33.36	peak		
2		9006.619	37.92	3.39	41.31	74.00	-32.69	peak		
3	*	12312.20	36.26	5.48	41.74	74.00	-32.26	peak		

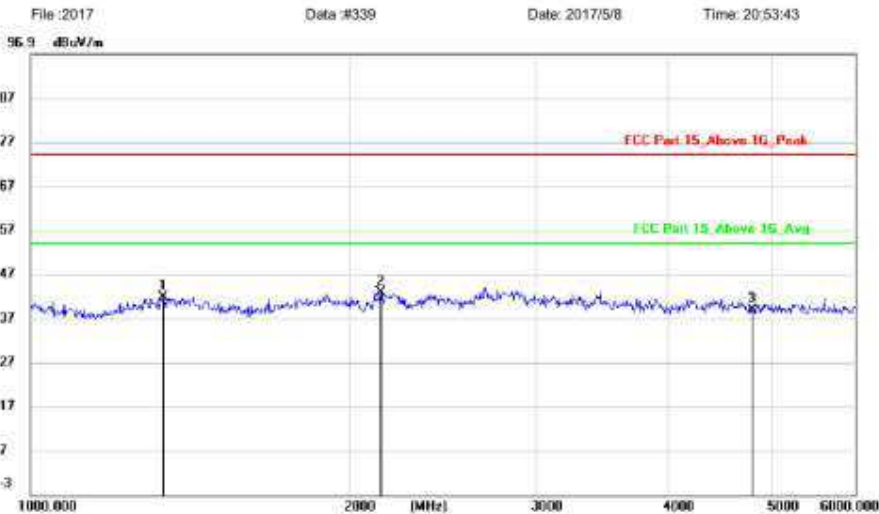
Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB	Polarization: Horizontal	Temperature: 23.5
Limit: FCC Part 15_Above 1G_Peak	Power: DC 5V	Humidity: 51 %
EUT:	Distance: 3m	
M/N:		
Mode: BT 3.0 1M 2441		
Note:		

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree
1		1334.774	49.02	-7.21	41.81	74.00	-32.19	peak	
2	*	2143.114	46.64	-3.78	42.86	74.00	-31.14	peak	
3		4804.000	41.72	-2.93	38.79	74.00	-35.21	peak	

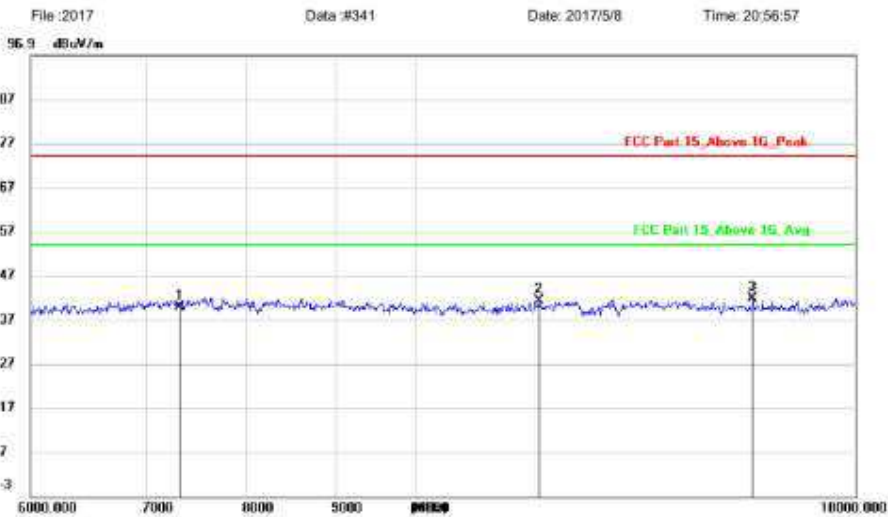
Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB	Polarization: Horizontal	Temperature: 23.5
Limit: FCC Part 15_Above 1G_Peak	Power: DC 5V	Humidity: 51 %
EUT:	Distance: 3m	
M/N:		
Mode: BT 3.0 1M 2441		
Note:		

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		7323.000	36.41	3.45	39.86	74.00	-34.14	peak		
2		11820.80	35.74	5.65	41.39	74.00	-32.61	peak		
3	*	15703.29	37.35	4.34	41.69	74.00	-32.31	peak		

Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB	Polarization: Horizontal	Temperature: 23.5
Limit: FCC Part 15_Above 1G_Peak	Power: DC 5V	Humidity: 51 %
EUT:	Distance: 3m	
M/N:		
Mode: BT 3.0 1M 2480		
Note:		

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		1373.633	48.30	-7.08	41.22	74.00	-32.78	peak		
2	*	2881.169	47.58	-2.65	44.93	74.00	-29.07	peak		
3		4415.239	44.65	-4.07	40.58	74.00	-33.42	peak		

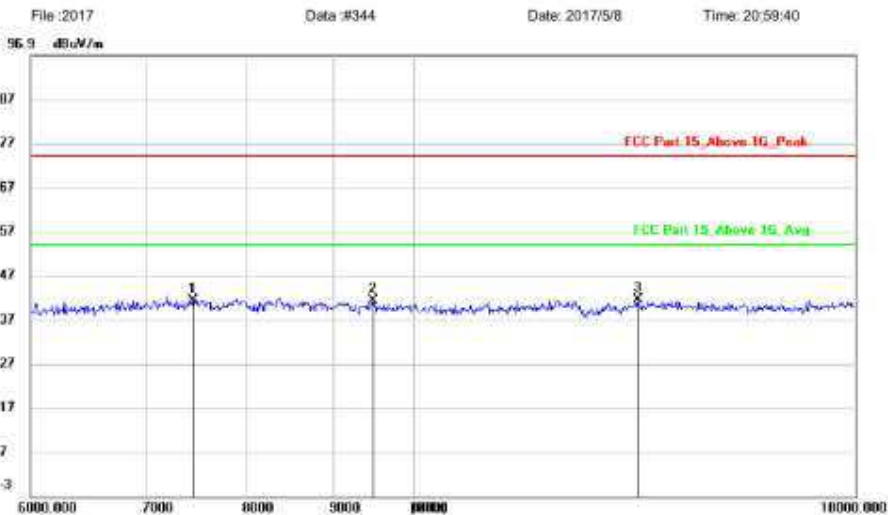
Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
 Building i, No.2, Lixin Road, Fuyong Street,
 Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB
 Limit: FCC Part 15_Above 1G_Peak
 EUT:
 M/N:
 Mode: BT 3.0 1M 2480
 Note:
 Polarization: *Horizontal*
 Power: DC 5V
 Distance: 3m
 Temperature: 23.5
 Humidity: 51 %

Radiated Emission Measurement



No. Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree	
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	7440.000	38.01	3.38	41.39	74.00	-32.61	peak		
2	9474.436	37.96	3.34	41.30	74.00	-32.70	peak		
3 *	13475.29	35.57	6.06	41.63	74.00	-32.37	peak		

Note: 1. *:Maximum data; x:Over limit; !:over margin.
 2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Low Energy mode, 30MHz - 1GHz



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB

Polarization: **Vertical**

Temperature: 23.5

Limit: FCC Part15 Class B Radiation

Power: DC 5V

Humidity: 51 %

EUT:

Distance:

M/N:

Mode: BLE 2480

Note:

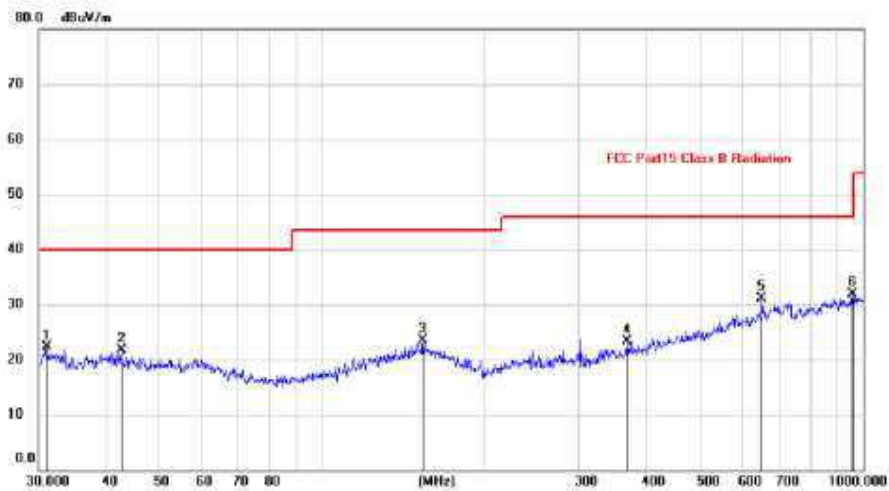
Radiated Emission Measurement

File: 2017

Data: #57

Date: 2017/4/13

Time: 13:40:45



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		30.9619	8.92	13.35	22.27	40.00	-17.73	peak		
2		42.7496	7.76	13.97	21.73	40.00	-18.27	peak		
3		153.7385	8.92	14.56	23.48	43.50	-20.02	peak		
4		366.8231	8.28	14.97	23.25	46.00	-22.75	peak		
5		649.6597	10.71	20.33	31.04	46.00	-14.96	peak		
6	*	955.4381	8.22	23.72	31.94	46.00	-14.06	peak		

Note: 1. *-Maximum data; x:Over limit; !:over margin.

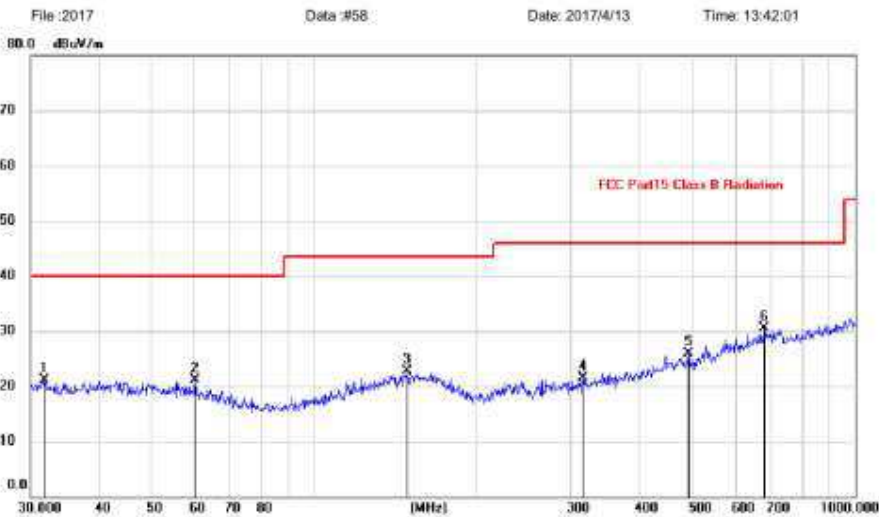
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB	Polarization: Horizontal	Temperature: 23.5
Limit: FCC Part15 Class B Radiation	Power: DC 5V	Humidity: 51 %
EUT:	Distance:	
M/N:		
Mode: BLE 2480		
Note:		

Radiated Emission Measurement



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	dBuV	Factor	ment			Height	Degree	Comment
				dB	dBuV/m	dBuV/m	dB	cm	degree	
1		31.7313	7.72	13.38	21.10	40.00	-18.90	peak		
2		60.2801	8.26	12.86	21.12	40.00	-18.88	peak		
3		148.9625	8.31	14.47	22.78	43.50	-20.72	peak		
4		315.4808	7.69	13.77	21.46	46.00	-24.54	peak		
5		492.4685	8.47	17.35	25.82	46.00	-20.18	peak		
6	*	682.3484	9.50	21.07	30.57	46.00	-15.43	peak		

Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site LAB

Polarization: **Horizontal**

Temperature: 23.5

Limit: FCC Part15 Class B Radiation

Power: DC 5V

Humidity: 51 %

EUT:

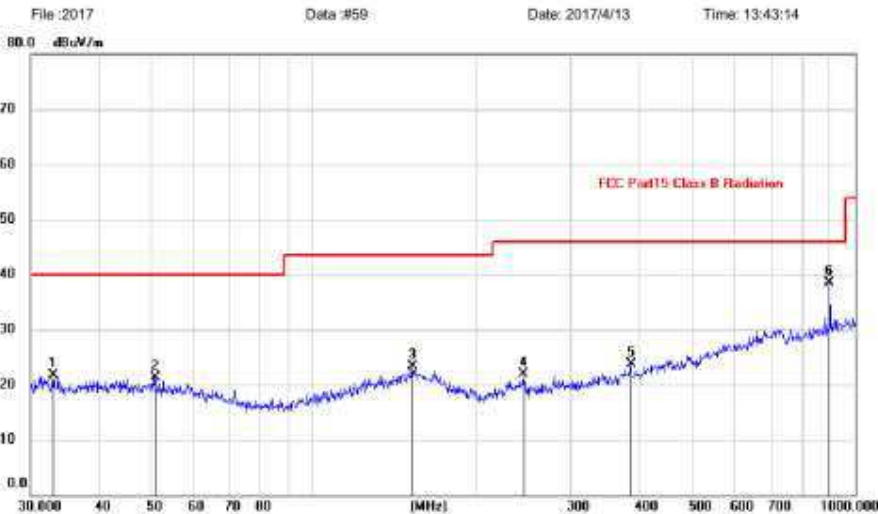
Distance:

M/N:

Mode: BLE 2440

Note:

Radiated Emission Measurement



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	dBuV	Factor	ment	dBuV/m	dB	Height	Degree	Comment
1		32.9791	8.23	13.44	21.67	40.00	-18.33	peak		
2		50.9420	7.61	13.64	21.25	40.00	-18.75	peak		
3		152.1297	8.69	14.56	23.25	43.50	-20.25	peak		
4		244.2321	9.87	12.01	21.88	46.00	-24.12	peak		
5		385.2805	8.34	15.39	23.73	46.00	-22.27	peak		
6	*	896.9965	15.57	22.90	38.47	46.00	-7.53	peak		

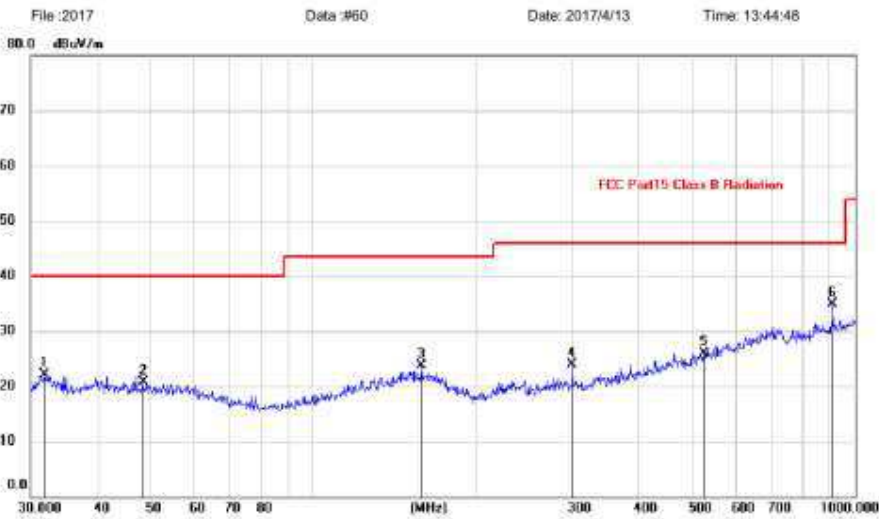
Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
 Building i, No.2, Lixin Road, Fuyong Street,
 Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB
 Limit: FCC Part15 Class B Radiation
 EUT:
 M/N:
 Mode: BLE 2440
 Note:
 Polarization: **Vertical**
 Power: DC 5V
 Distance:
 Temperature: 23.5
 Humidity: 51 %

Radiated Emission Measurement



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	Comment
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	
1		31.8427	8.77	13.38	22.15	40.00	-17.85	peak		
2		48.5016	7.09	13.66	20.75	40.00	-19.25	peak		
3		158.1123	9.16	14.57	23.73	43.50	-19.77	peak		
4		301.4224	10.48	13.51	23.99	46.00	-22.01	peak		
5		524.5541	7.96	18.02	25.98	46.00	-20.02	peak		
6	*	909.6667	11.75	23.25	35.00	46.00	-11.00	peak		

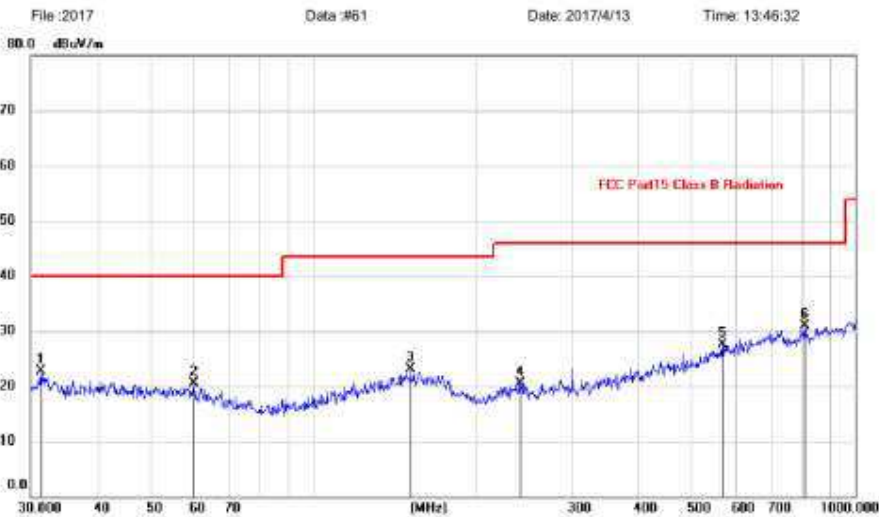
Note: 1. *:Maximum data; x:Over limit; !:over margin.
 2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB	Polarization: Vertical	Temperature: 23.5
Limit: FCC Part15 Class B Radiation	Power: DC 5V	Humidity: 51 %
EUT:	Distance:	
M/N:		
Mode: BLE 2402		
Note:		

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		31.2893	9.38	13.36	22.74	40.00	-17.26			peak
2		60.0691	7.57	12.96	20.53	40.00	-19.47			peak
3		151.0666	8.61	14.56	23.17	43.50	-20.33			peak
4		240.8304	8.51	11.99	20.50	46.00	-25.50			peak
5		568.6127	8.52	19.07	27.59	46.00	-18.41			peak
6	*	810.2654	8.74	22.09	30.83	46.00	-15.17			peak

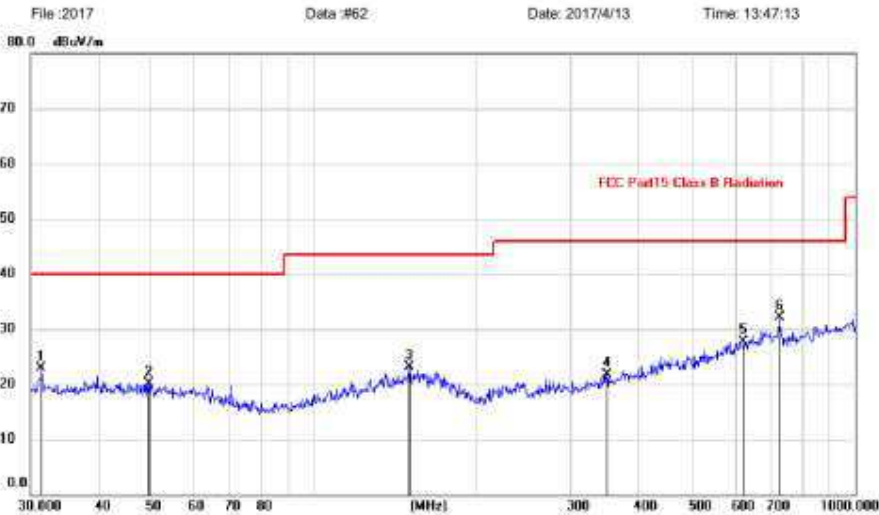
Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB	Polarization: Horizontal	Temperature: 23.5
Limit: FCC Part15 Class B Radiation	Power: DC 5V	Humidity: 51 %
EUT:	Distance:	
M/N:		
Mode: BLE 2402		
Note:		

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree
1		31.3992	9.48	13.37	22.85	40.00	-17.15	peak	
2		49.5328	6.40	13.68	20.08	40.00	-19.92	peak	
3		150.0108	8.58	14.55	23.13	43.50	-20.37	peak	
4		348.0274	7.34	14.41	21.75	46.00	-24.25	peak	
5		620.7096	7.96	19.68	27.64	46.00	-18.36	peak	
6	*	726.8052	10.74	21.33	32.07	46.00	-13.93	peak	

Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Low Energy mode, 1GHz - 18GHz



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB	Polarization: Vertical	Temperature: 23.5
Limit: FCC Part 15_Above 1G_Peak	Power: DC 5V	Humidity: 51 %
EUT:	Distance: 3m	
M/N:		
Mode: BLE 2402		
Note:		

Radiated Emission Measurement



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		4804.000	42.15	-2.93	39.22	74.00	-34.78	peak		
2		1366.262	49.47	-7.12	42.35	74.00	-31.65	peak		
3	*	2860.573	46.45	-2.70	43.75	74.00	-30.25	peak		

Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB	Polarization: Horizontal	Temperature: 23.5
Limit: FCC Part 15_Above 1G_Peak	Power: DC 5V	Humidity: 51 %
EUT:	Distance: 3m	
M/N:		
Mode: BLE 2402		
Note:		

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree
1		4804.000	42.05	-2.93	39.12	74.00	-34.88	peak	
2		1411.090	48.12	-7.01	41.11	74.00	-32.89	peak	
3	*	2886.342	47.11	-2.64	44.47	74.00	-29.53	peak	

Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB	Polarization: Vertical	Temperature: 23.5
Limit: FCC Part 15_Above 1G_Peak	Power: DC 5V	Humidity: 51 %
EUT:	Distance: 3m	
M/N:		
Mode: BLE 2402		
Note:		

Radiated Emission Measurement



No. Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree	
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	7206.000	37.03	3.46	40.49	74.00	-33.51	peak		
2	8937.484	37.93	3.54	41.47	74.00	-32.53	peak		
3 *	13744.96	35.62	6.55	42.17	74.00	-31.83	peak		

Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB	Polarization: Horizontal	Temperature: 23.5
Limit: FCC Part 15_Above 1G_Peak	Power: DC 5V	Humidity: 51 %
EUT:	Distance: 3m	
M/N:		
Mode: BLE 2440		
Note:		

Radiated Emission Measurement



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	Comment
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	
1		4880.000	41.96	-2.76	39.20	74.00	-34.80	peak		
2		1398.492	49.15	-7.00	42.15	74.00	-31.85	peak		
3	*	2720.464	47.13	-2.90	44.23	74.00	-29.77	peak		

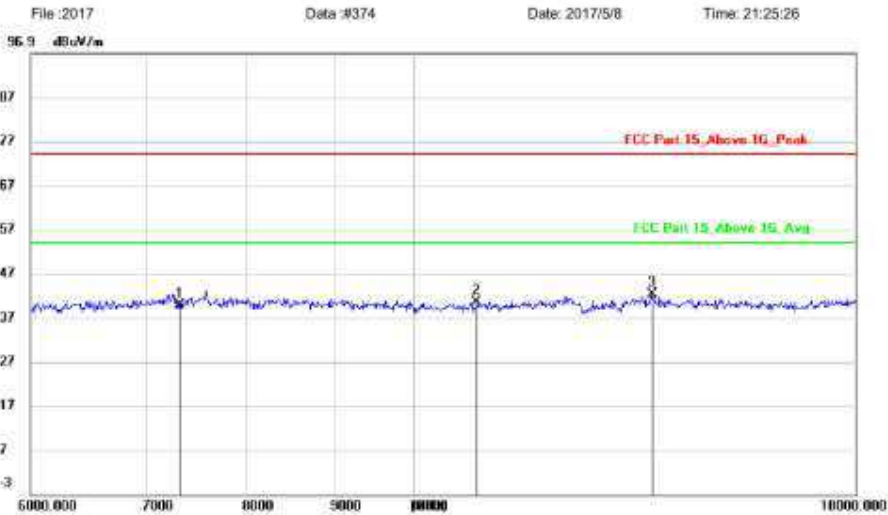
Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB	Polarization: Vertical	Temperature: 23.5
Limit: FCC Part 15_Above 1G_Peak	Power: DC 5V	Humidity: 51 %
EUT:	Distance: 3m	
M/N:		
Mode: BLE 2440		
Note:		

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		7320.000	36.35	3.45	39.80	74.00	-34.20	peak		
2		10884.06	34.86	5.68	40.54	74.00	-33.46	peak		
3	*	13744.96	35.62	6.55	42.17	74.00	-31.83	peak		

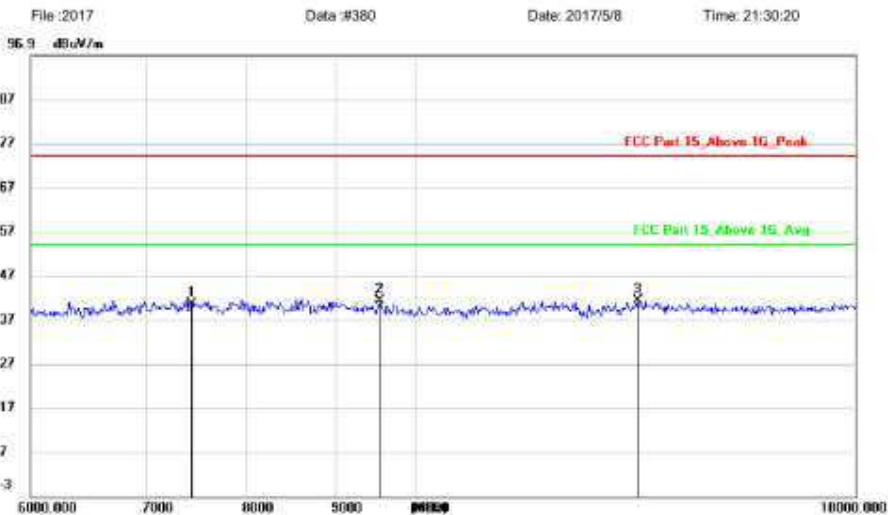
Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB	Polarization: Horizontal	Temperature: 23.5
Limit: FCC Part 15_Above 1G_Peak	Power: DC 5V	Humidity: 51 %
EUT:	Distance: 3m	
M/N:		
Mode: BLE 2480		
Note:		

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		7440.000	37.09	3.38	40.47	74.00	-33.53	peak		
2		9558.241	38.10	3.14	41.24	74.00	-32.76	peak		
3	*	13475.29	35.31	6.06	41.37	74.00	-32.63	peak		

Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Appendix B.2: Test Plots of Band Edge (Radiated)

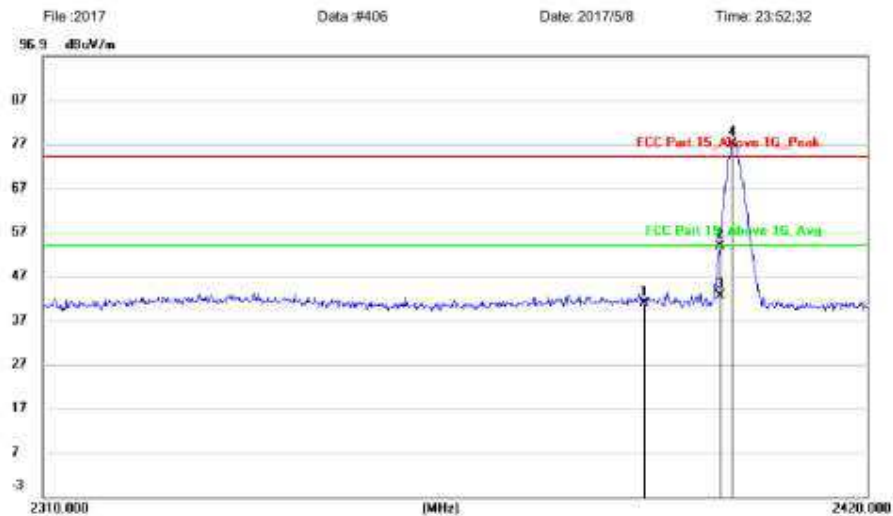
BDR mode, Low Channel



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB	Polarization: Vertical	Temperature: 23.5
Limit: FCC Part 15_Above 1G_Peak	Power: DC 5V	Humidity: 51 %
EUT:	Distance: 3m	
M/N:		
Mode: BT 3.0 1M 2402		
Note:		

Radiated Emission Measurement



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	dBuV	Factor	ment	dBuV/m	dB	Height	Degree	
				dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		2390.000	44.29	-3.40	40.89	74.00	-33.11			peak
2		2400.000	57.21	-3.41	53.80	74.00	-20.20			peak
3		2400.000	45.94	-3.41	42.53	54.00	-11.47			AVG
4	*	2401.794	80.38	-3.41	76.97	74.00	2.97			peak

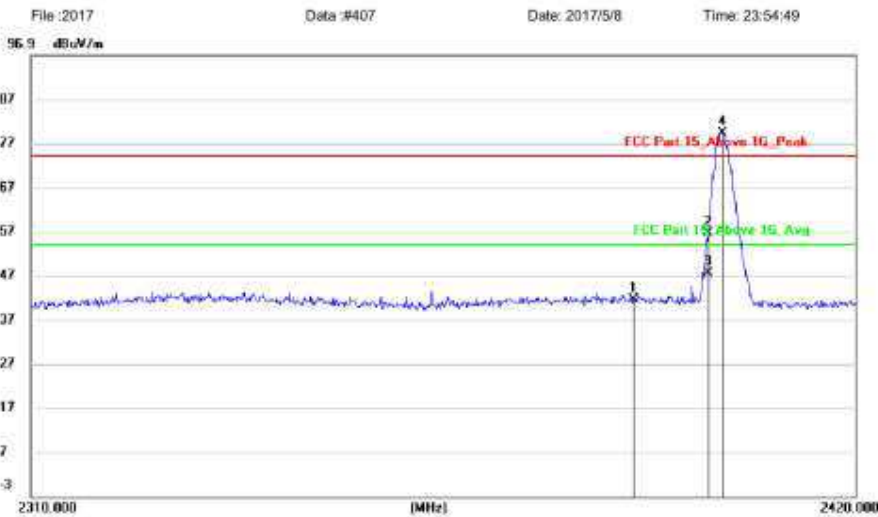
Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
 Building i, No.2, Lixin Road, Fuyong Street,
 Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB
 Limit: FCC Part 15_Above 1G_Peak
 EUT:
 M/N:
 Mode: BT 3.0 1M 2402
 Note:
 Polarization: *Horizontal*
 Power: DC 5V
 Distance: 3m
 Temperature: 23.5
 Humidity: 51 %

Radiated Emission Measurement



No. Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree	
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	2390.000	45.01	-3.40	41.61	74.00	-32.39			peak
2	2400.000	59.98	-3.41	56.57	74.00	-17.43			peak
3	2400.000	51.04	-3.41	47.63	54.00	-6.37			AVG
4 *	2402.018	82.75	-3.41	79.34	74.00	5.34			peak

Note: 1. *:Maximum data; x:Over limit; !:over margin.
 2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

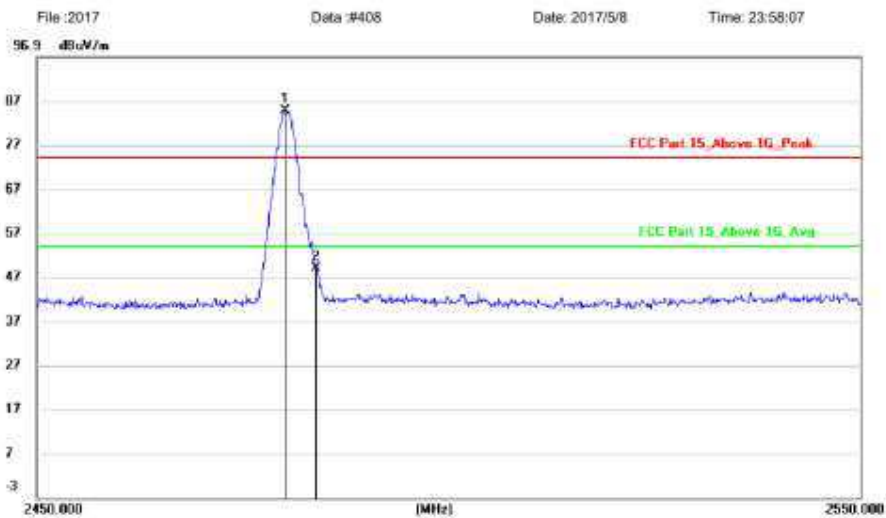
BDR mode, High Channel



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB	Polarization: Vertical	Temperature: 23.5
Limit: FCC Part 15_Above 1G_Peak	Power: DC 5V	Humidity: 51 %
EUT:	Distance: 3m	
M/N:		
Mode: BT 3.0 1M 2480		
Note:		

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree
1	*	2479.740	88.05	-3.38	84.67	74.00	10.67	peak	
2		2483.500	52.44	-3.38	49.06	74.00	-24.94	peak	

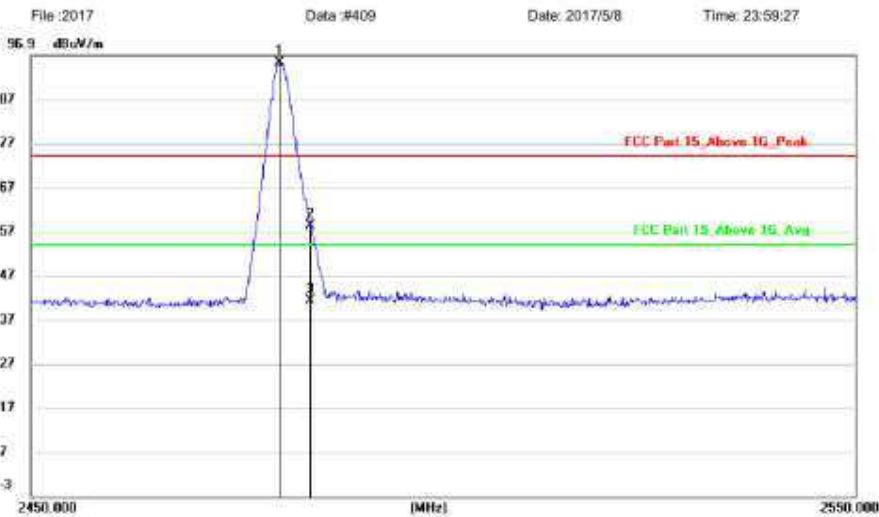
Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
 Building i, No.2, Lixin Road, Fuyong Street,
 Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB
 Limit: FCC Part 15_Above 1G_Peak
 EUT:
 M/N:
 Mode: BT 3.0 1M 2480
 Note:
 Polarization: **Horizontal**
 Power: DC 5V
 Distance: 3m
 Temperature: 23.5
 Humidity: 51 %

Radiated Emission Measurement



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	Comment
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	
1	*	2479.840	98.56	-3.38	95.18	74.00	21.18	peak		
2		2483.500	61.59	-3.38	58.21	74.00	-15.79	peak		
3		2483.500	44.73	-3.38	41.35	54.00	-12.65	AVG		

Note: 1. *:Maximum data; x:Over limit; !:over margin.
 2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

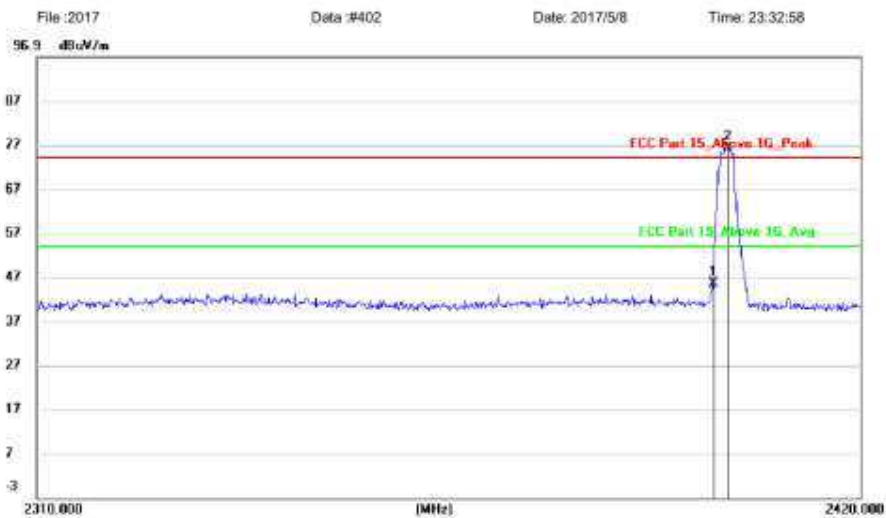
Low Energy mode, Low Channel



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB	Polarization: Vertical	Temperature: 23.5
Limit: FCC Part 15_Above 1G_Peak	Power: DC 5V	Humidity: 51 %
EUT:	Distance: 3m	
M/N:		
Mode: BLE 2402		
Note:		

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree
1		2400.000	49.03	-3.41	45.62	74.00	-28.38	peak	
2	*	2402.018	79.58	-3.41	76.17	74.00	2.17	peak	

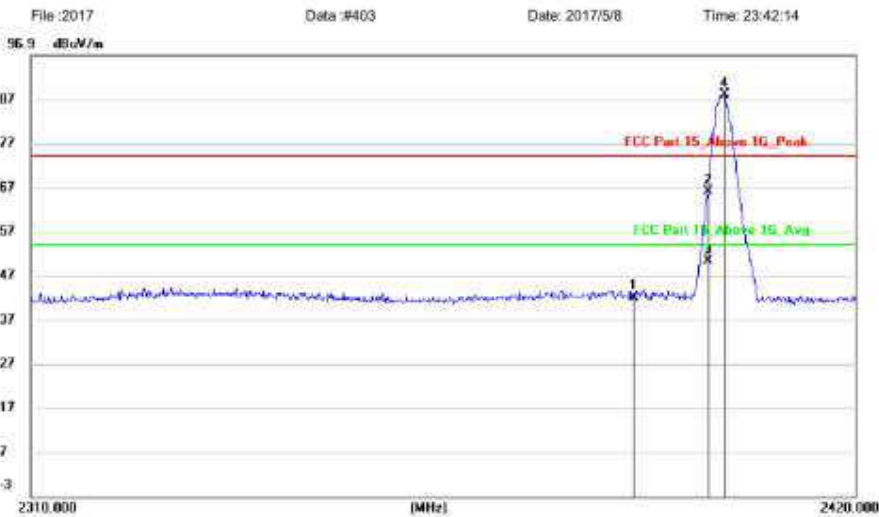
Note: 1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB	Polarization: Horizontal	Temperature: 23.5
Limit: FCC Part 15_Above 1G_Peak	Power: DC 5V	Humidity: 51 %
EUT:	Distance: 3m	
M/N:		
Mode: BLE 2402		
Note:		

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		2390.000	45.31	-3.40	41.91	74.00	-32.09			peak
2		2400.000	69.45	-3.41	66.04	74.00	-7.96			peak
3		2400.000	53.73	-3.41	50.32	54.00	-3.68			AVG
4	*	2402.242	91.33	-3.41	87.92	74.00	13.92			peak

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

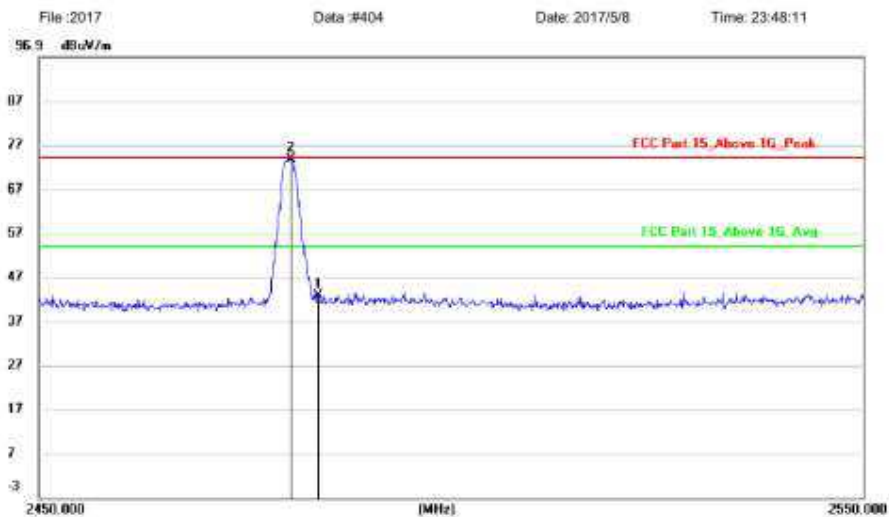
Low Energy mode, High Channel



Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB	Polarization: Vertical	Temperature: 23.5
Limit: FCC Part 15_Above 1G_Peak	Power: DC 5V	Humidity: 51 %
EUT:	Distance: 3m	
M/N:		
Mode: BLE 2402		
Note:		

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree
1		2483.500	46.16	-3.38	42.78	74.00	-31.22	peak	
2	*	2480.237	77.16	-3.38	73.78	74.00	-0.22	peak	

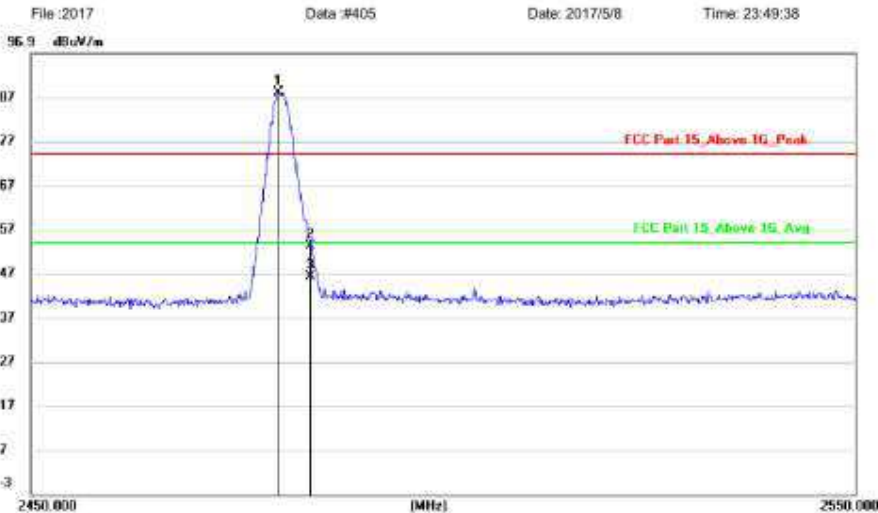
Note: 1. *-Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



Shenzhen Alpha Product Testing Co., Ltd.
 Building i, No.2, Lixin Road, Fuyong Street,
 Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB
 Limit: FCC Part 15_Above 1G_Peak
 EUT:
 M/N:
 Mode: BLE 2402
 Note:
 Polarization: *Horizontal*
 Power: DC 5V
 Distance: 3m
 Temperature: 23.5
 Humidity: 51 %

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2479.641	91.52	-3.38	88.14	74.00	14.14	peak		
2		2483.500	56.59	-3.38	53.21	74.00	-20.79	peak		
3		2483.500	49.59	-3.38	46.21	54.00	-7.79	AVG		

Note: 1. *:Maximum data; x:Over limit; !:over margin.
 2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Appendix B.3: Test Plots of Conducted Emission

C Mode

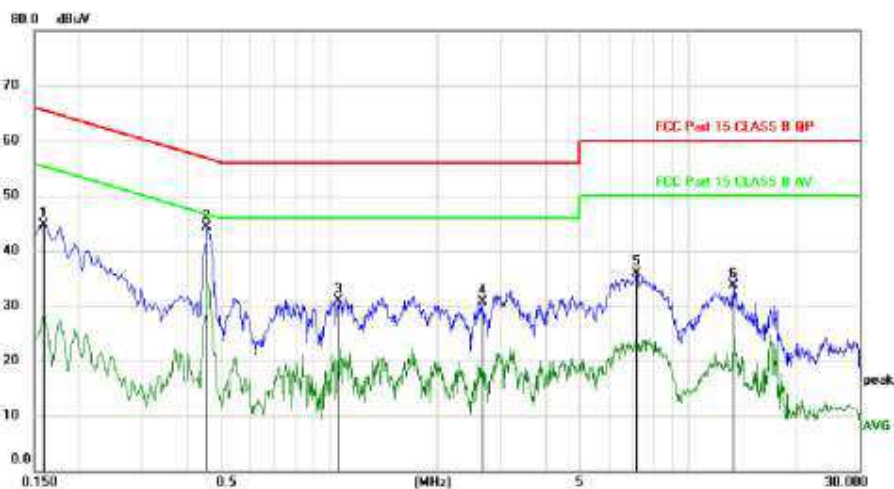


Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB	Phase: N	Temperature: 23.8
Limit: FCC Part 15 CLASS B QP	Power: AC 120V/60Hz	Humidity: 54 %
EUT: MID		
M/N:		
Mode: Bluetooth Link		
Note:		

Conducted Emission Measurement

File: 2017 Data: #76 Date: 2017-5-6 Time: 11:08:23



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.1590	35.06	9.73	44.79	65.52	-20.73	peak	
2 *	0.4560	34.45	9.78	44.23	56.77	-12.54	peak	
3	1.0545	21.11	9.84	30.95	56.00	-25.05	peak	
4	2.6700	20.69	10.01	30.70	56.00	-25.30	peak	
5	7.2105	25.65	10.28	35.93	60.00	-24.07	peak	
6	13.3575	23.32	10.34	33.66	60.00	-26.34	peak	

*:Maximum data x:Over limit !:over margin

(Reference Only)

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

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Page: 1

Engineer Signature:

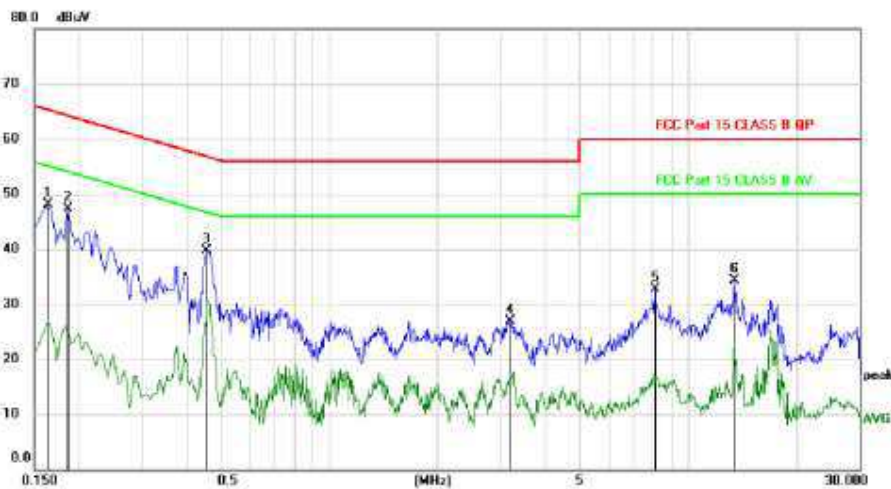


Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

Site: LAB	Phase: L1	Temperature: 23.8
Limit: FCC Part 15 CLASS B QP	Power: AC 120V/60Hz	Humidity: 54 %
EUT: MID		
M/N:		
Mode: Bluetooth Link		
Note:		

Conducted Emission Measurement

File: 2017 Data #77 Date: 2017-5-6 Time: 11:09:58



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1635	38.47	9.73	48.20	65.28	-17.08	peak	
2	*	0.1860	37.59	9.74	47.33	64.21	-16.88	peak	
3		0.4560	30.01	9.78	39.79	56.77	-16.98	peak	
4		3.2055	16.94	10.06	27.00	56.00	-29.00	peak	
5		8.0655	22.36	10.30	32.66	60.00	-27.34	peak	
6		13.4205	24.05	10.34	34.39	60.00	-25.61	peak	

*: Maximum data x: Over limit !: over margin (Reference Only)

Note: Measurement=Reading Level+Correct Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

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Page: 1

Engineer Signature: