

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				
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:	Andy Yan / Project Manager				
01.06.2017		kontrolliert von / reviewed by:		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(pass) = entspricht o.g. Prüfgrundlage(n) F(all) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(pass) = passed a.m. test specifications(s) F(all) = 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>					

Prüfbericht - Nr.: 50084596 002
Test Report No.

Seite 2 von 28
Page 2 of 28

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

Contents

1	GENERAL REMARKS	4
1.1	COMPLEMENTARY MATERIALS	4
2	TEST SITES	4
2.1	TEST FACILITIES	4
2.2	LIST OF TEST AND MEASUREMENT INSTRUMENTS.....	5
2.3	TRACEABILITY	6
2.4	CALIBRATION	6
2.5	MEASUREMENT UNCERTAINTY.....	6
2.6	LOCATION OF ORIGINAL DATA.....	6
2.7	STATUS OF FACILITY USED FOR TESTING.....	6
3	GENERAL PRODUCT INFORMATION	7
3.1	PRODUCT FUNCTION AND INTENDED USE.....	7
3.2	RATINGS AND SYSTEM DETAILS	7
3.3	INDEPENDENT OPERATION MODES	10
3.4	NOISE GENERATING AND NOISE SUPPRESSING PARTS	10
3.5	SUBMITTED DOCUMENTS.....	10
4	TEST SET-UP AND OPERATION MODES	11
4.1	PRINCIPLE OF CONFIGURATION SELECTION	11
4.2	TEST OPERATION AND TEST SOFTWARE.....	11
4.3	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT.....	11
4.4	COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE.....	11
4.5	TEST SETUP DIAGRAM	12
5	TEST RESULTS	14
5.1	TRANSMITTER REQUIREMENT & TEST SUITES	14
5.1.1	Antenna Requirement	14
5.1.2	Maximum Peak Conducted Output Power.....	15
5.1.3	Conducted Power Spectral Density	16
5.1.4	6dB Bandwidth	17
5.1.5	Conducted Spurious Emissions Measured in 100 kHz Bandwidth	18
5.1.6	Radiated Spurious Emission	19
5.1.7	20dB Bandwidth	20
5.1.8	Carrier Frequency Separation.....	21
5.1.9	Number of Hopping Frequency	22
5.1.10	Time of Occupancy	23
5.1.11	Conducted Emission on AC Mains	25
6	PHOTOGRAPHS OF THE TEST SET-UP	26
7	LIST OF TABLES.....	28
8	LIST OF PHOTOGRAPHS	28

Prüfbericht - Nr.: 50084596 002
Test Report No.

Seite 4 von 28
Page 4 of 28

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.

Prüfbericht - Nr.: 50084596 002
Test Report No.

Seite 5 von 28
Page 5 of 28

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

Prüfbericht - Nr.: 50084596 002
Test Report No.

Seite 6 von 28
Page 6 of 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)	± 4.16dB
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.

Prüfbericht - Nr.: 50084596 002
Test Report No.

Seite 7 von 28
Page 7 of 28

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, π/4DQPSK, 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

Prüfbericht - Nr.: 50084596 002
Test Report No.

 Seite 8 von 28
 Page 8 of 28

Table 3: RF Channel and Frequency of Bluetooth

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)						
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

Prüfbericht - Nr.: 50084596 002
Test Report No.

 Seite 9 von 28
 Page 9 of 28

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.

Prüfbericht - Nr.: 50084596 002
Test Report No.

Seite 10 von 28
Page 10 of 28

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)

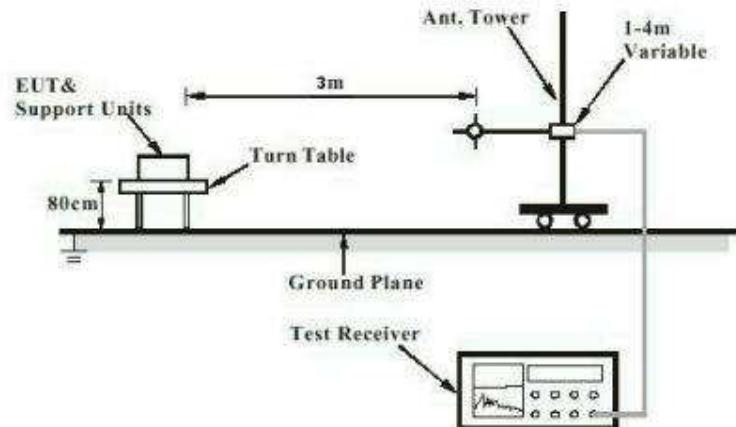


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

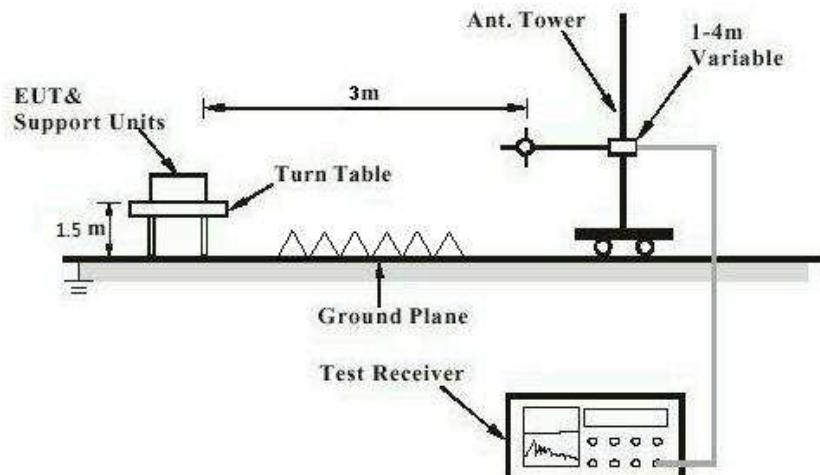
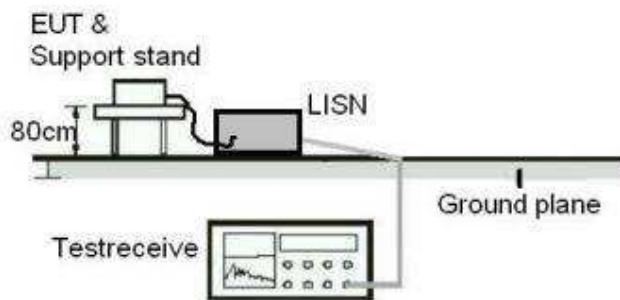
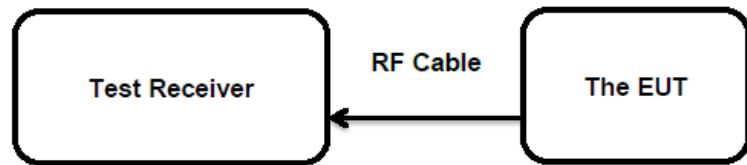


Diagram of Measurement Configuration for Mains Conduction Measurement**Diagram of Measurement Configuration for Conducted Transmitter Measurement**

Prüfbericht - Nr.: 50084596 002
Test Report No.

Seite 14 von 28
Page 14 of 28

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.

Prüfbericht - Nr.: 50084596 002
Test Report No.

 Seite 15 von 28
 Page 15 of 28

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.

Prüfbericht - Nr.: 50084596 002
*Test Report No.*Seite 16 von 28
Page 16 of 28**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.

Prüfbericht - Nr.: 50084596 002
*Test Report No.*Seite 17 von 28
Page 17 of 28**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.

Prüfbericht - Nr.: 50084596 002
Test Report No.

Seite 18 von 28
Page 18 of 28

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.

Prüfbericht - Nr.: 50084596 002
Test Report No.

Seite 19 von 28
Page 19 of 28

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.

Prüfbericht - Nr.: 50084596 002
Test Report No.

Seite 20 von 28
Page 20 of 28

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	Within the frequency band 2400 - 2483.5MHz
	2440	1109	739	
	2480	1164	776	
Maximum Measured Value		1164	776	/

For the measurement records, refer to the appendix A.

Prüfbericht - Nr.: 50084596 002
Test Report No.

 Seite 21 von 28
 Page 21 of 28

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	$\geq 25\text{kHz}$ or 2/3 of 20dB bandwidth		Pass
Adjacency Channel	2403			
Middle Channel	2441			Pass
Adjacency Channel	2442			
High Channel	2480			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.

Prüfbericht - Nr.: 50084596 002
*Test Report No.*Seite 22 von 28
Page 22 of 28

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.

Prüfbericht - Nr.: 50084596 002
Test Report No.

Seite 23 von 28
Page 23 of 28

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

Prüfbericht - Nr.: 50084596 002
Test Report No.

 Seite 24 von 28
 Page 24 of 28

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	< 0.4s
		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.

Prüfbericht - Nr.: 50084596 002
Test Report No.

Seite 25 von 28
Page 25 of 28

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.

7 List of Tables

Table 1: List of Test and Measurement Equipment.....	5
Table 2: Technical Specification of EUT	7
Table 3: RF Channel and Frequency of Bluetooth	8
Table 4: RF Channel and Frequency of Bluetooth Low Energy	8
Table 5: Frequency Hopping Information.....	9
Table 6: List of Accessories and Auxiliary Equipment.....	11
Table 7: Test Result of Maximum Peak Conducted Output Power.....	15
Table 8: Test Result of Power Spectral Density, Low Energy	16
Table 9: Test Result of 6dB Bandwidth, Low Energy	17
Table 10: Test Result of 20dB Bandwidth	20
Table 11: Test Result of Carrier Frequency Separation	21
Table 12: Test Result of Number of Hopping Frequency	22
Table 13: Test Result of Time of Occupancy	24

8 List of Photographs

Photograph 1: Set-up for Radiated Spurious Emission (Up to 1GHz)	26
Photograph 2: Set-up for Radiated Spurious Emission (Above 1GHz).....	26
Photograph 3: Set-up for Conducted Emission on AC Mains	27

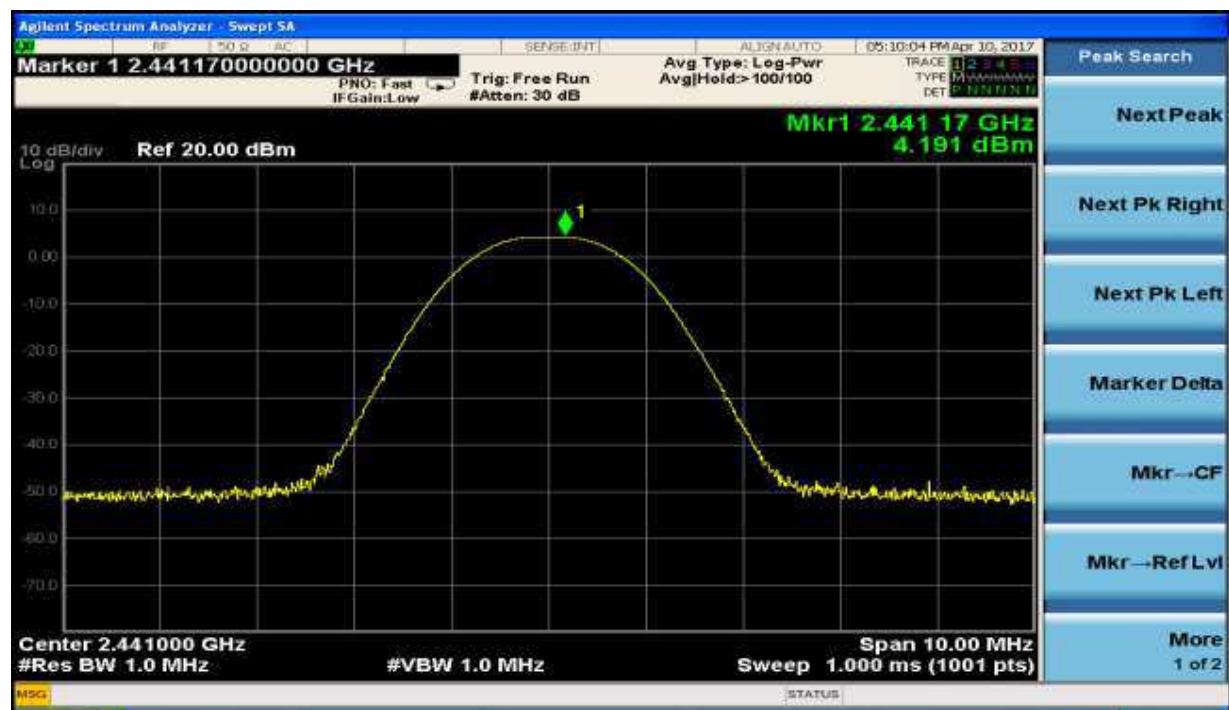
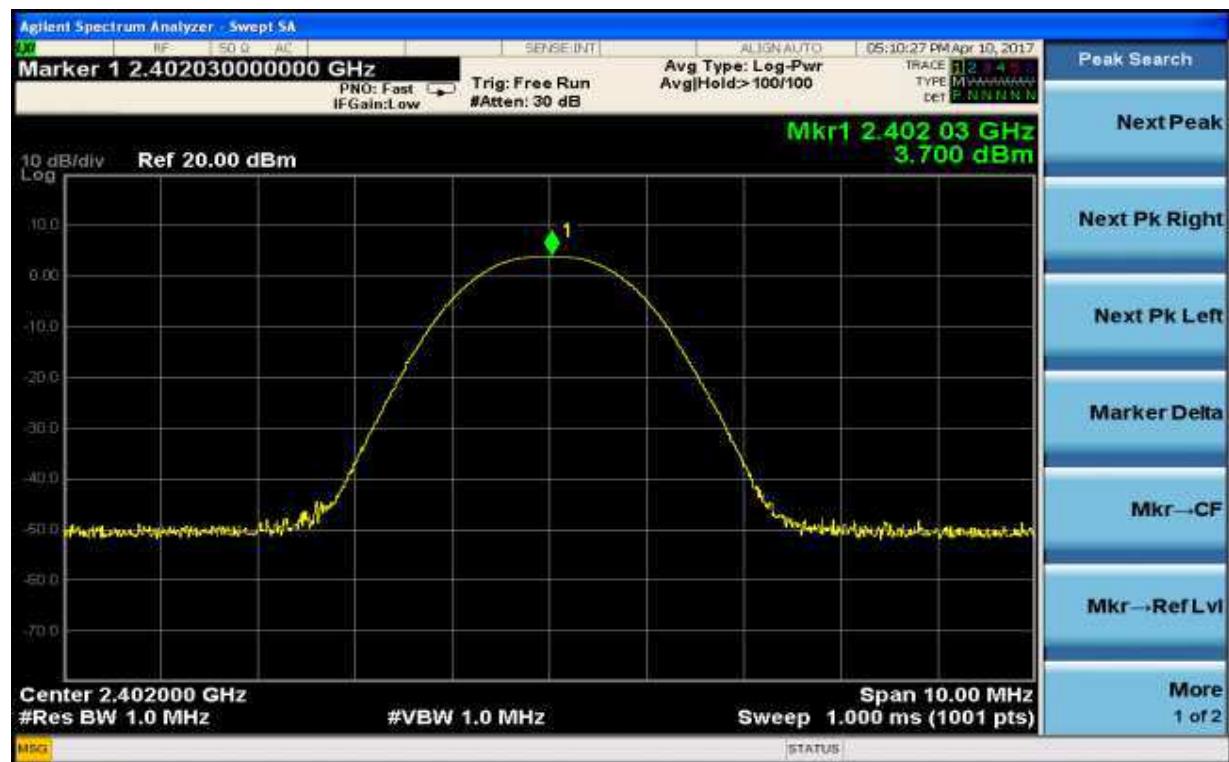
Appendix A

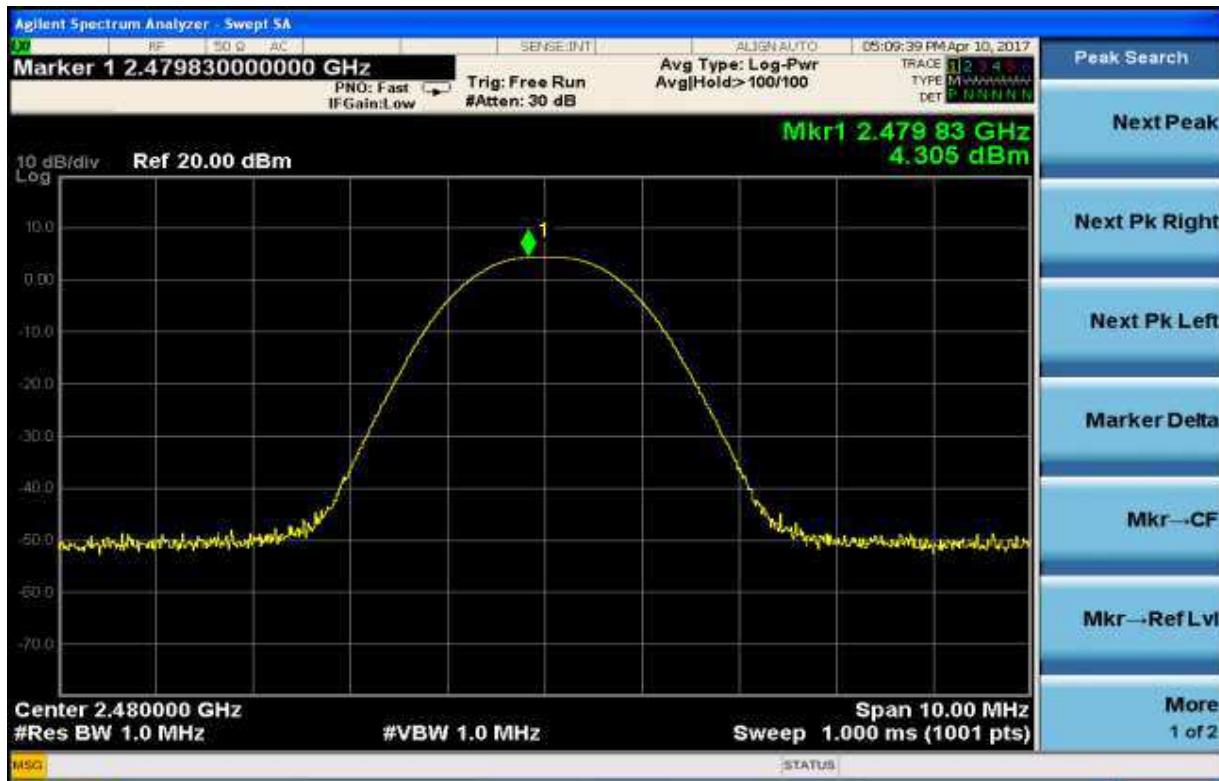
Test Results of Bluetooth 4.2 (Dual mode) of Conducted Testing

APPENDIX A	1
APPENDIX A.1: TEST PLOTS OF MAXIMUM PEAK CONDUCTED OUTPUT POWER.....	2
<i>BDR Mode, DH1</i>	2
<i>EDR Mode, 3DH1</i>	3
<i>Low Energy Mode</i>	5
APPENDIX A.2: TEST PLOTS OF CONDUCTED POWER SPECTRAL DENSITY.....	6
<i>Low Energy Mode</i>	6
APPENDIX A.3: TEST PLOTS OF 6dB BANDWIDTH	8
<i>Low Energy Mode</i>	8
APPENDIX A.4: TEST PLOTS OF 20dB BANDWIDTH	10
<i>BDR Mode, DH1</i>	10
<i>EDR Mode, 3DH1</i>	11
APPENDIX A.5: TEST PLOTS OF CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 kHz BANDWIDTH	13
<i>BDR Mode, DH1</i>	13
<i>EDR Mode, 3DH1</i>	14
<i>Low Energy Mode</i>	16
<i>BDR Mode, Band Edge</i>	17
<i>EDR Mode, Band Edge</i>	18
<i>Low Energy Mode, Band Edge</i>	19
APPENDIX A.6: TEST PLOTS OF CARRIER FREQUENCY SEPARATION.....	20
<i>Hopping Mode</i>	20
APPENDIX A.7: TEST PLOTS OF NUMBER OF HOPPING FREQUENCY	21
<i>Hopping Mode</i>	21
APPENDIX A.8: TEST PLOTS OF TIME OF OCCUPANCY.....	22
<i>BDR Mode, DH1</i>	22
<i>BDR Mode, DH3</i>	23
<i>BDR Mode, DH5</i>	25
<i>EDR Mode, 3DH1</i>	26
<i>EDR Mode, 3DH3</i>	28
<i>EDR Mode, 3DH5</i>	29

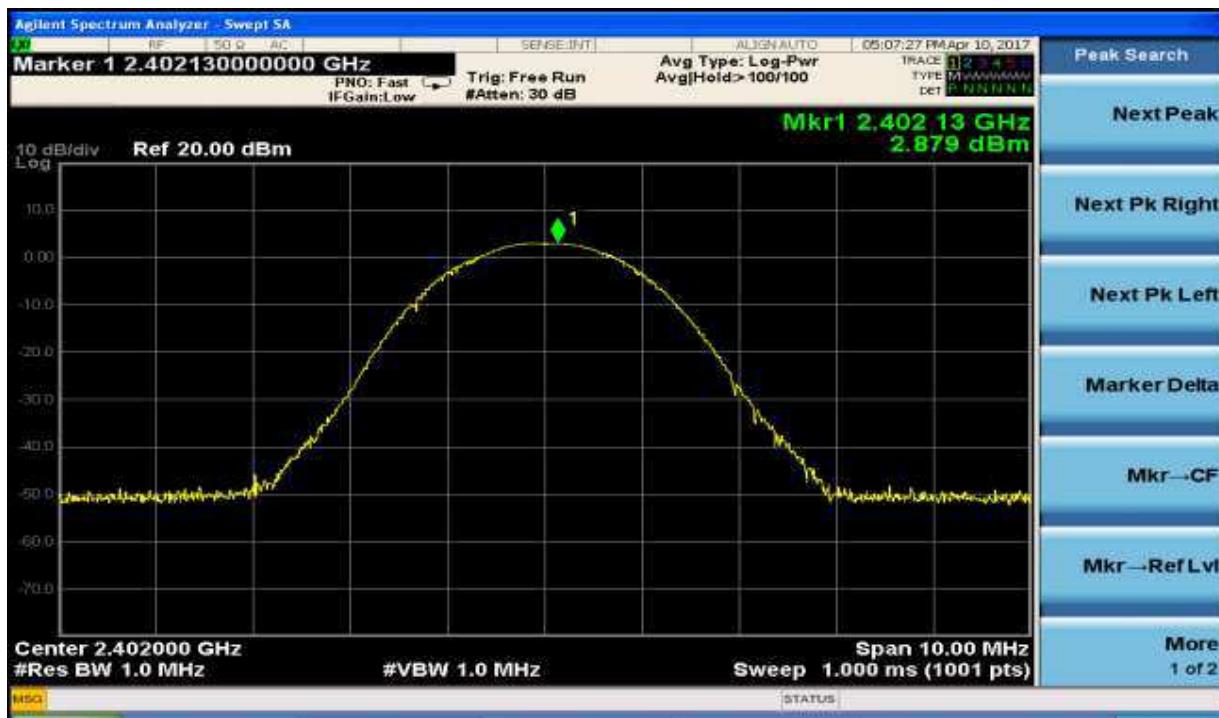
Appendix A.1: Test Plots of Maximum Peak Conducted Output Power

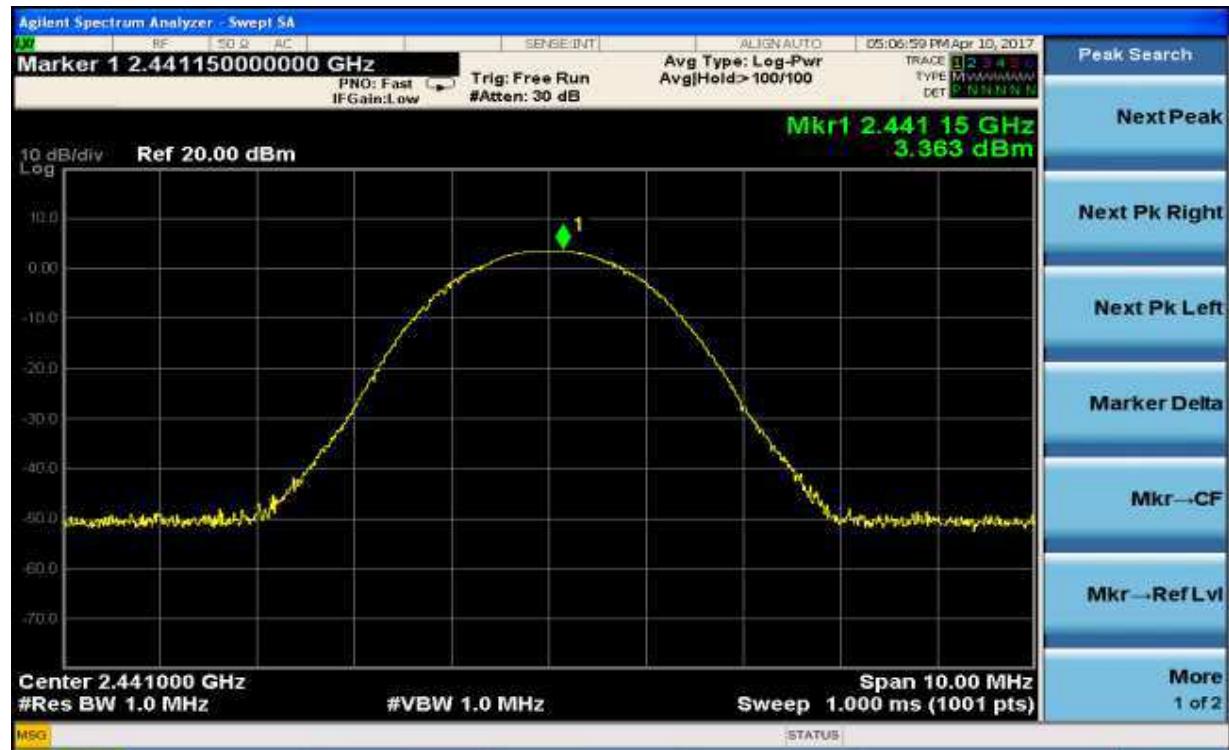
BDR Mode, DH1





EDR Mode, 3DH1





Low Energy Mode





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

Low Energy Mode



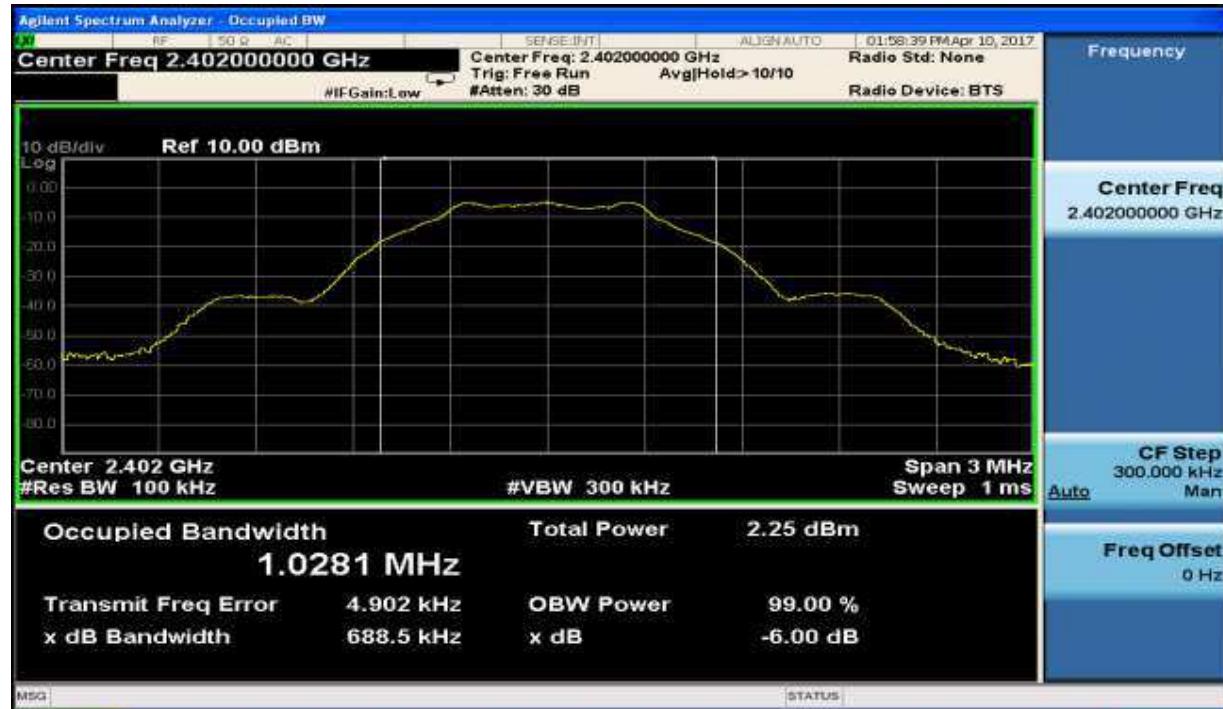
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Appendix A.3: Test Plots of 6dB Bandwidth

Low Energy Mode





Appendix A.4: Test Plots of 20dB Bandwidth

BDR Mode, DH1



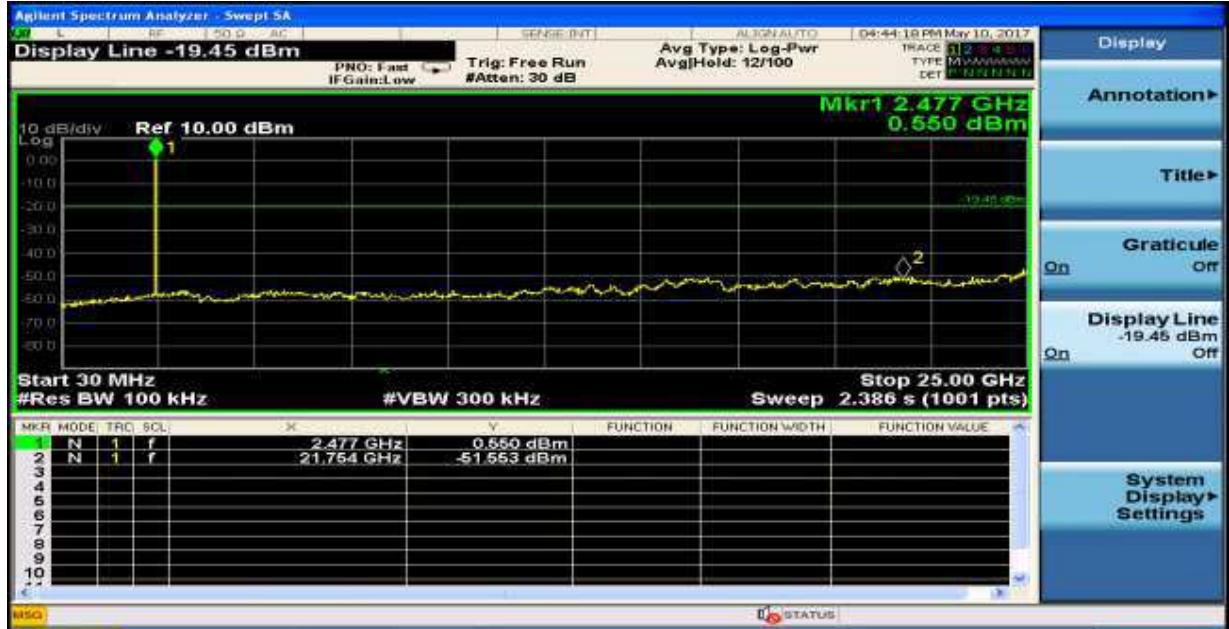
**EDR Mode, 3DH1**



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

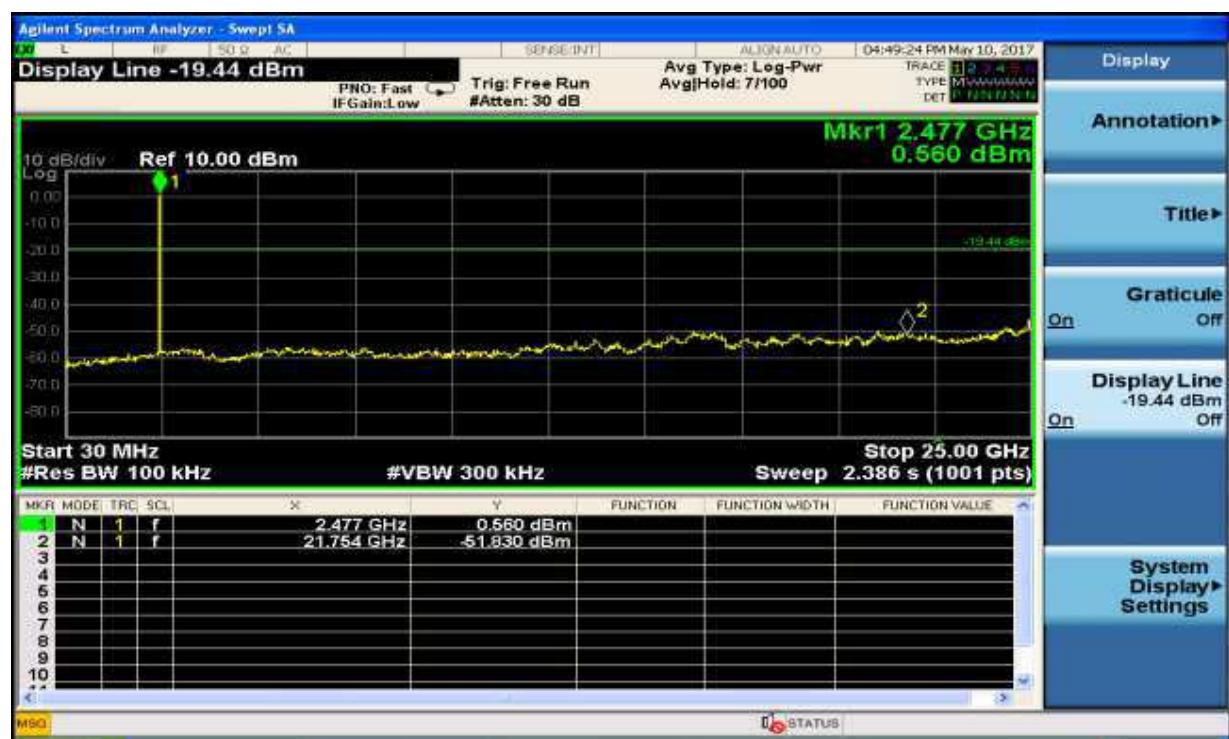
BDR Mode, DH1



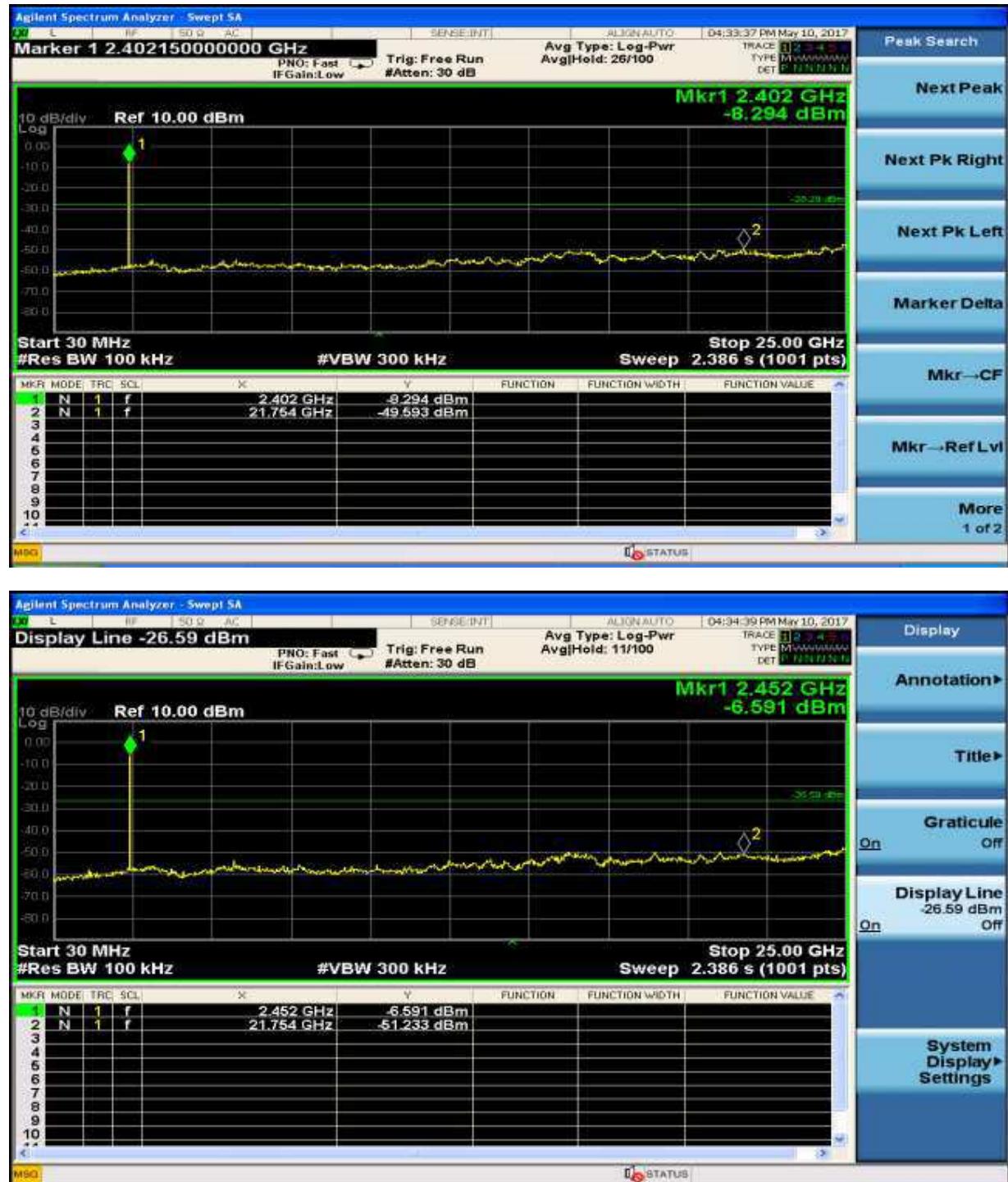


EDR Mode, 3DH1



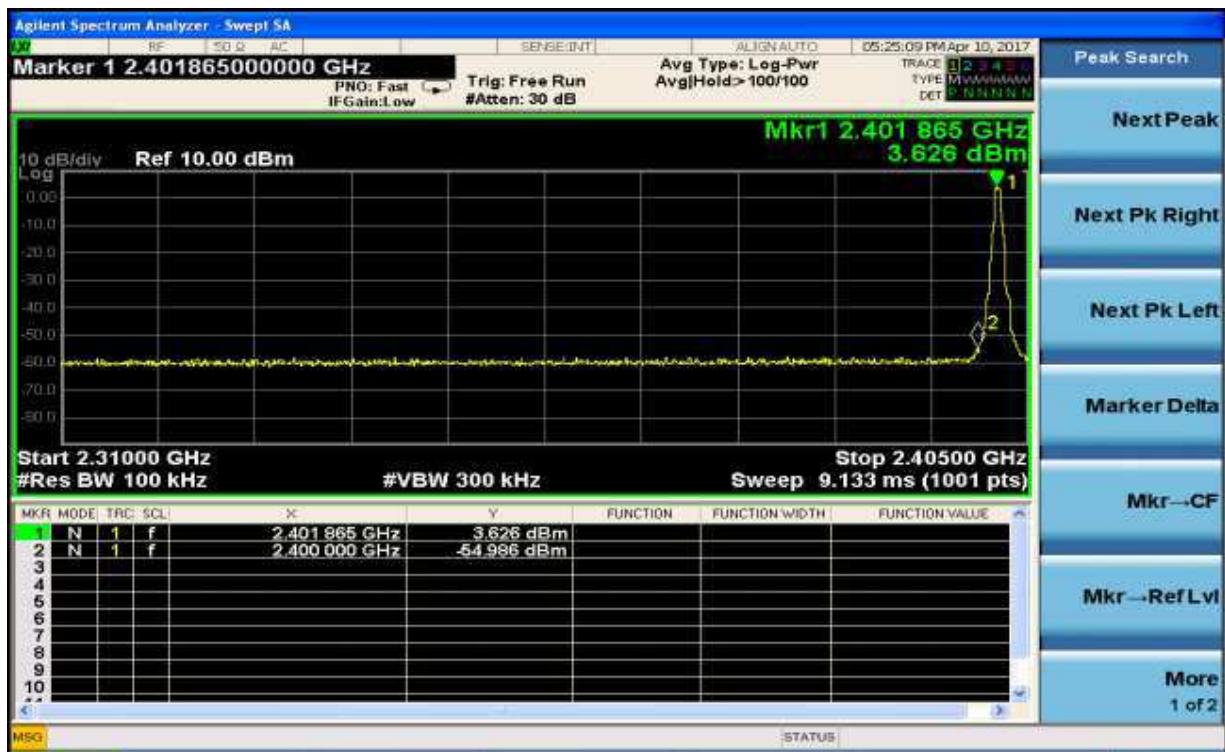


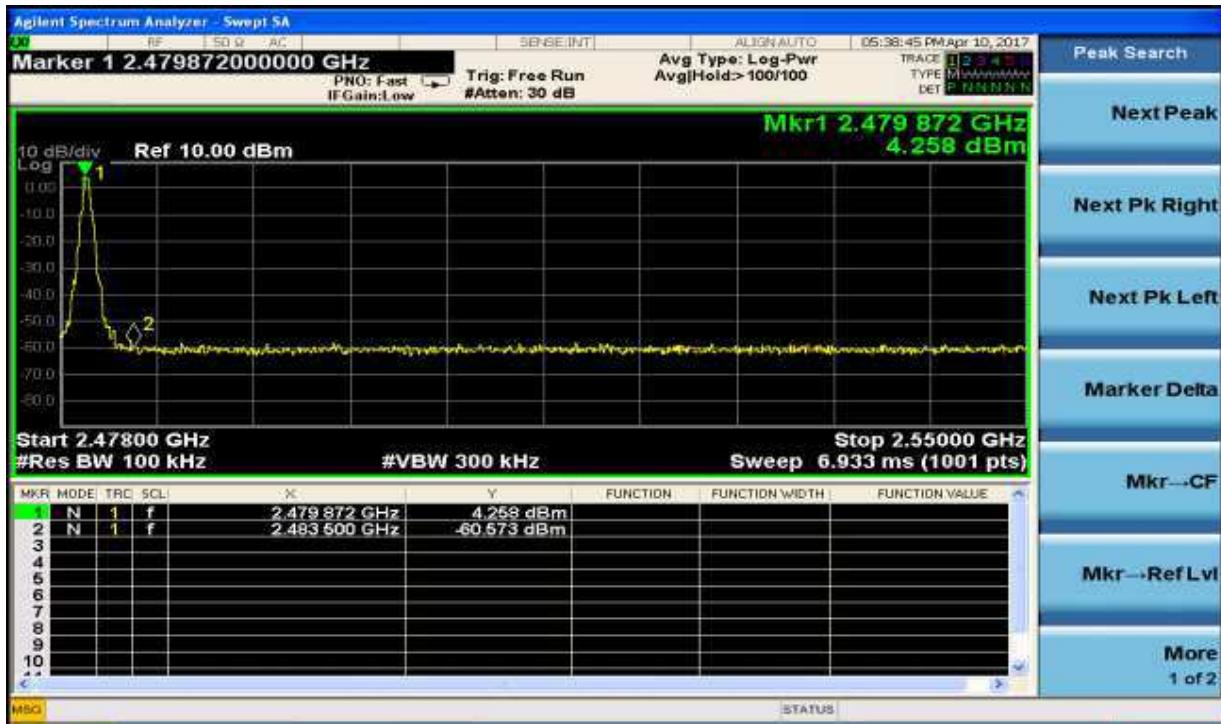
Low Energy Mode



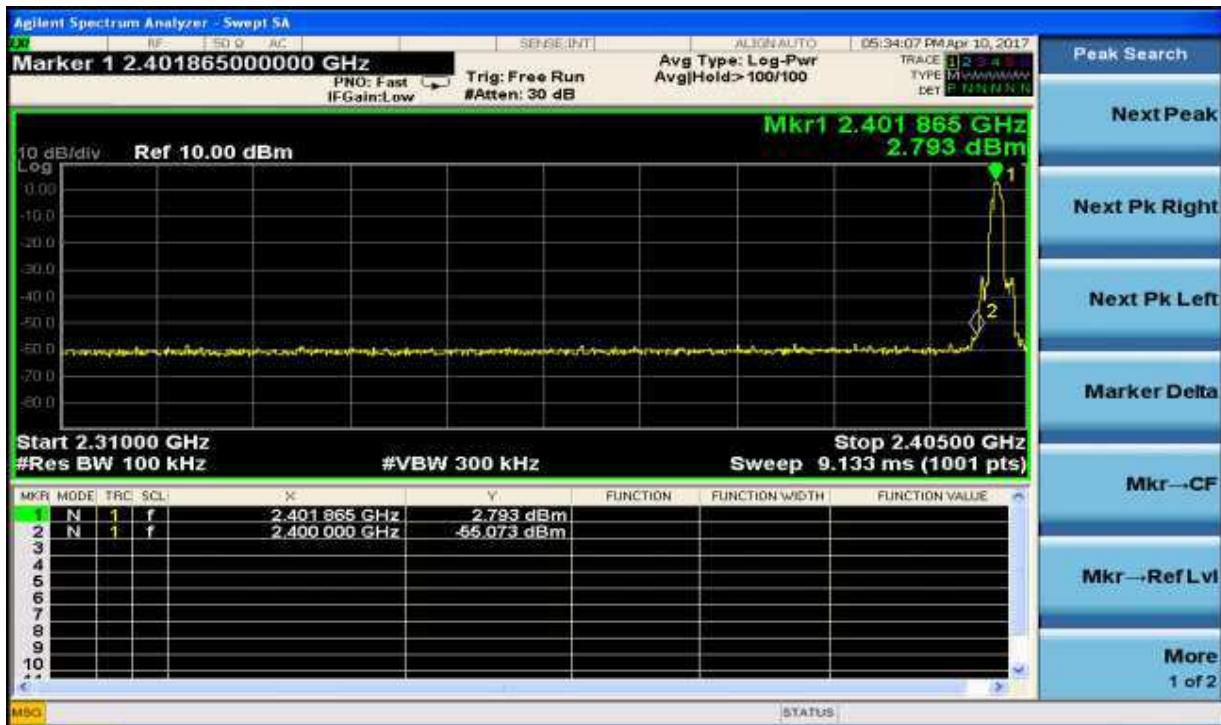


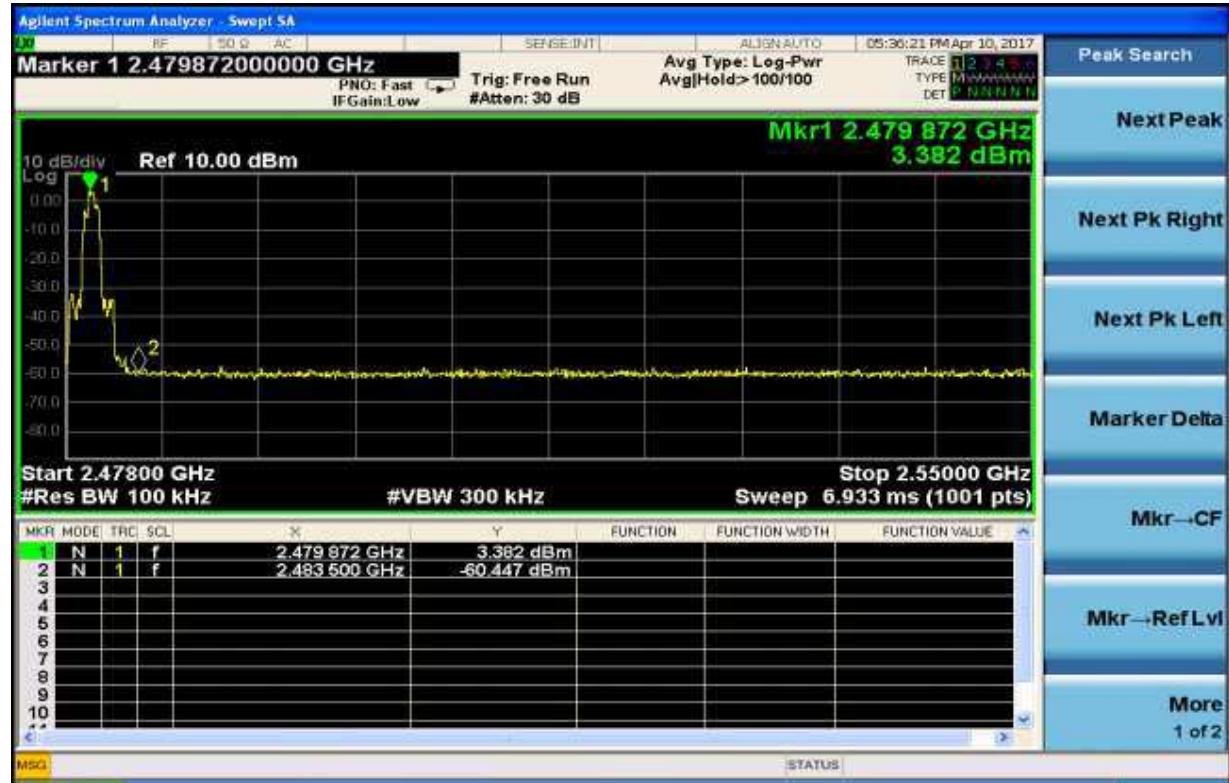
BDR Mode, Band Edge





EDR Mode, Band Edge





Low Energy Mode, Band Edge

Refer to Appendix B Bandedge

Appendix A.6: Test Plots of Carrier Frequency Separation

Hopping Mode





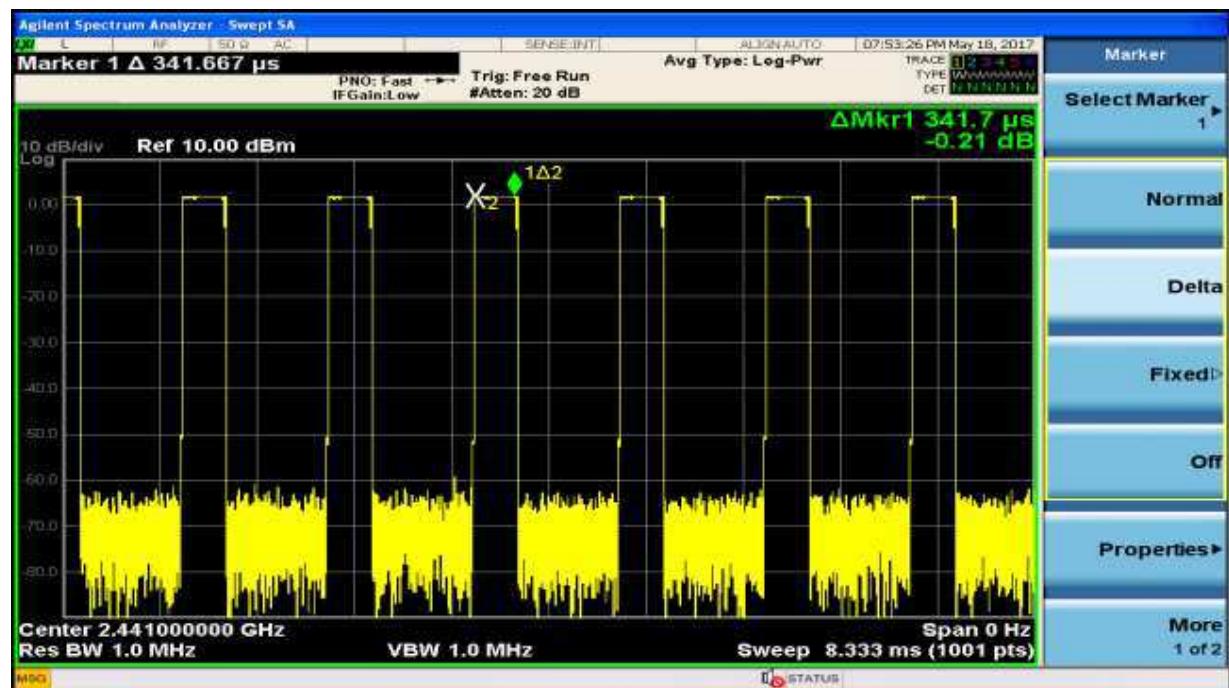
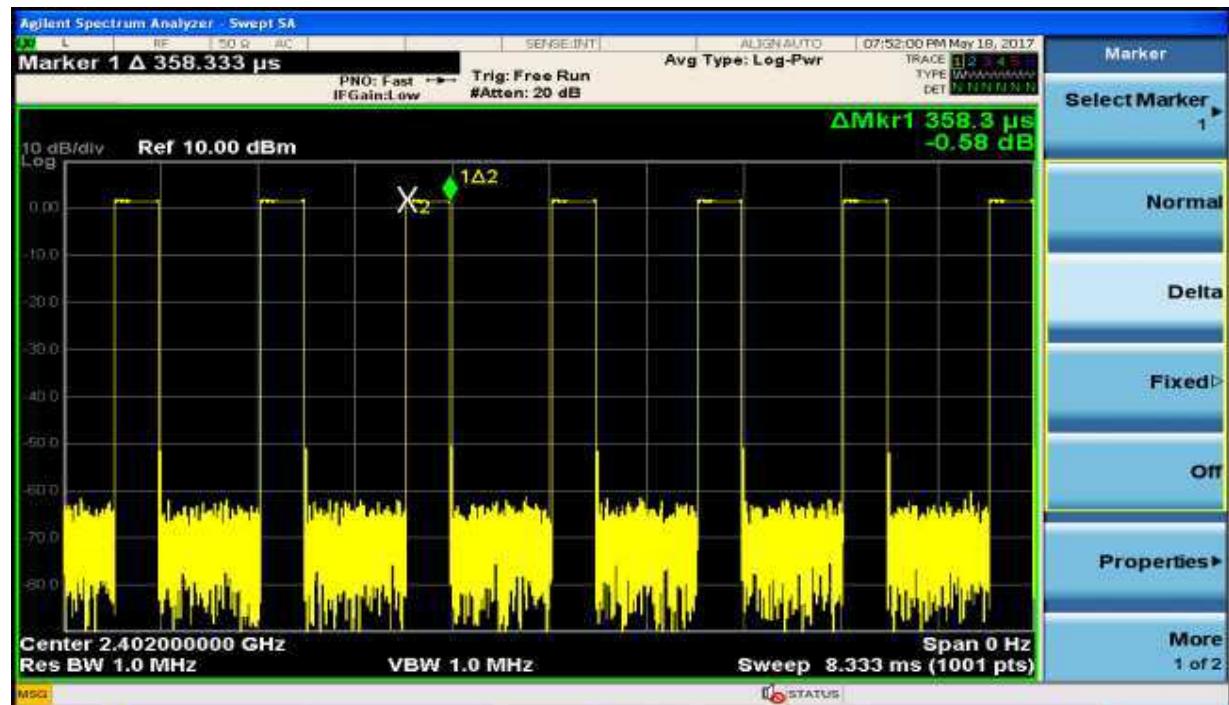
Appendix A.7: Test Plots of Number of Hopping Frequency

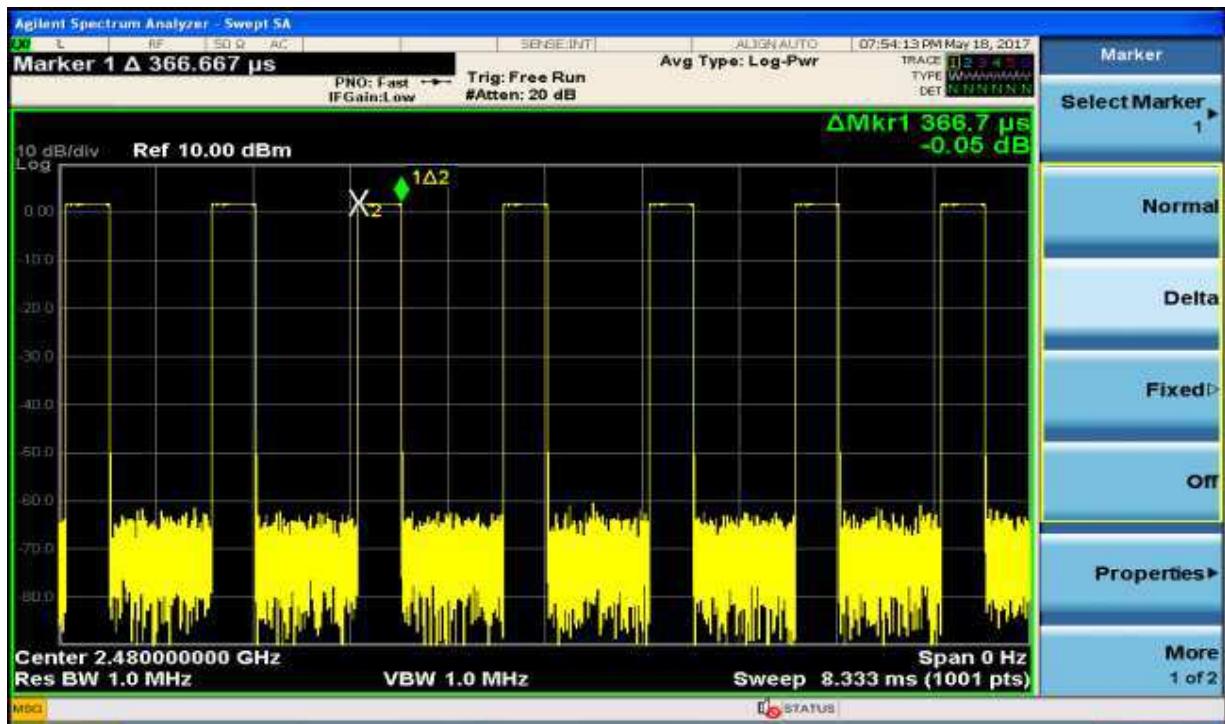
Hopping Mode



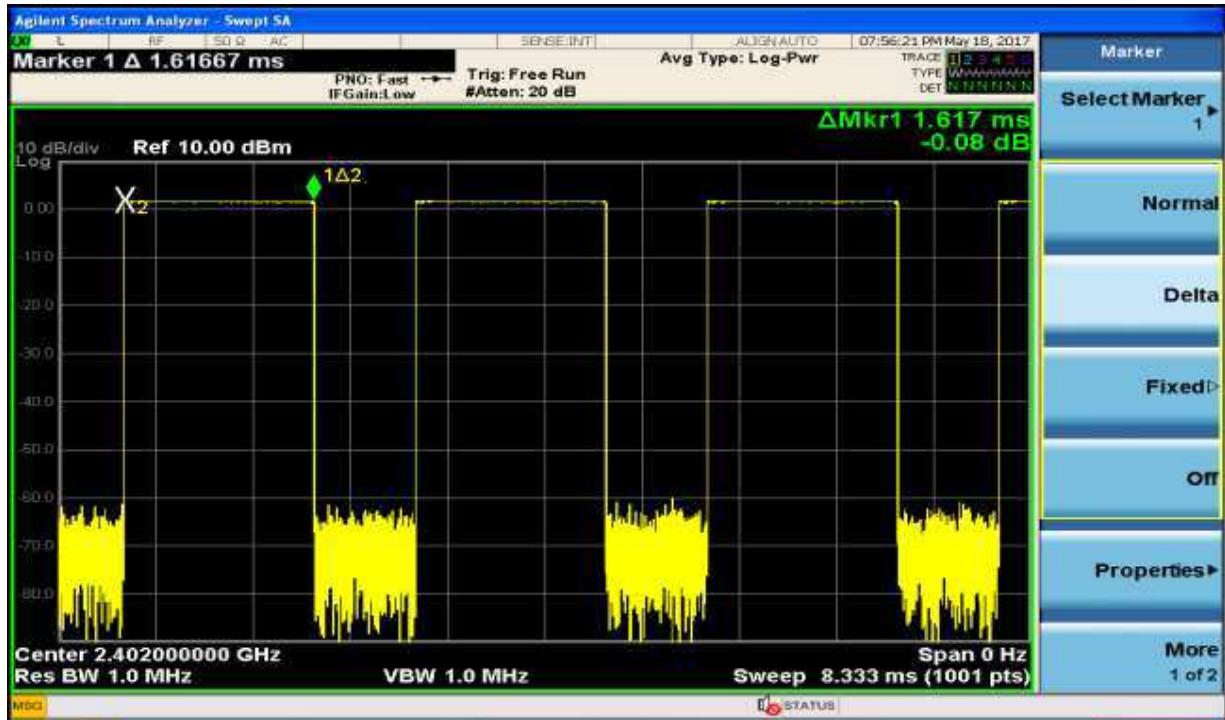
Appendix A.8: Test Plots of Time of Occupancy

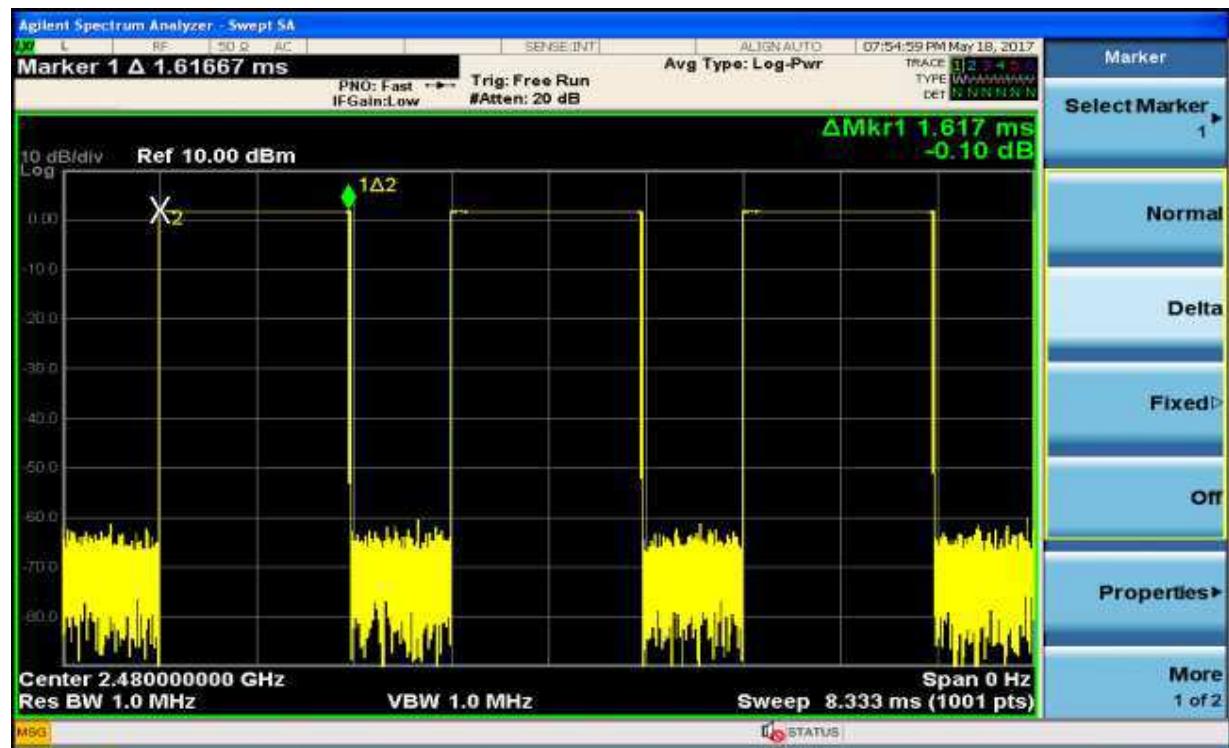
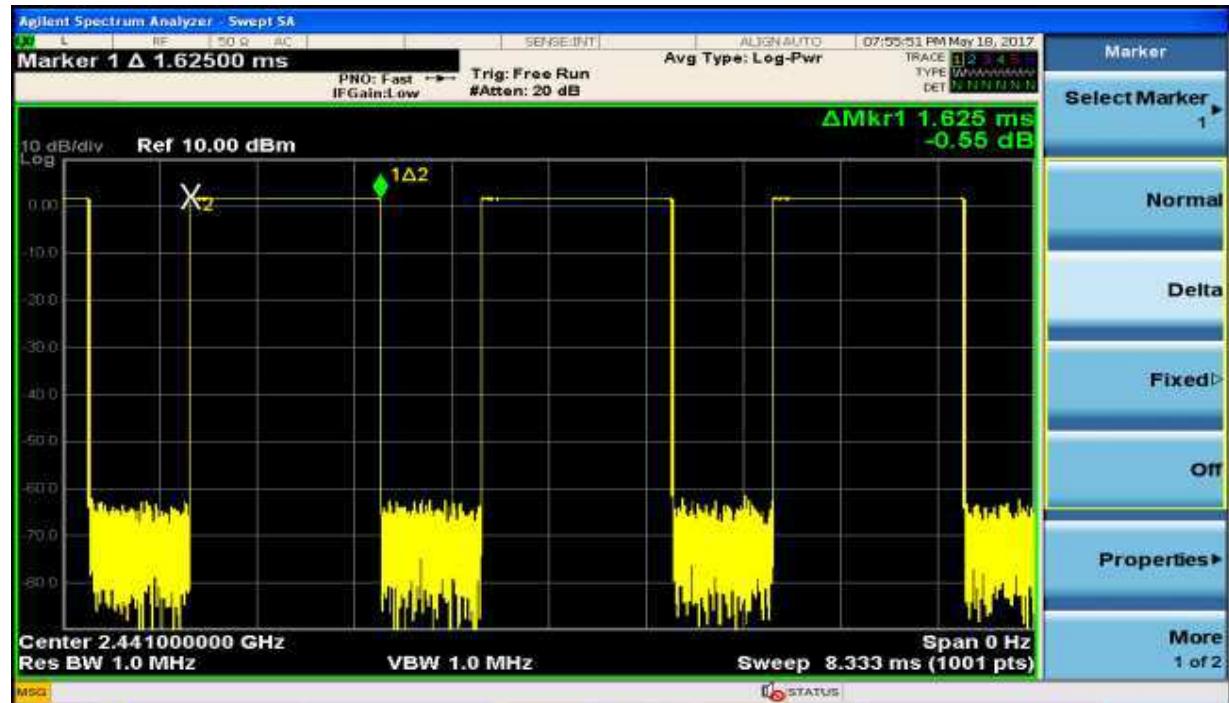
BDR Mode, DH1



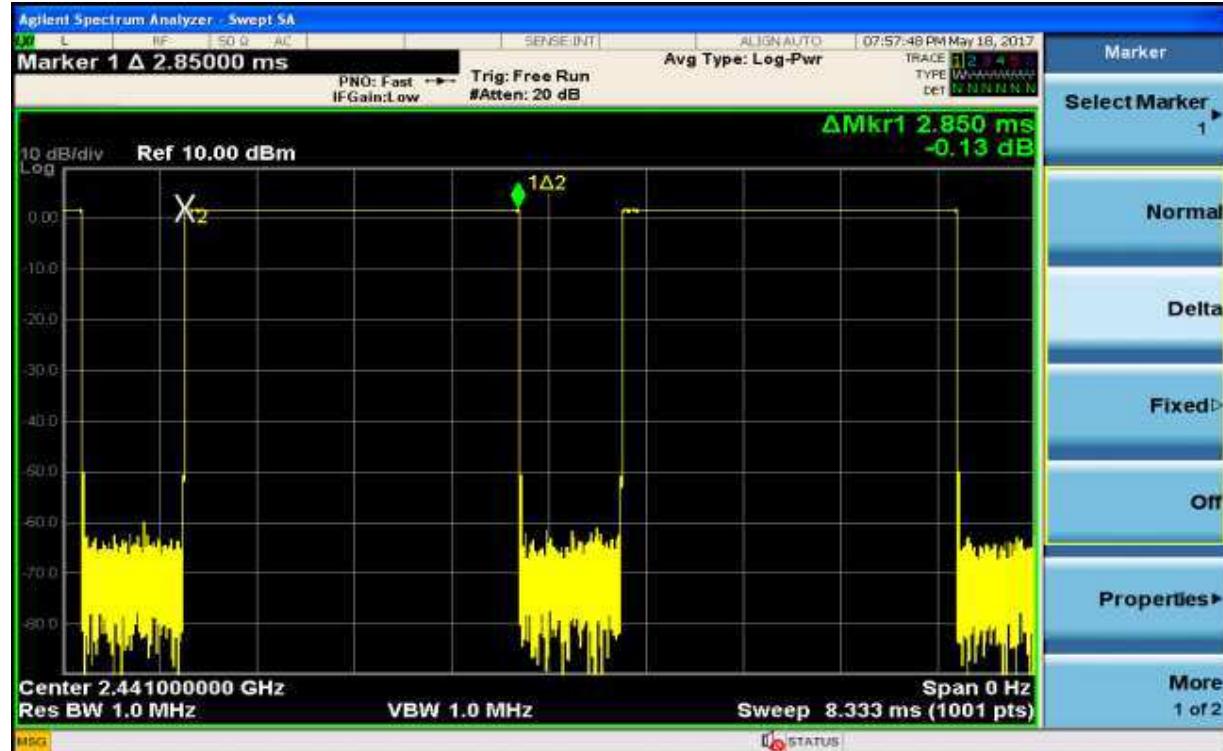
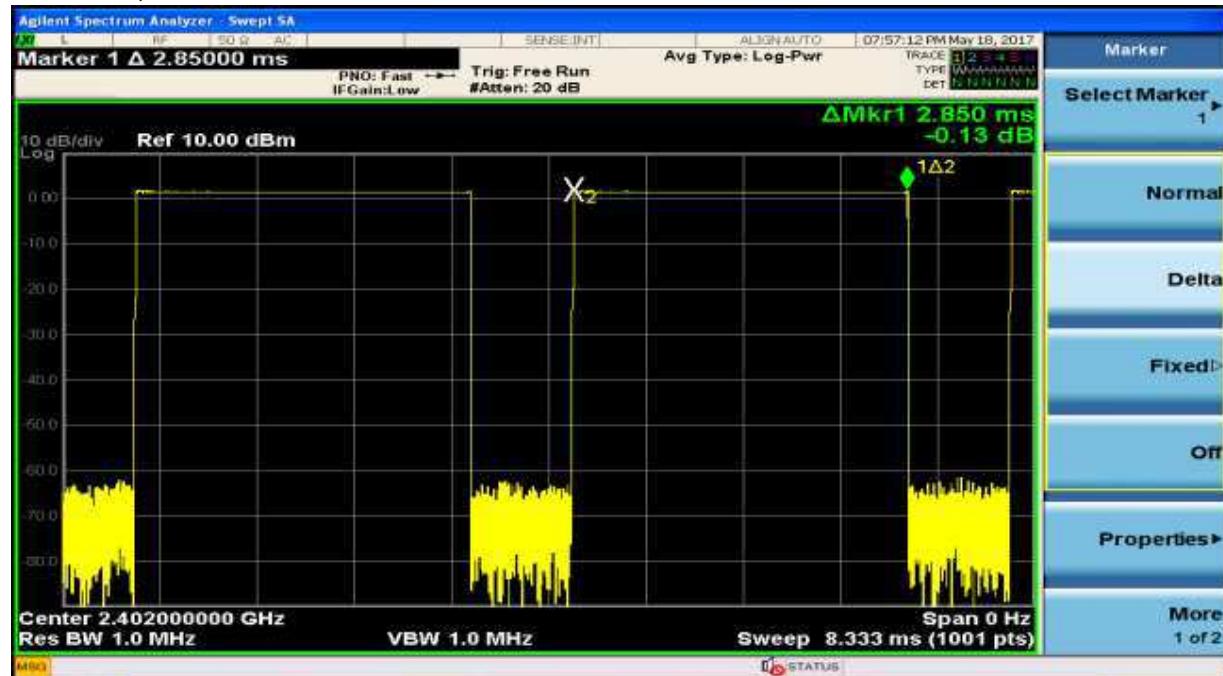


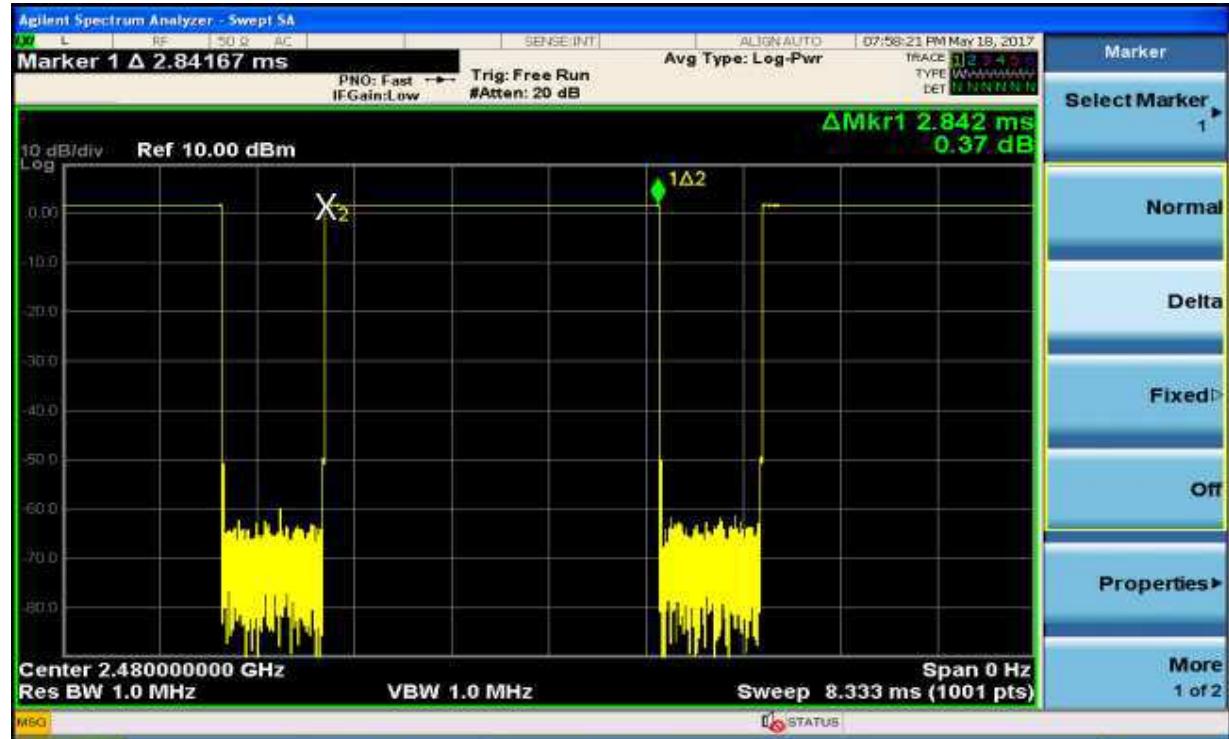
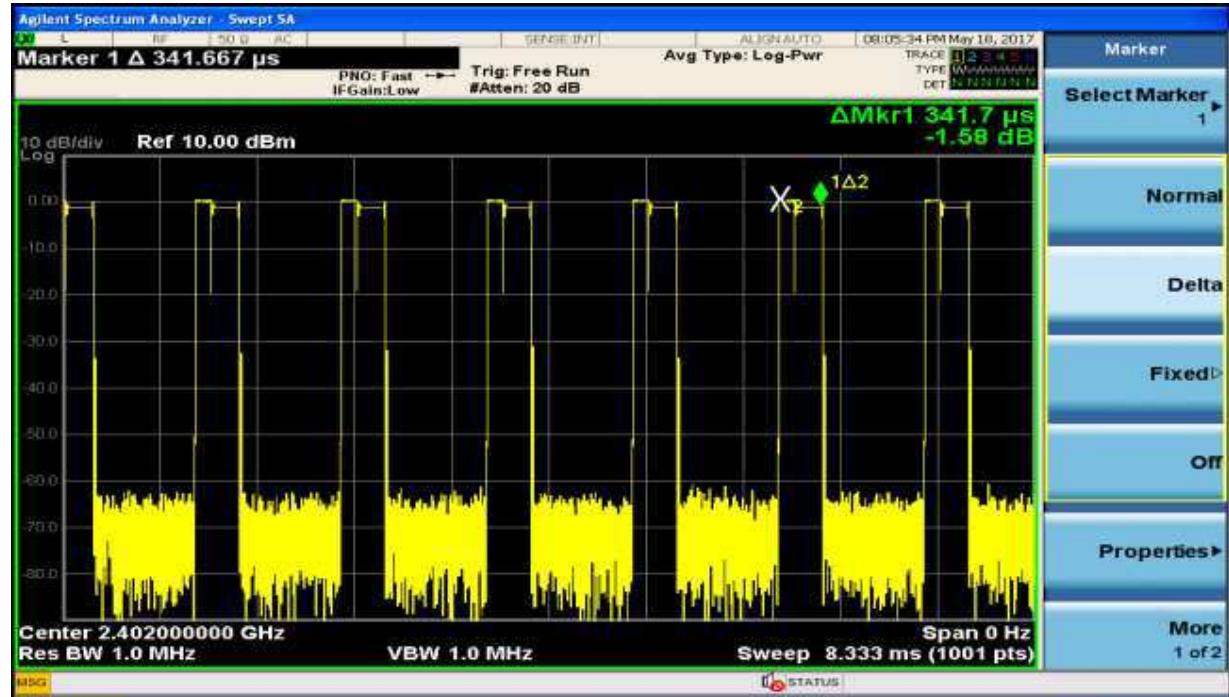
BDR Mode, DH3

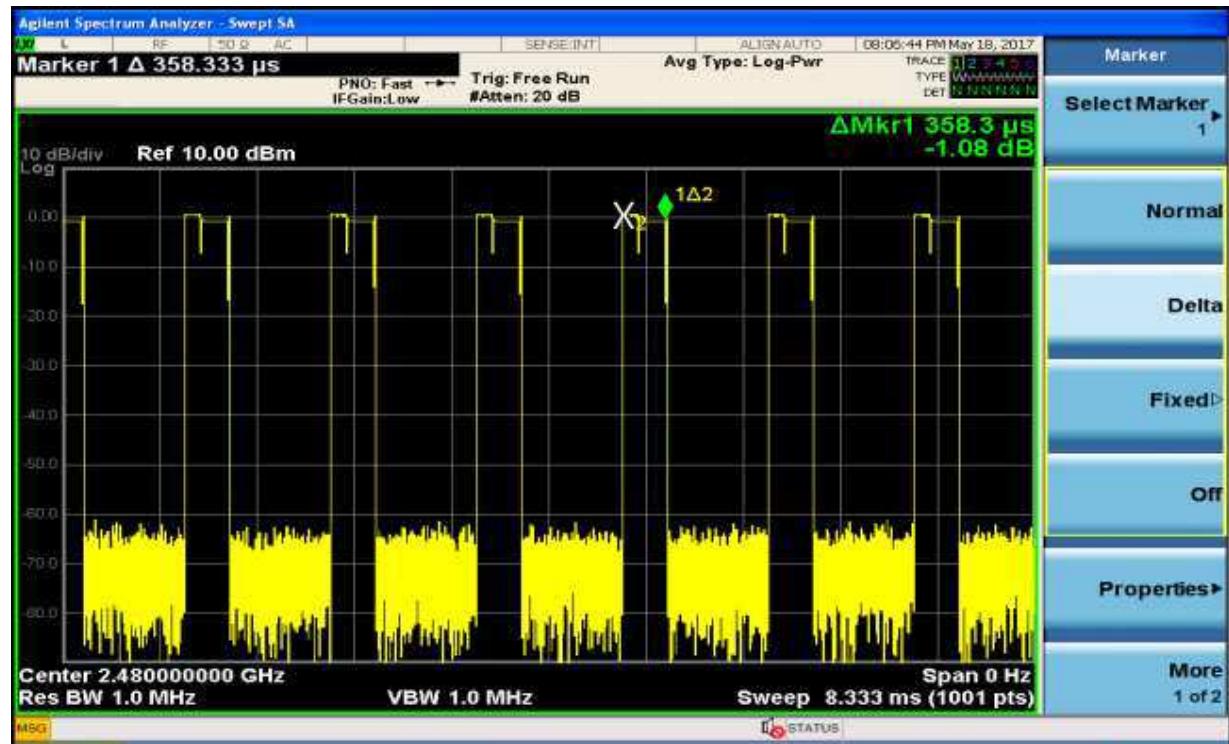
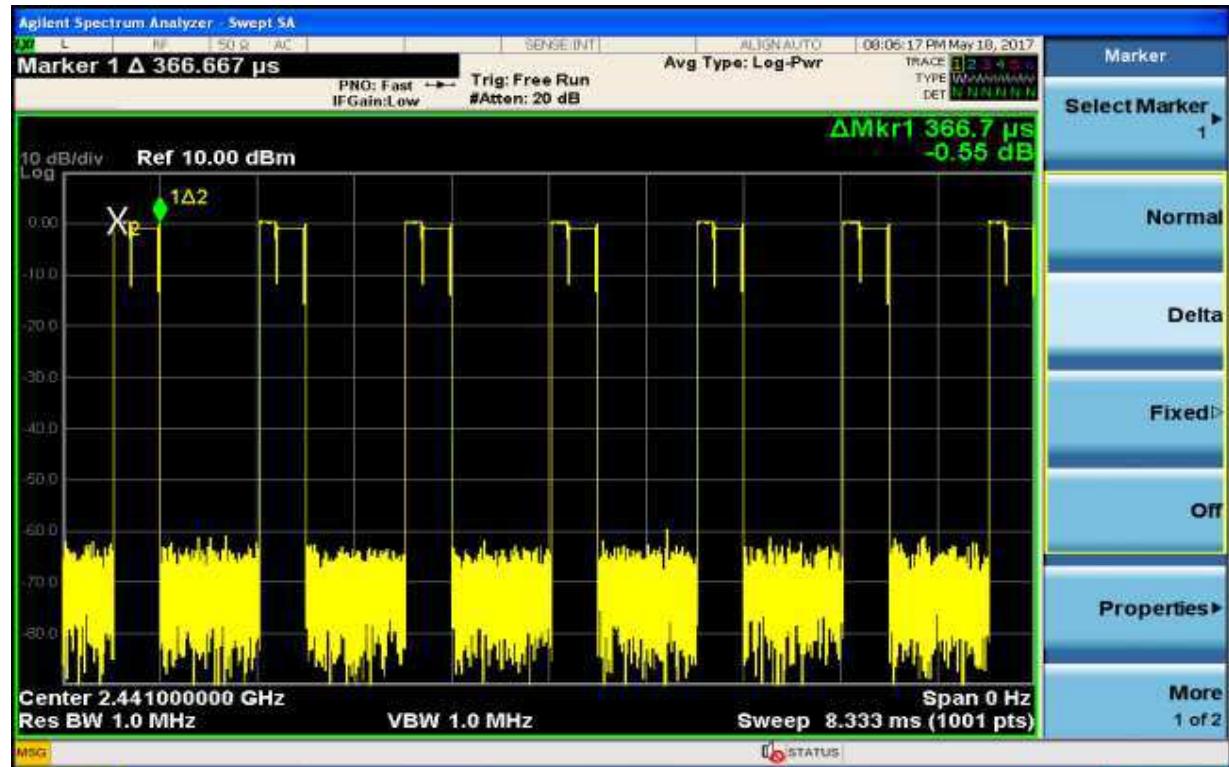




BDR Mode, DH5

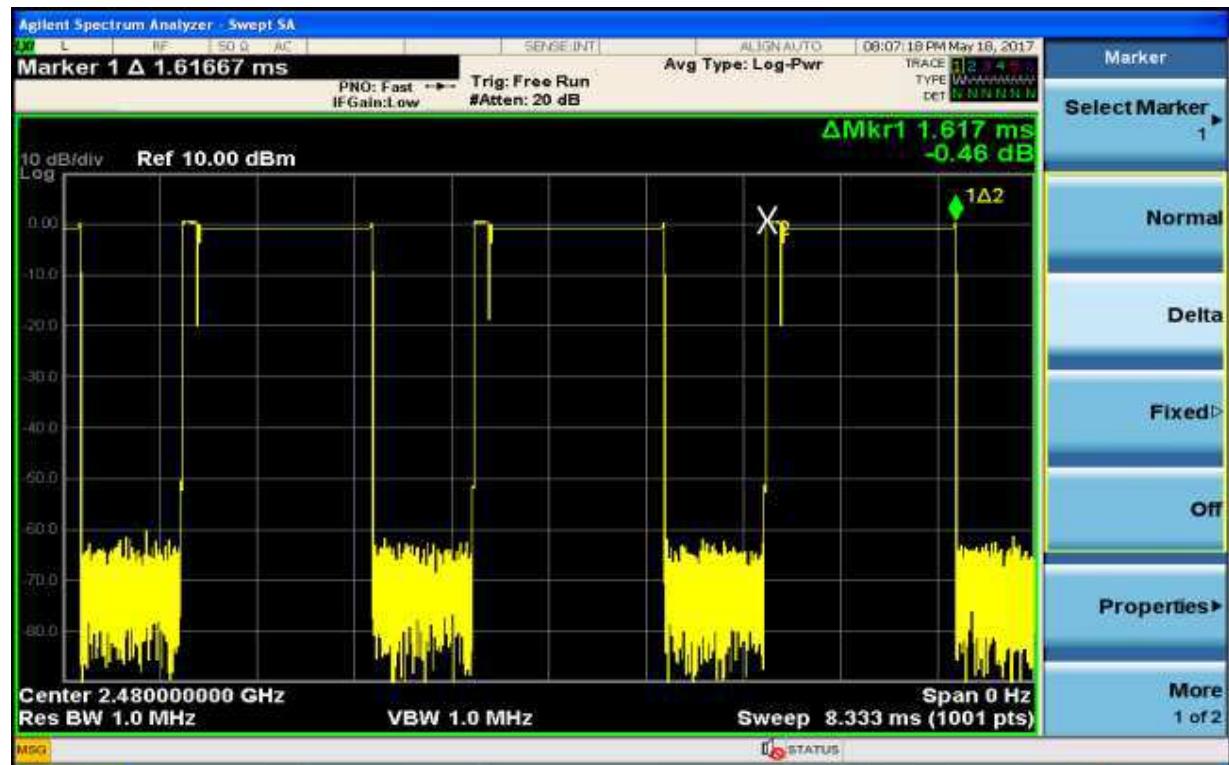


**EDR Mode, 3DH1**

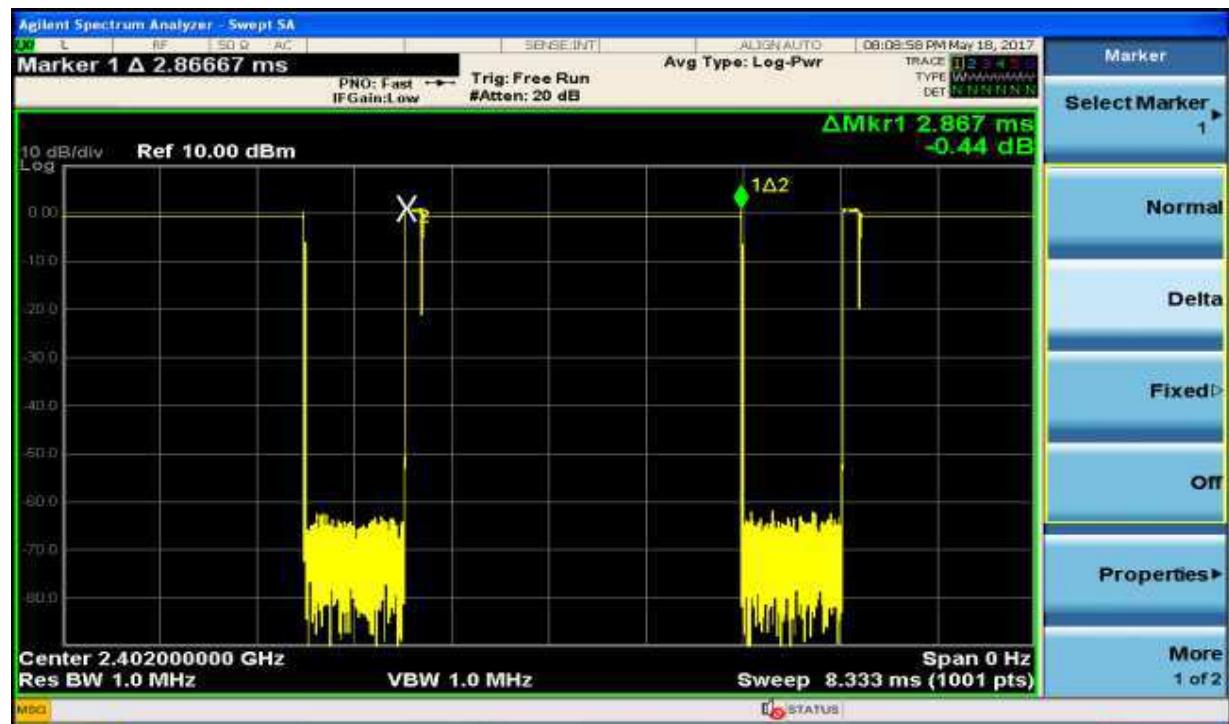


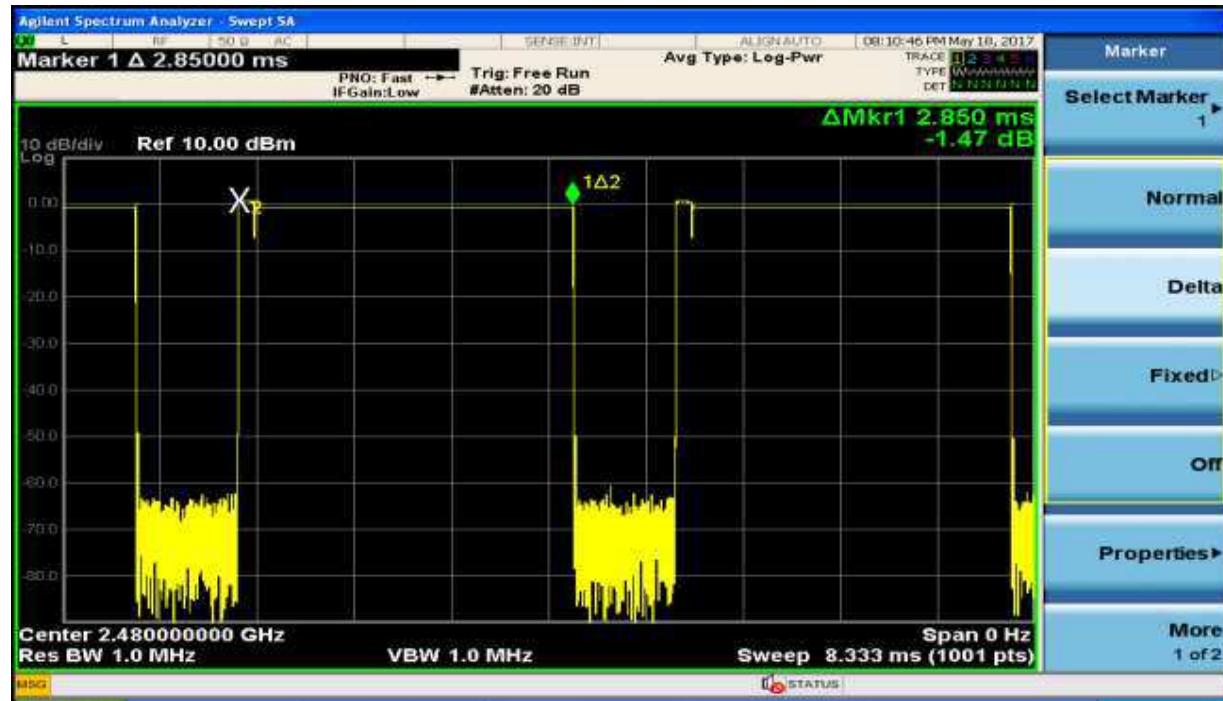
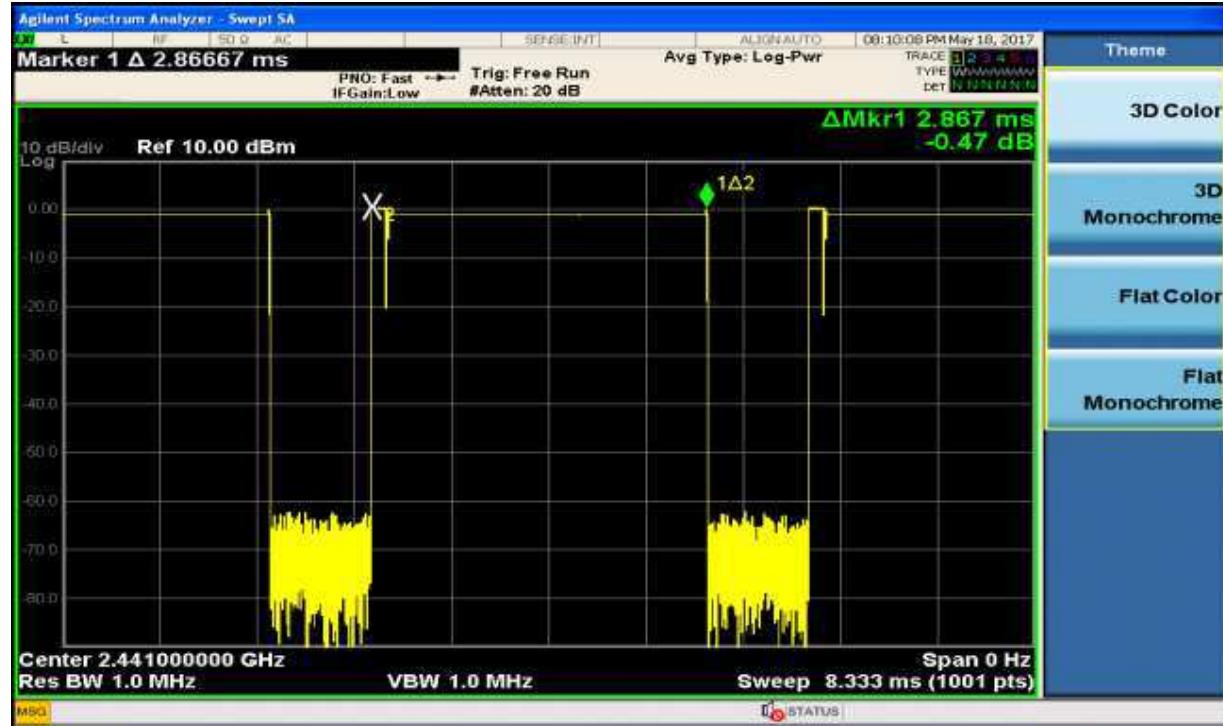
EDR Mode, 3DH3





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
<i>BDR mode, 30MHz - 1GHz</i>	4
<i>BDR mode, 1GHz - 18GHz</i>	10
<i>Low Energy mode, 30MHz - 1GHz</i>	16
<i>Low Energy mode, 1GHz - 18GHz</i>	22
APPENDIX B.2: TEST PLOTS OF BAND EDGE (RADIATED)	29
<i>BDR mode, Low Channel</i>	29
<i>BDR mode, High Channel</i>	31
<i>Low Energy mode, Low Channel</i>	33
<i>Low Energy mode, High Channel</i>	35
APPENDIX B.3: TEST PLOTS OF CONDUCTED EMISSION.....	37
<i>C Mode</i>	37

Appendix B
50084596 002



Produkte
Products

Page 2 of 38



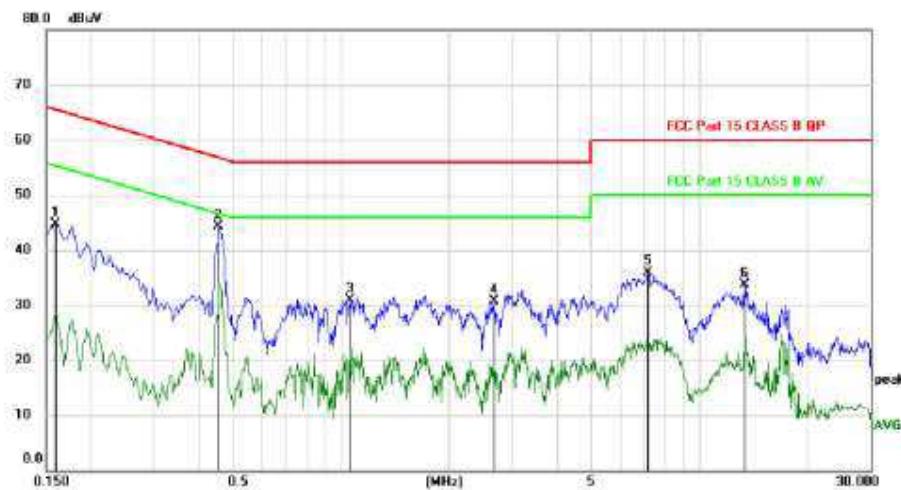
Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

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

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

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:

Appendix B
50084596 002



Produkte
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Page 3 of 38

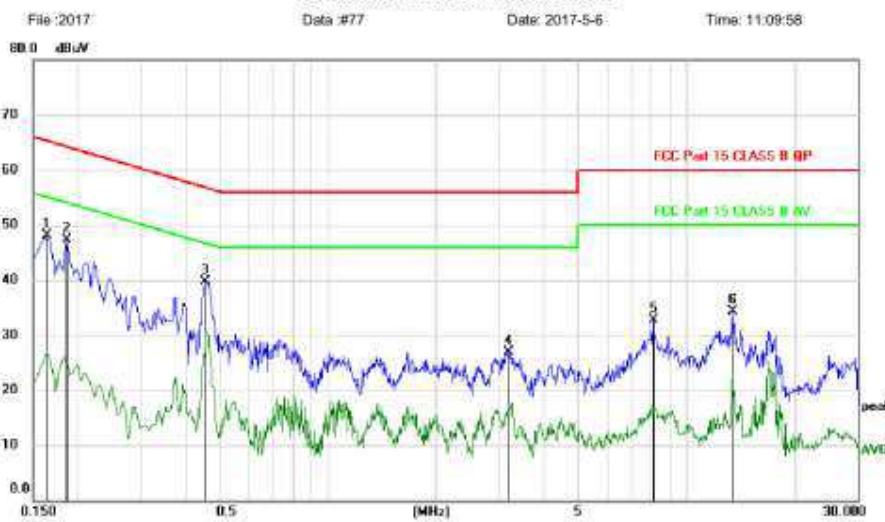


Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

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

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

Conducted Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.1635	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+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

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Page: 1

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.

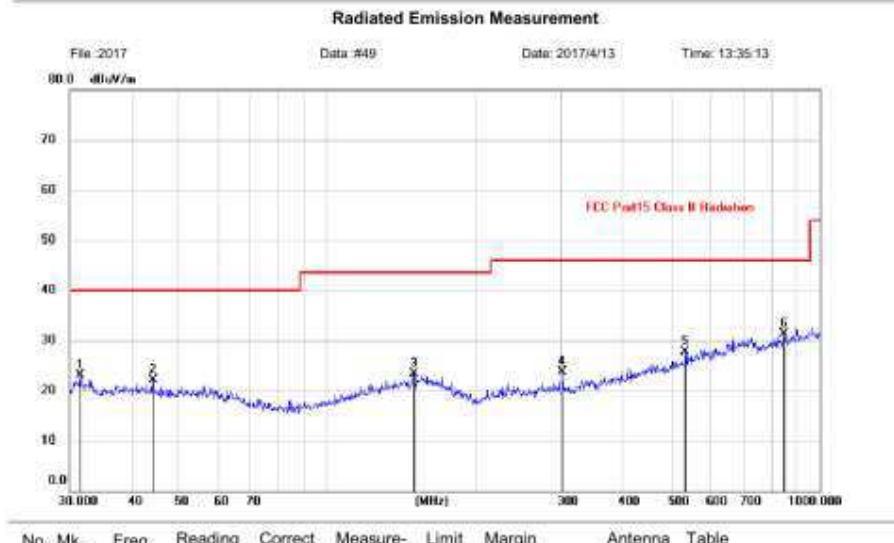
Appendix B.1: Test Plots of Radiated Spurious Emission

BDR mode, 30MHz - 1GHz



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:BT 1M 2402		
Note:		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm
1	31.5095	9.73	13.37	23.10	40.00	-16.90	peak		
2	44.2752	8.25	13.82	22.07	40.00	-17.93	peak		
3	150.0108	8.83	14.55	23.38	43.50	-20.12	peak		
4	301.4224	10.14	13.51	23.65	46.00	-22.35	peak		
5	533.8321	9.43	18.18	27.61	46.00	-18.39	peak		
6	* 848.0563	8.70	22.68	31.38	46.00	-14.62	peak		

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

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

Appendix B
50084596 002



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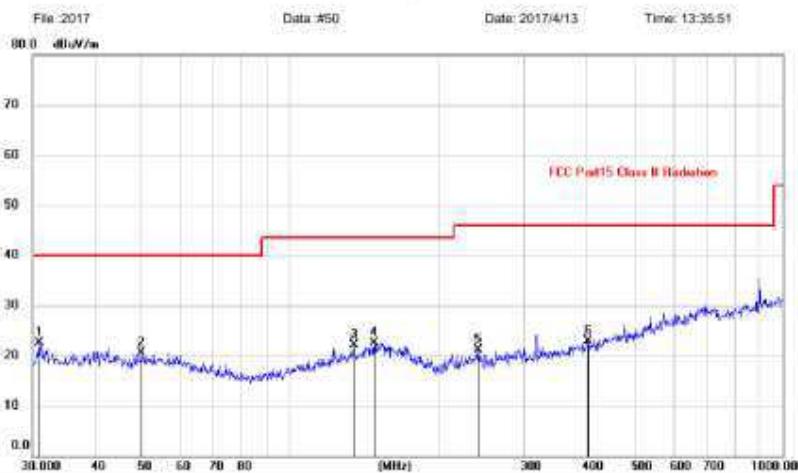
Page 5 of 38



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 Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	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; l:over margin.

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

Appendix B
50084596 002



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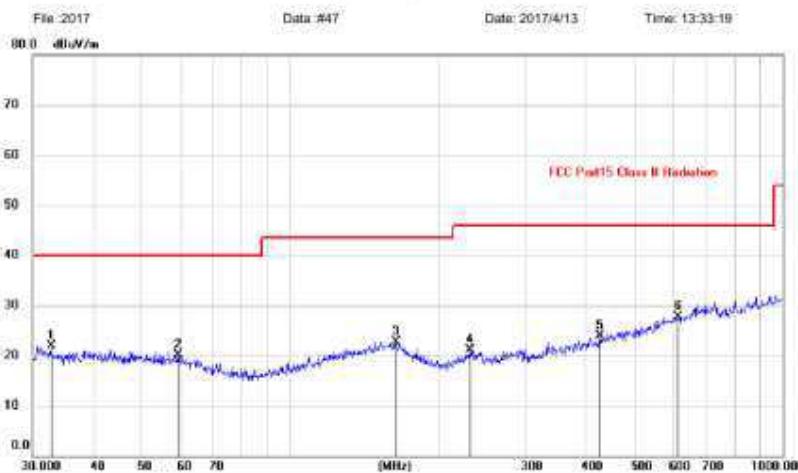
Page 6 of 38



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**
Limit: FCC Part15 Class B Radiation
Power: DC 5V
EUT:
Temperature: 23.5
M/N:
Distance:
Mode: BT-1M 2441
Humidity: 51 %
Note:

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dB	Detector	cm	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; l:over margin.

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

Appendix B
50084596 002



Produkte
Products

Page 7 of 38

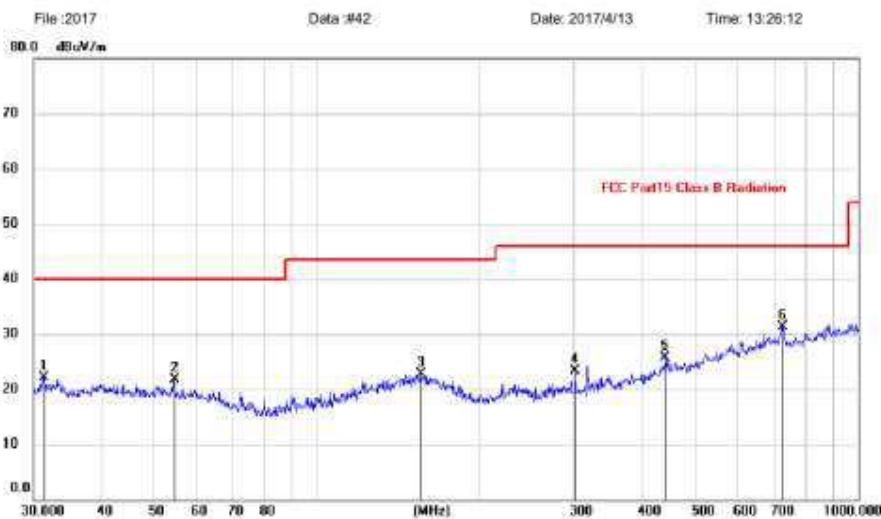


Shenzhen Alpha Product Testing Co., Ltd.
Building i, No.2, Lixin Road, Fuyong Street,
Bao'an District, 518103, Shenzhen, Guangdong, China

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

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

Radiated Emission Measurement



No.	Mk.	Freq. MHz	Reading Level dB	Correct Factor	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Antenna Height cm	Table Degree	Comment
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.

Appendix B

50084596 002



Produkte

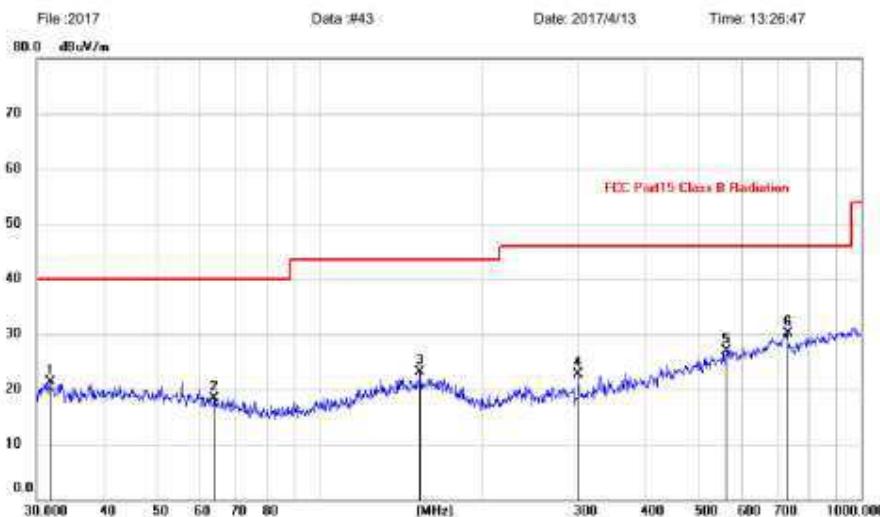
Products

Page 8 of 38



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: BT 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	dB	Detector	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; l:over margin.

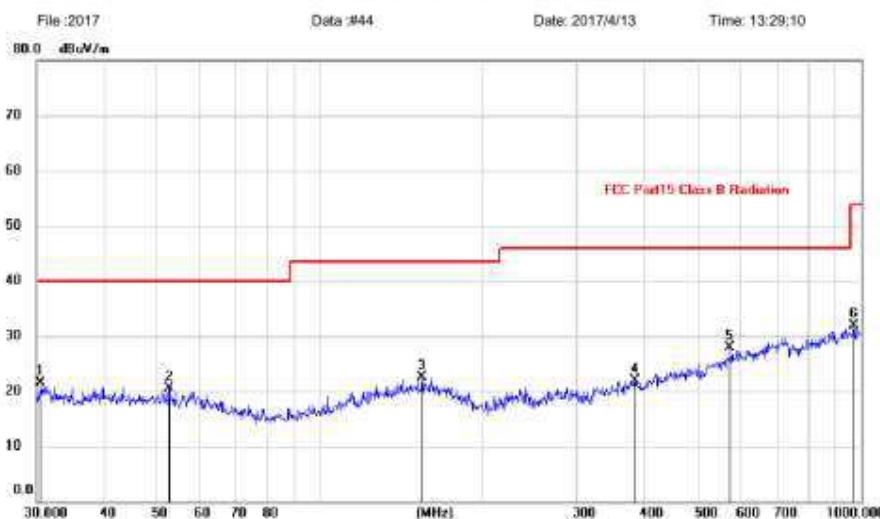
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



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 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	dB	Detector	cm	degree	Comment
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									

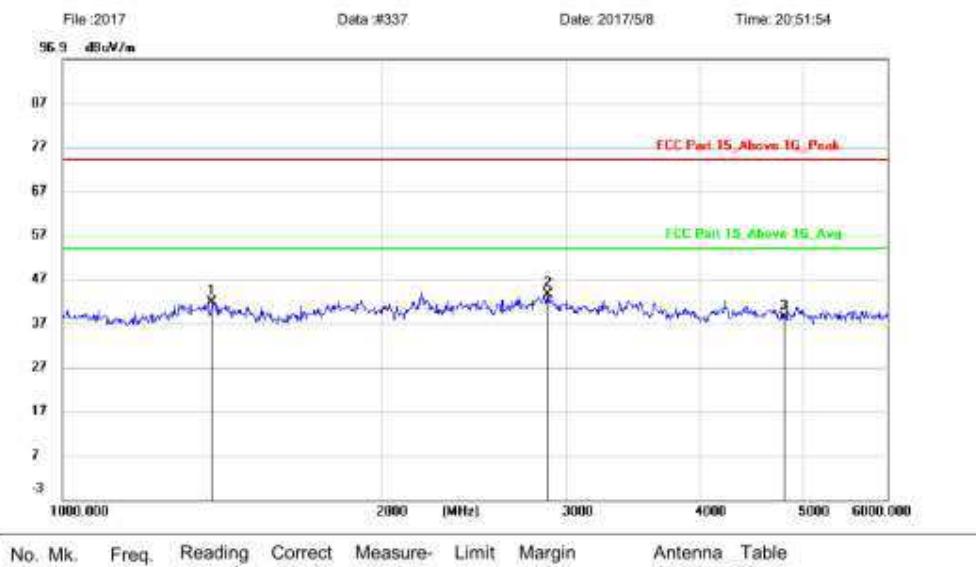
Note: 1. *Maximum data; x:Over limit; l:over margin.

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 Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree	Comment	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	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; l: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 2402
Note:

Radiated Emission Measurement



Note: 1. *Maximum data; x:Over limit; l: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



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

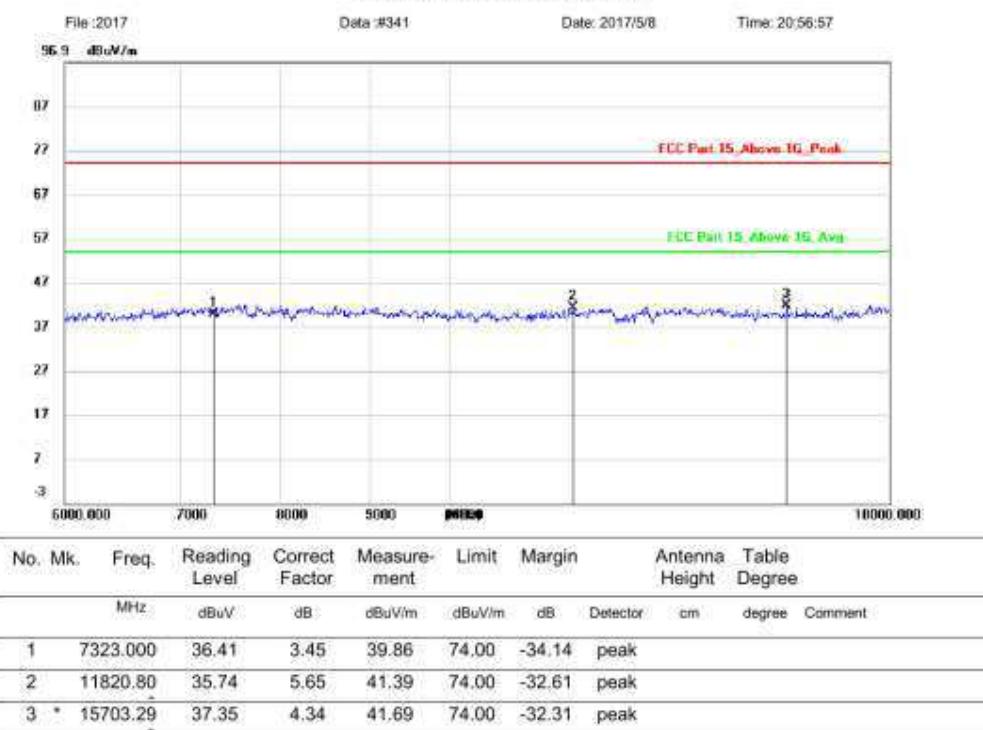
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



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



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

Appendix B

50084596 002



Produkte

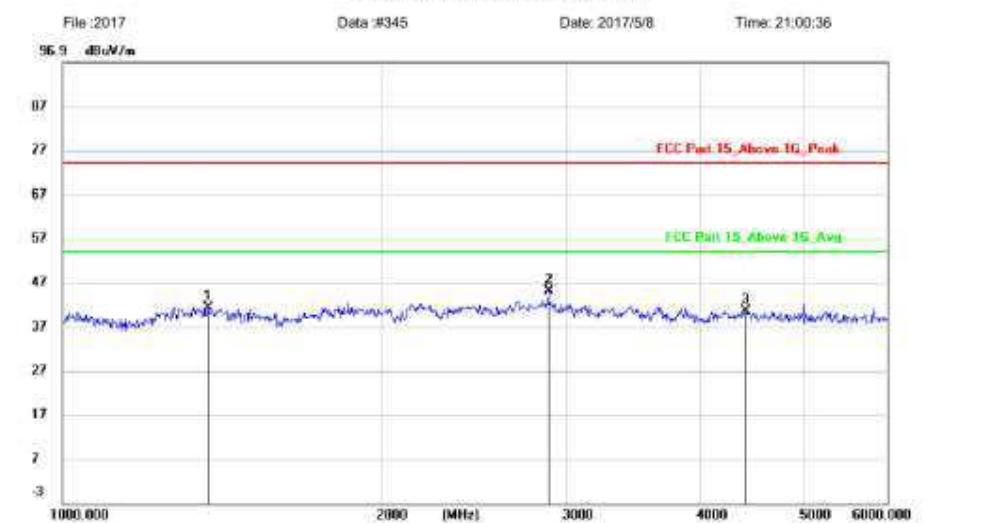
Products

Page 14 of 38



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	Detector	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; l: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



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

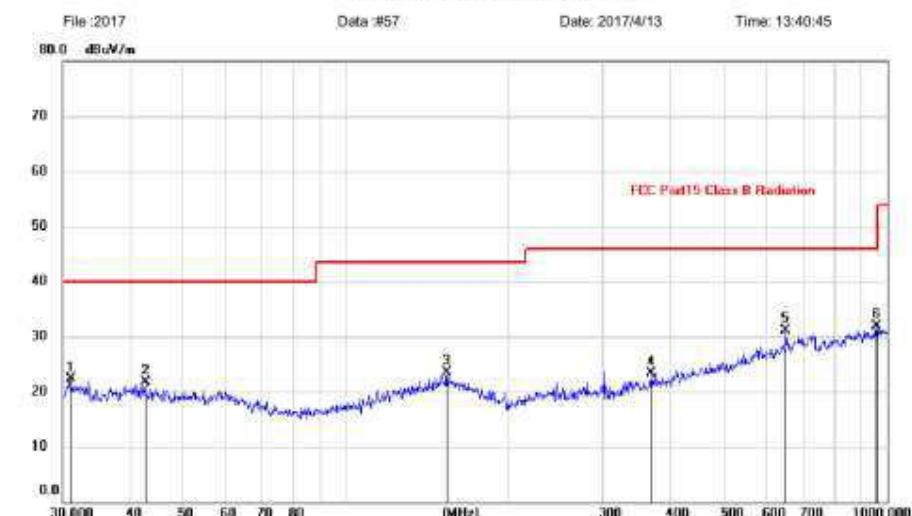
Low Energy mode, 30MHz - 1GHz



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



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree	Comment	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	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; l:over margin.

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

Appendix B

50084596 002



Produkte

Products

Page 17 of 38



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

Polarization: **Horizontal**

Temperature: 23.5

EUT:

Power: DC 5V

Humidity: 51 %

M/N:

Distance:

Mode: BLE 2480

Note:

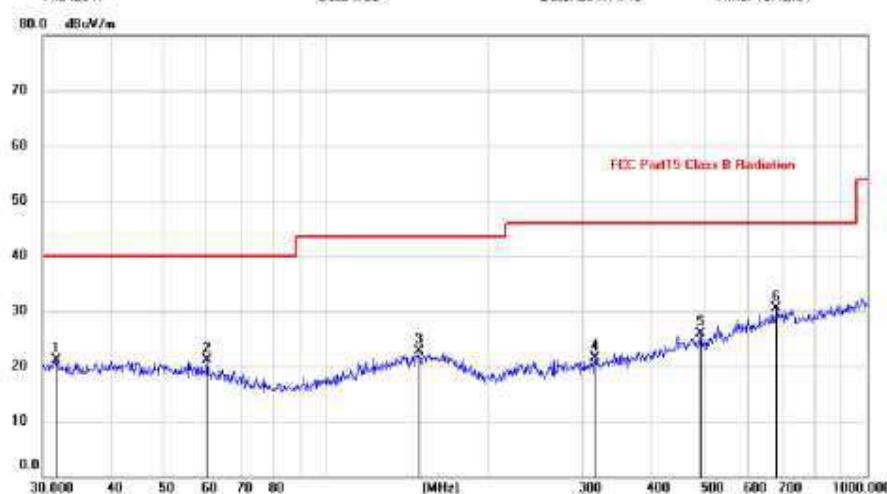
Radiated Emission Measurement

File:2017

Data #58

Date: 2017/4/13

Time: 13:42:01



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Antenna Height cm		Table Degree	Comment
								Detector	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; l:over margin.

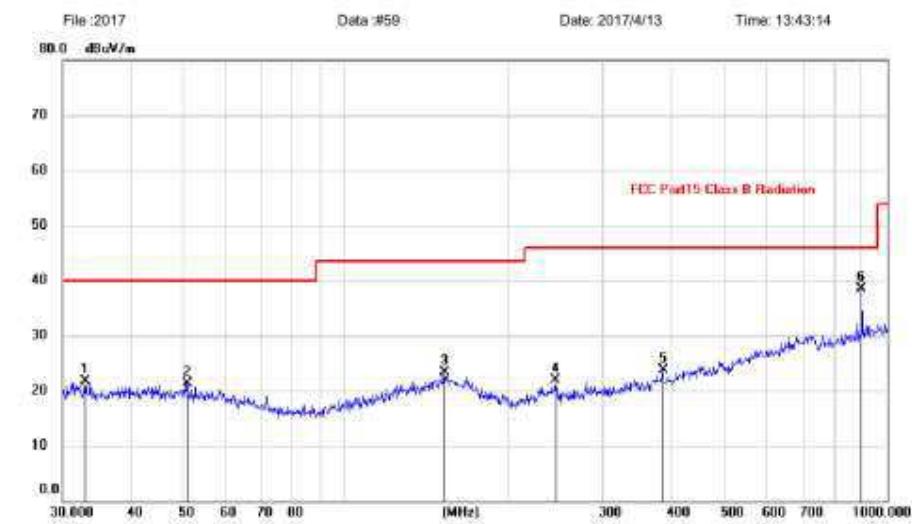
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



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 Level	Correct Factor	Measure- ment	Limit	Margin	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
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.

Appendix B

50084596 002



Produkte

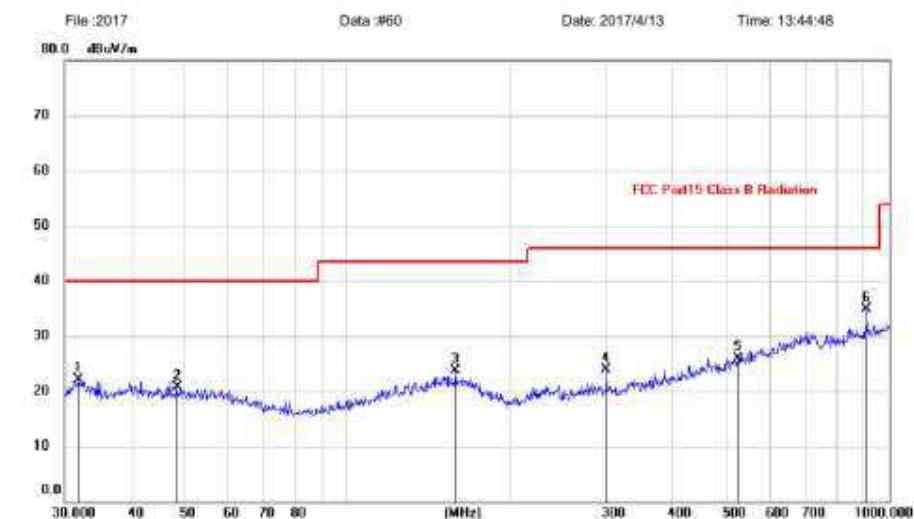
Products

Page 19 of 38



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 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	dB	Detector	cm	degree	Comment
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; l:over margin.

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

Appendix B

50084596 002



Produkte

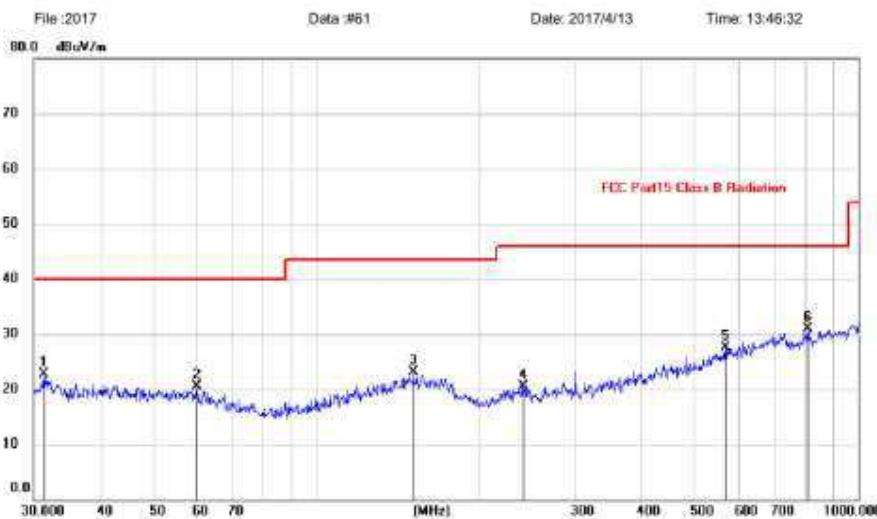
Products

Page 20 of 38



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	Measure-ment	Limit	Margin	Antenna Height Table Degree								
								MHz	dBuV	dB	dBuV/m	dB	Detector	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; l:over margin.

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

Appendix B

50084596 002



TÜV Rheinland®

Produkte

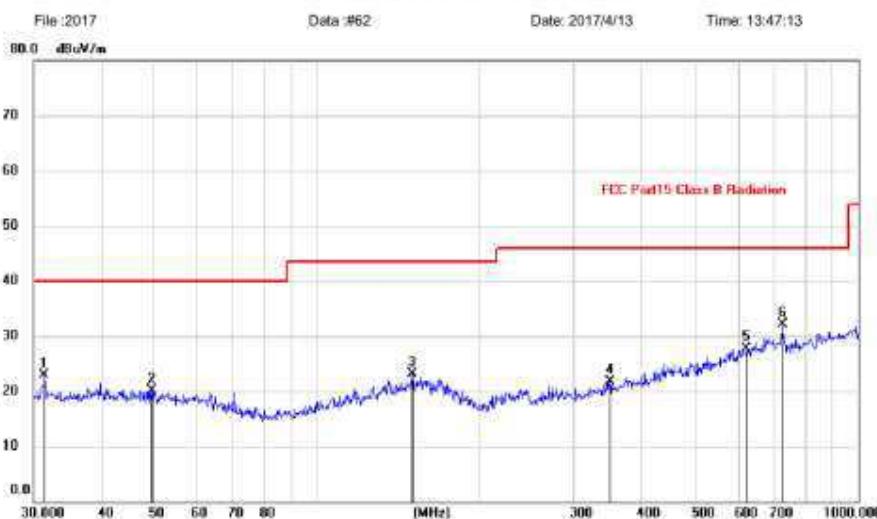
Products

Page 21 of 38



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	Measure-ment	Limit	Margin	Antenna Height Table Degree								
								MHz	dBuV	dB	dBuV/m	dB	Detector	cm	degree	Comment
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; l: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

Note:1. *:Maximum data; x:Over limit; l: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	Comment
	MHz	dBuV	dB		dBuV/m	dB	Detector	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; l:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Appendix B

50084596 002



Produkte

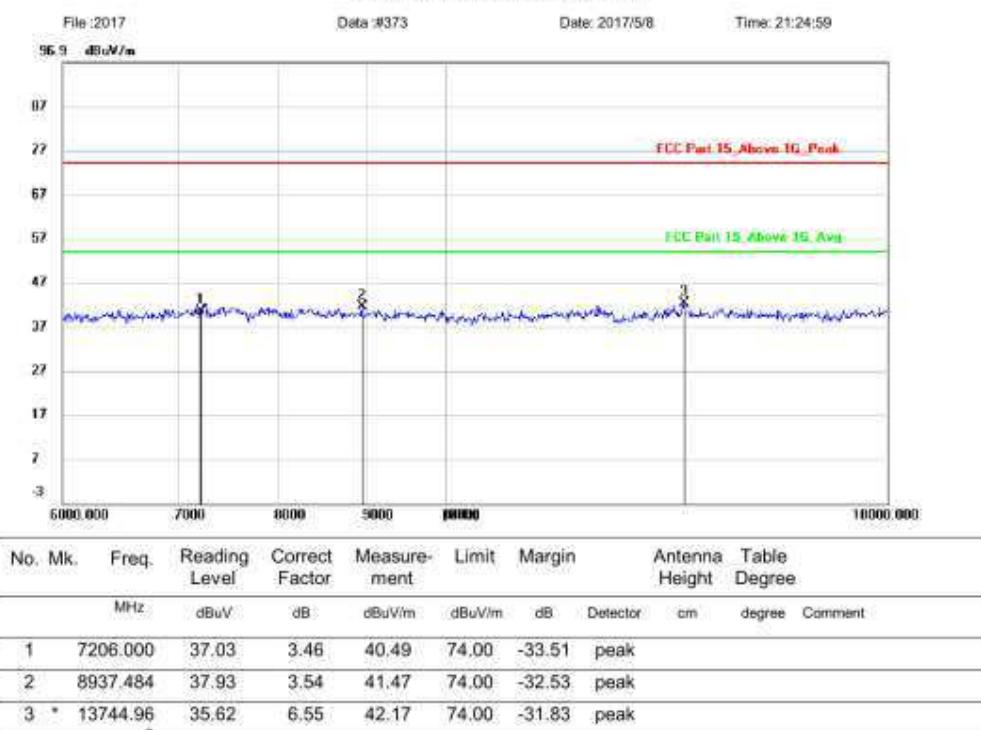
Products

Page 24 of 38



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

Note: 1. *Maximum data; x:Over limit; l: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



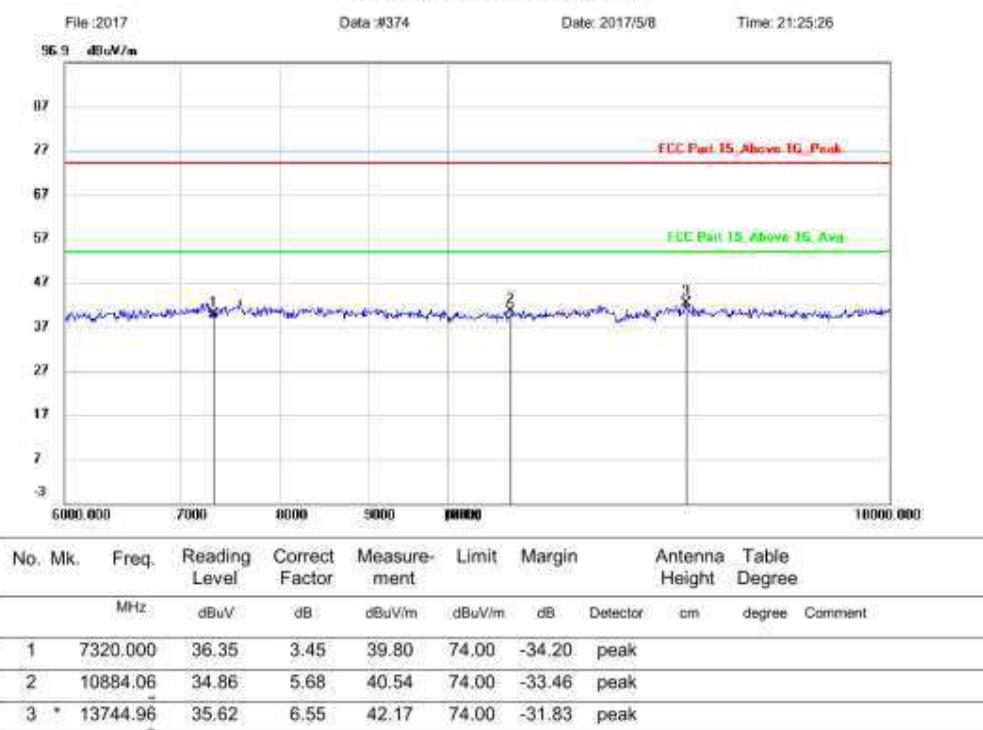
Note: 1. *Maximum data; x:Over limit; l:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



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



Note: 1. *Maximum data; x:Over limit; l: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 2480
Note:

Radiated Emission Measurement



Note: 1. *Maximum data; x:Over limit; l: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



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

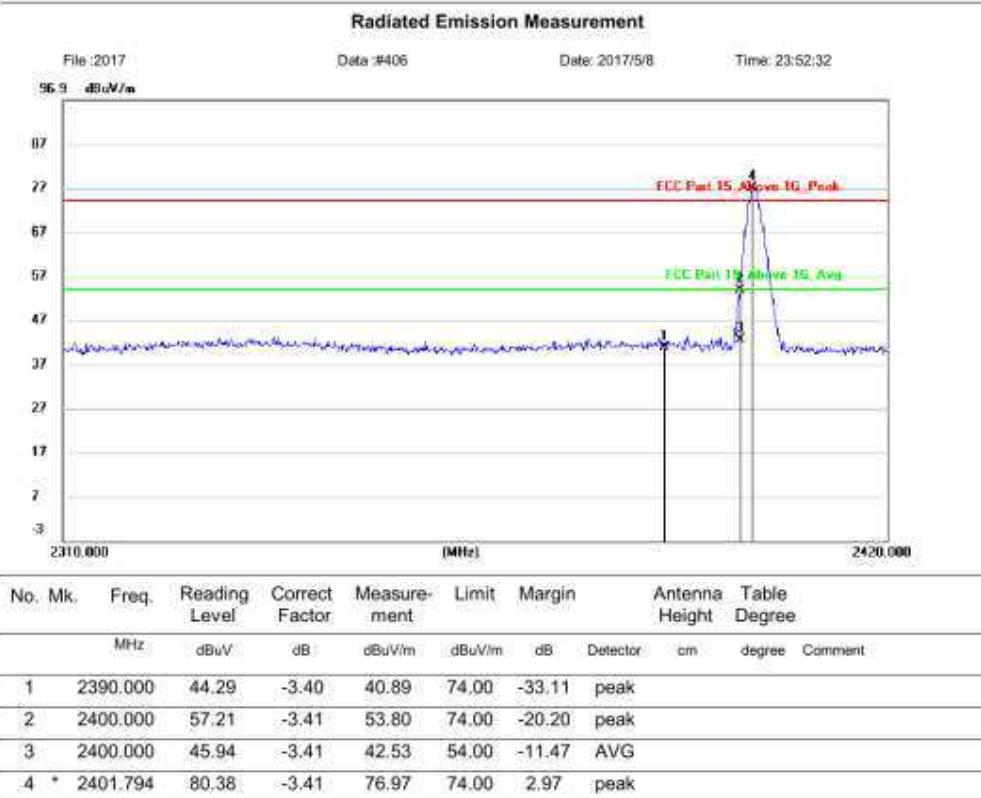
Appendix B.2: Test Plots of Band Edge (Radiated)

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:



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

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

Appendix B

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Produkte

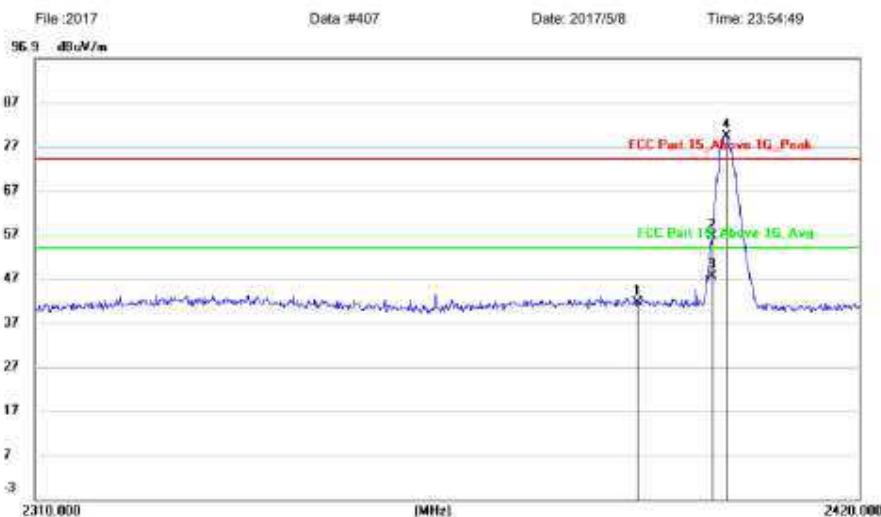
Products

Page 30 of 38



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 Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	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; l:over margin.

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

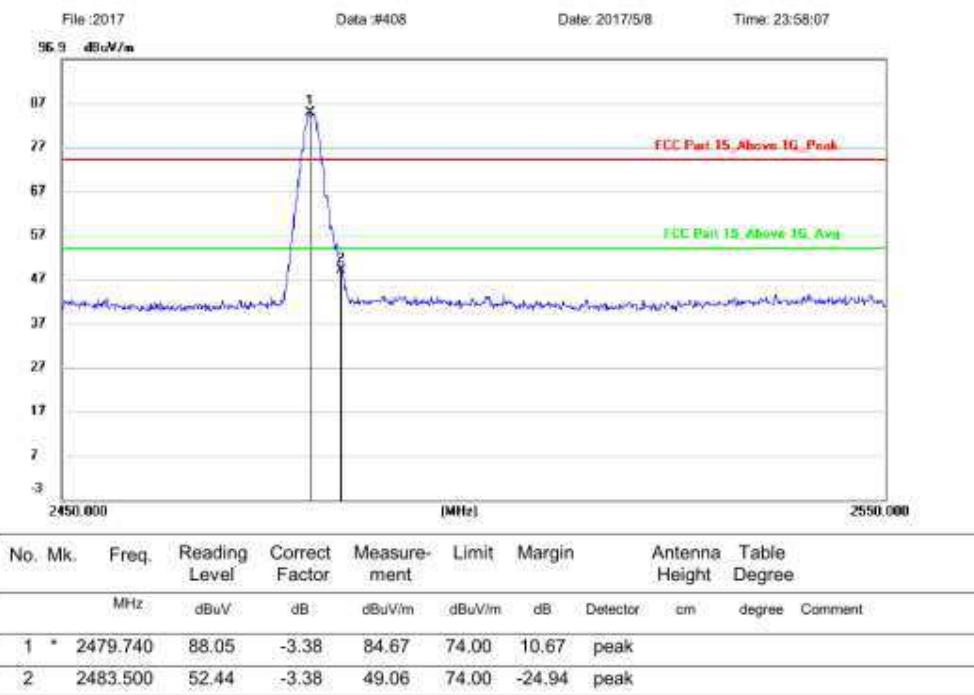
BDR mode, High Channel



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:
M/N:
Mode: BT 3.0_1M 2480
Note:

Radiated Emission Measurement



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

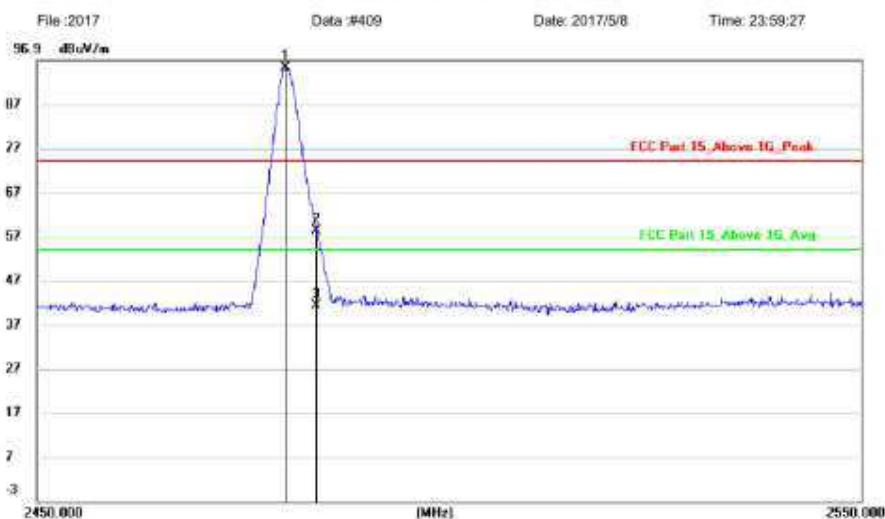
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



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	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	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; l: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:
M/N:
Mode:BLE 2402
Note:

Radiated Emission Measurement



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

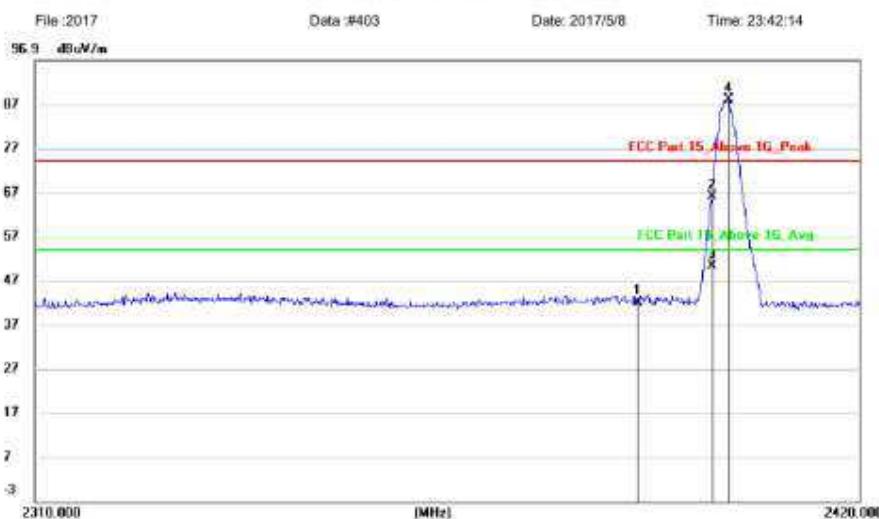
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



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	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
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; l:over margin.

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

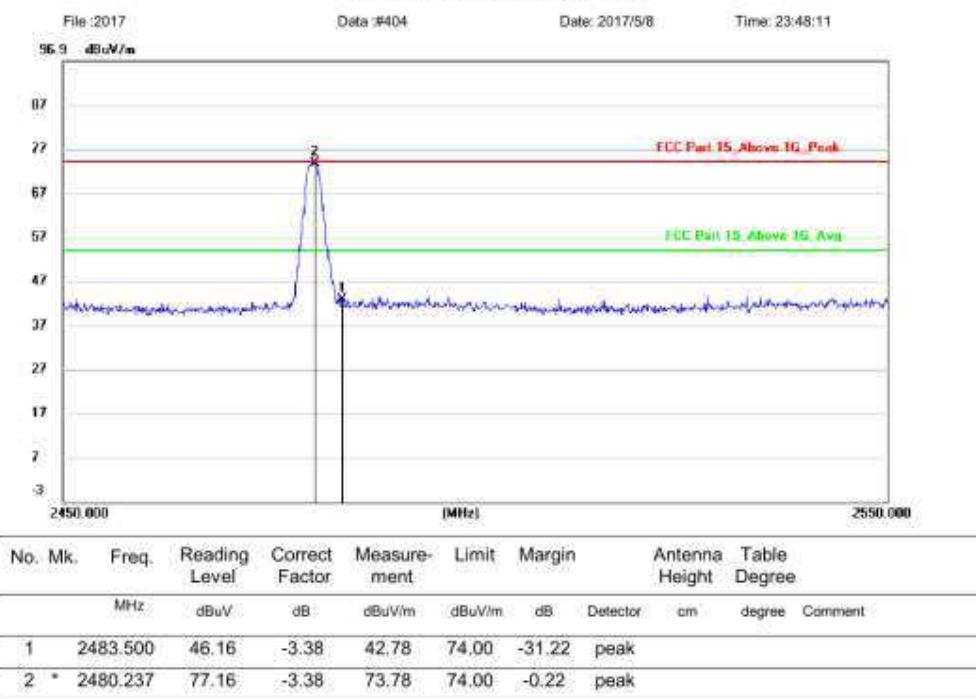
Low Energy mode, High Channel



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



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

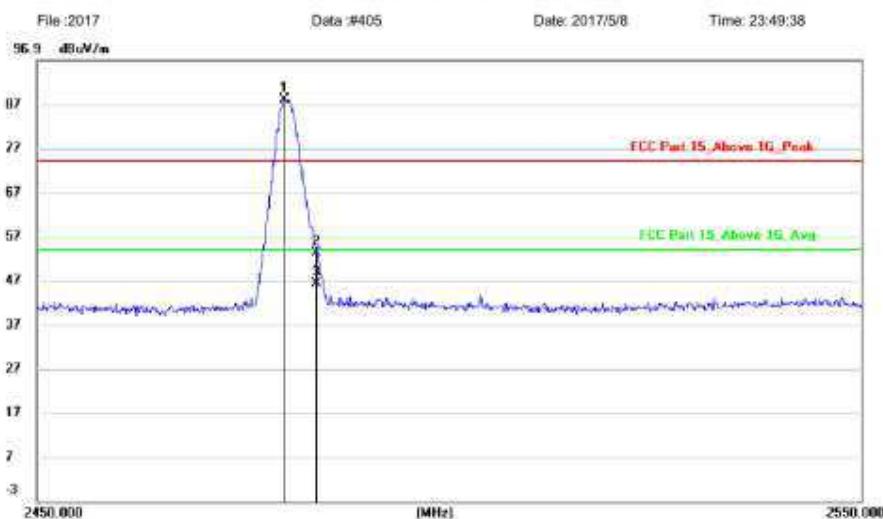
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.



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



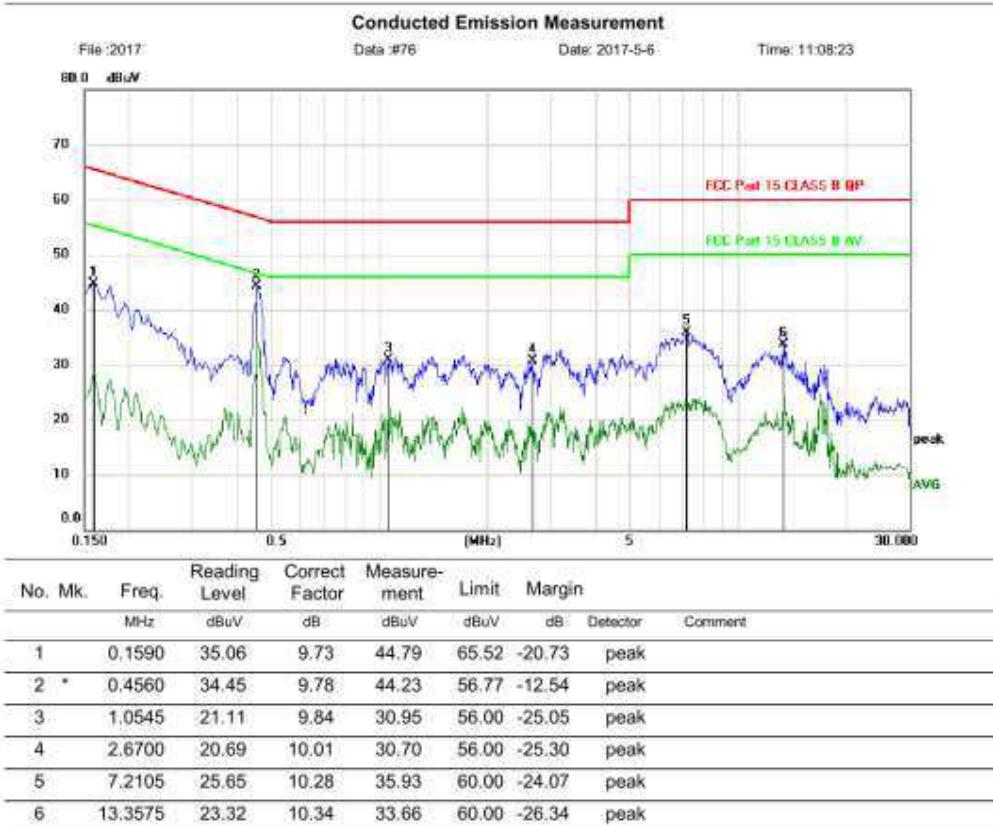
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	2479.641	91.52	-3.38	88.14	74.00	14.14	peak		
2		2483.500	56.59	-3.38	53.21	74.00	-20.79	peak		
3		2483.500	49.59	-3.38	46.21	54.00	-7.79	AVG		

Note: 1. *Maximum data; x:Over limit; l: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: 23.6
Limit: FCC Part 15 CLASS B QP	Power: AC 120V/60Hz	Humidity: 54 %
EUT: MID		
M/N:		
Mode: Bluetooth Link		
Note:		



*: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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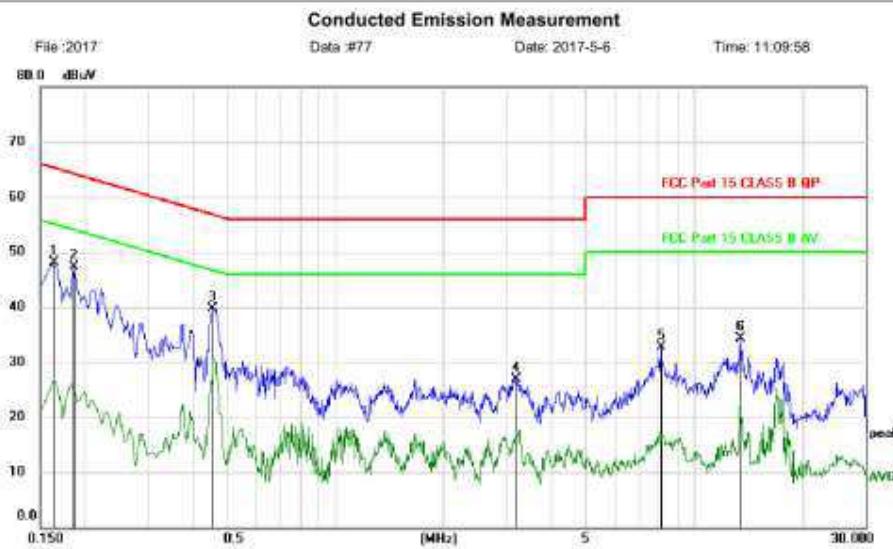
Page: 1

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: 23.6
Limit: FCC Part 15 CLASS B QP Power: AC 120V/60Hz Humidity: 54 %
EUT: MID
M/N:
Mode: Bluetooth Link
Note:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Comment
		MHz	dBuV	dB	dBuV	dB	Detector	
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+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

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Page: 1

Engineer Signature: