

FCC Test Report

FCC ID : 2AX7S-ATC63E
Equipment : Tablet PC
Model No. : ATC63E
Brand Name : AIMobile
Applicant : AIMobile Co., Ltd.
Address : 6F,No. 166,Section 4, Chengde Road, Shilin
District, Taipei City, 11167 Taiwan
Standard : 47 CFR FCC Part 15.247
Received Date : Jan. 07, 2022
Tested Date : May 16 ~ May 23, 2022

We, International Certification Corporation, would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:

Approved by:



Along Chen / Assistant Manager



Gary Chang / Manager

Table of Contents

1	GENERAL DESCRIPTION	5
1.1	Information.....	5
1.2	Local Support Equipment List	9
1.3	Test Setup Chart	9
1.4	The Equipment List	10
1.5	Test Standards	11
1.6	Reference Guidance	11
1.7	Deviation from Test Standard and Measurement Procedure.....	11
1.8	Measurement Uncertainty	11
2	TEST CONFIGURATION.....	12
2.1	Testing Facility	12
2.2	The Worst Test Modes and Channel Details	12
3	TRANSMITTER TEST RESULTS	13
3.1	Unwanted Emissions into Restricted Frequency Bands	13
3.2	Unwanted Emissions into Non-Restricted Frequency Bands	16
3.3	Conducted Output Power	17
3.4	Number of Hopping Frequency	18
3.5	20dB and Occupied Bandwidth.....	19
3.6	Channel Separation.....	20
3.7	Number of Dwell Time.....	21
3.8	AC Power Line Conducted Emissions	22
4	TEST LABORATORY INFORMATION	23

Appendix A. Unwanted Emissions into Restricted Frequency Bands

Appendix B. Unwanted Emissions into Non-Restricted Frequency Bands

Appendix C. Conducted Output Power

Appendix D. Number of Hopping Frequency

Appendix E. 20dB and Occupied Bandwidth

Appendix F. Channel Separation

Appendix G. Number of Dwell Time

Appendix H. AC Power Line Conducted Emissions

Release Record

Report No.	Version	Description	Issued Date
FR210701AD	Rev. 01	Initial issue	Aug. 17, 2022
FR210701AD	Rev. 02	Version of Bluetooth is modified.	Sep. 22, 2022

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	AC Power Line Conducted Emission	[dBuV]: 0.455MHz 38.99 (Margin -7.80dB) - AV	Pass
15.247(d) 15.209	Unwanted Emissions	[dBuV/m at 3m]: 71.64MHz 38.84 (Margin -1.16dB) - QP	Pass
15.247(d)	Band Edge	Meet the requirement of limit	Pass
15.247(b)(1)	Conducted Output Power	Power [dBm]: 10.98	Pass
15.247(a)(1)(iii)	Number of Hopping Channels	Meet the requirement of limit	Pass
15.247(a)(1)	Hopping Channel Separation	Meet the requirement of limit	Pass
15.247(a)(1)(iii)	Dwell Time	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Information

The EUT had six SKU options (SKU1, SKU2, SKU3, SKU1-2, SKU2-2 and SKU3-2). Six options were assessed and SKU2-2 was found to be worst case and was selected for the final testing.

1.1.1 SKU Details

The following SUKs are provided to this EUT.

SKU No.	SKU1	SKU2	SKU3	SKU1-2	SKU2-2	SKU3-2
SKU Description	Intel i3-1115G4E	Intel i5-1145G7E	Intel Celeron 6305E	Intel i3-1115G4E	Intel i5-1145G7E	Intel Celeron 6305E
	13.3"					
M/B	1310A3325001	1310A3325002	1310A3325003	1310A3325001	1310A3325002	1310A3325003
I/O Board	1310A3324701			1310A3388801		
	Audio Codec ALC256M			Audio Codec ALC888S		
Memory (LPDDR4)	Samsung 16GB			Samsung 16GB		
	M471A2K43EB1-CWE			M471A2K43EB1-CWE		
Storage (SSD)	Phison 1TB			Phison 1TB		
	PM81024GPKTCB5BINV-E13T4A			PM81024GPKTCB5BINV-E13T4A		
WLAN Module	Intel			Intel		
	AX210.NGWGII.NV			AX210.NGWGII.NV		
Note: The above SUK, SKU SKU2-2 was selected as a representative one for the final test and only its data was recorded in this report.						

1.1.2 Specification of the Equipment under Test (EUT)

RF General Information				
Frequency Range (MHz)	Bluetooth Mode	Ch. Frequency (MHz)	Channel Number	Data Rate
2400-2483.5	BR V5.2	2402-2480	0-78 [79]	1 Mbps
2400-2483.5	EDR V5.2	2402-2480	0-78 [79]	2 Mbps
2400-2483.5	EDR V5.2	2402-2480	0-78 [79]	3 Mbps
Note 1: RF output power specifies that Maximum Peak Conducted Output Power.				
Note 2: Bluetooth BR uses a GFSK.				
Note 3: Bluetooth EDR uses a combination of $\pi/4$ -DQPSK and 8DPSK.				

1.1.3 Antenna Details

Ant. No.	Brand	Model	Type	Connector	Gain (dBi)
1	AWAN	AYF6Y-100184	PIFA	UFL	2.68

1.1.4 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	19 Vdc from adapter 10.8 Vdc from battery
--------------------------	--

1.1.5 Accessories

Accessories		
No.	Equipment	Description
1	Adapter	Brand: FSP Model: FSP090-DBBN3 I/P: 100-240Vac, 50-60Hz, 1.5A O/P: 19.0Vdc, 4.74A, 90.0W Power Line: AC: 1m non-shielded without core DC: 1.45m non-shielded with one core
2	Adapter	Brand: FSP Model: FSP090-RBBM1 I/P: 100-240Vac, 50-60Hz, 1.5-0.6A O/P: 19.0Vdc, 4.74A, 90.0W Power Line: AC: 1m non-shielded without core DC: 1.4m non-shielded with one core
3	Rechargeable Li-ion Battery	Model: ATC-63E-BAT Normal Voltage: 10.8Vdc Rating: 4660mAh (50.3Wh) Charge Voltage Limit: 12.6Vdc

Note: Two adapters (FSP090-DBBN3 and FSP090-RBBM1) had been covered during the pretest, and found that FSP090-DBBN3 adapter was the worst case and was selected for final test.

1.1.6 Channel List

Frequency band (MHz)				2400~2483.5			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461	---	---

1.1.7 Test Tool and Duty Cycle

Test Tool	DRTU , Version: V0.1032.22.130.0	
Modulation Mode	Duty Cycle Of Test Signal (%)	Duty Factor (dB)
DH5	79.69%	0.99
2DH5	80.31%	0.95
3DH5	80.55%	0.94

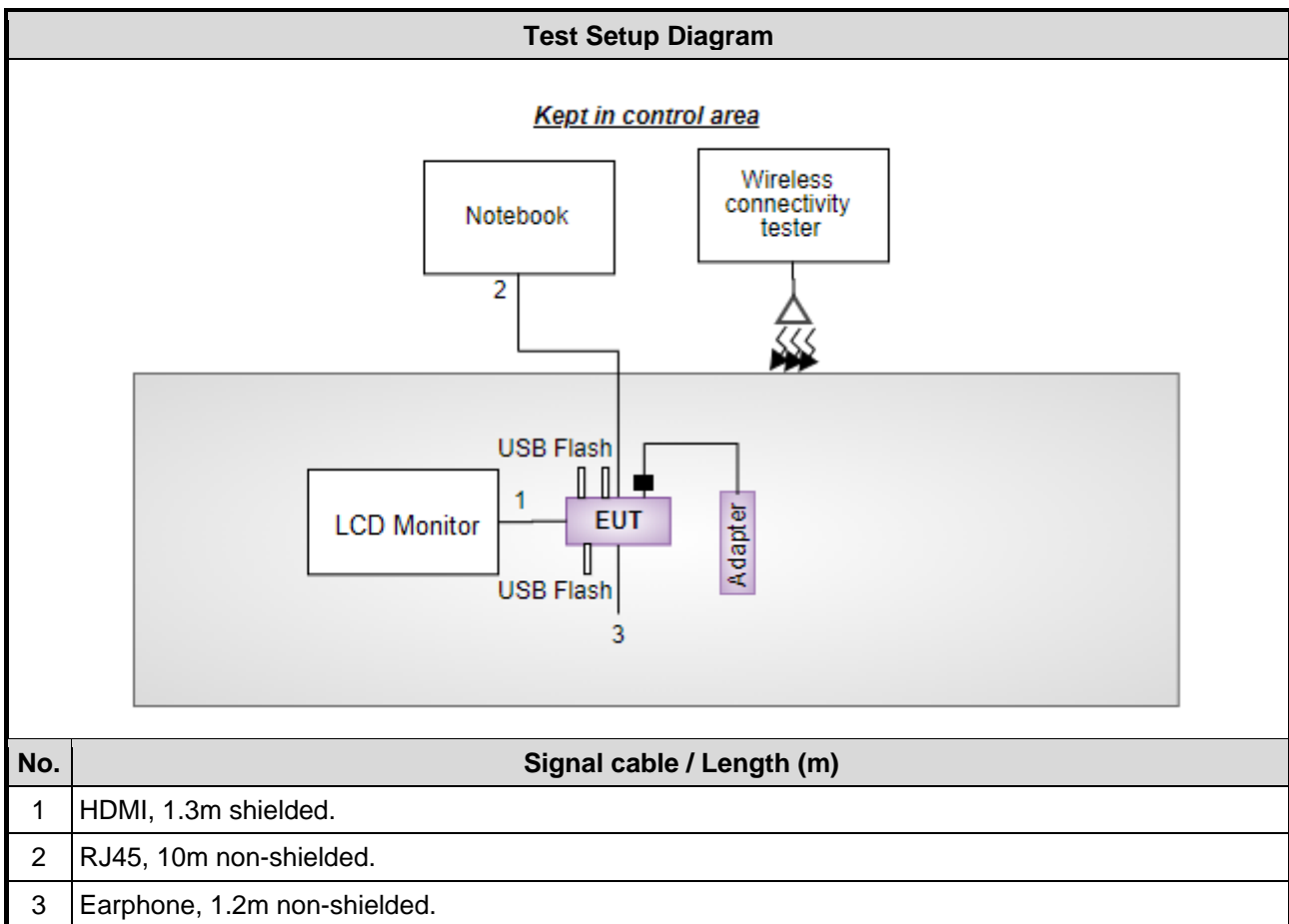
1.1.8 Power Index of Test Tool

Modulation Mode	Test Frequency (MHz)		
	2402	2441	2480
GFSK / 1Mbps	default	default	default
$\pi/4$ -DQPSK / 2Mbps	default	default	default
8DPSK / 3Mbps	default	default	default

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Remarks
1	Notebook	DELL	Latitude E5470	DoC	---
2	USB Flash	pqi(USB 3.1 Type-C)	Connect 313/16GB	---	---
3	USB Flash	Transcend(USB 3.0)	JetFlash 700	---	---
4	USB Flash	Transcend(USB 3.0)	JetFlash 700	---	---
5	Earphone	Samsung	EHS64	---	---
6	LCD Monitor	ASUS(27")	MX27UCS	---	---
7	Wireless connectivity tester	R&S	CMW270	---	---

1.3 Test Setup Chart



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	May 16, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101658	Feb. 16, 2022	Feb. 15, 2023
LISN	R&S	ENV216	101579	Apr. 21, 2022	Apr. 20, 2023
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127667	Jan .07, 2022	Jan .06, 2023
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 19, 2021	Oct. 18, 2022
50 ohm terminal (Support Unit)	NA	50	04	May 25, 2021	May 24, 2022
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Tested Date	May 16, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Wireless connectivity tester	R&S	CMW270	100856	Nov. 01, 2021	Oct. 31, 2022
Receiver	R&S	ESR3	101657	Mar. 15, 2022	Mar. 14, 2023
Spectrum Analyzer	R&S	FSV40	101498	Nov. 29, 2021	Nov. 28, 2022
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 08, 2021	Nov. 07, 2022
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jun. 30, 2021	Jun. 29, 2022
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 03, 2021	Dec. 02, 2022
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170508	Jan. 11, 2022	Jan. 10, 2023
Preamplifier	EMC	EMC02325	980225	Jun. 29, 2021	Jun. 28, 2022
Preamplifier	Agilent	83017A	MY39501308	Sep. 28, 2021	Sep. 27, 2022
Preamplifier	EMC	EMC184045B	980192	Jul. 14, 2021	Jul. 13, 2022
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 05, 2021	Oct. 04, 2022
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 05, 2021	Oct. 04, 2022
LF cable 11M	EMC	EMCCFD400-NW-N W-11000	200801	Oct. 05, 2021	Oct. 04, 2022
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	160502	Oct. 05, 2021	Oct. 04, 2022
RF Cable	EMC	EMC104-35M-35M-8000	210920	Oct. 05, 2021	Oct. 04, 2022
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Oct. 05, 2021	Oct. 04, 2022
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Tested Date	May 23, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Wireless connectivity tester	R&S	CMW270	100856	Nov. 01, 2021	Oct. 31, 2022
Spectrum Analyzer	R&S	FSV40	101910	Apr. 18, 2022	Apr. 17, 2023
Power Meter	Anritsu	ML2495A	1241002	Nov. 07, 2021	Nov. 06, 2022
Power Sensor	Anritsu	MA2411B	1207366	Nov. 07, 2021	Nov. 06, 2022
Measurement Software	Sporton	SENSE-15247_FS	V5.10.7.11	NA	NA
Spectrum Analyzer	R&S	FSV40	101910	Apr. 18, 2022	Apr. 17, 2023
Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

47 CFR FCC Part 15.247
ANSI C63.10-2013

1.6 Reference Guidance

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

1.7 Deviation from Test Standard and Measurement Procedure

None

1.8 Measurement Uncertainty

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor ($k=2$)).

Measurement Uncertainty	
Parameters	Uncertainty
Bandwidth	±34.130 Hz
Conducted power	±0.808 dB
Power density	±0.583 dB
Conducted emission	±2.715 dB
AC conducted emission	±2.92 dB
Unwanted Emission ≤ 1GHz	±3.41 dB
Unwanted Emission > 1GHz	±4.59 dB
Time	±0.1%

2 Test Configuration

2.1 Testing Facility

Test Laboratory	International Certification Corporation
Test Site	CO01-WS, 03CH01-WS, TH01-WS
Address of Test Site	No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)

- FCC Designation No.: TW2732
- FCC site registration No.: 181692
- ISED#: 10807A
- CAB identifier: TW2732

2.2 The Worst Test Modes and Channel Details

Test item	Mode	Test Frequency (MHz)	Data Rate (Mbps)	Test Configuration
AC Power Line Conducted Emissions	GFSK	2441	1Mbps	---
Unwanted Emissions ≤ 1GHz	GFSK	2441	1Mbps	---
Unwanted Emissions > 1GHz	GFSK 8DPSK	2402, 2441, 2480 2402, 2441, 2480	1Mbps 3Mbps	---
Conducted Output Power	GFSK π/4 DQPSK 8DPSK	2402, 2441, 2480 2402, 2441, 2480 2402, 2441, 2480	1Mbps 2Mbps 3Mbps	---
Number of Hopping Channels	GFSK π/4 DQPSK 8DPSK	2402~2480 2402~2480 2402~2480	1Mbps 2Mbps 3Mbps	---
Hopping Channel Separation 20dB and Occupied bandwidth	GFSK π/4 DQPSK 8DPSK	2402, 2441, 2480 2402, 2441, 2480 2402, 2441, 2480	1Mbps 2Mbps 3Mbps	---
Dwell Time	GFSK π/4 DQPSK 8DPSK	2402 2402 2402	1Mbps 2Mbps 3Mbps	---

NOTE:

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Z-plane** results were found as the worst case and were shown in this report.

3 Transmitter Test Results

3.1 Unwanted Emissions into Restricted Frequency Bands

3.1.1 Limit of Unwanted Emissions into Restricted Frequency Bands

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:
Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

Note 2:
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

3.1.2 Test Procedures

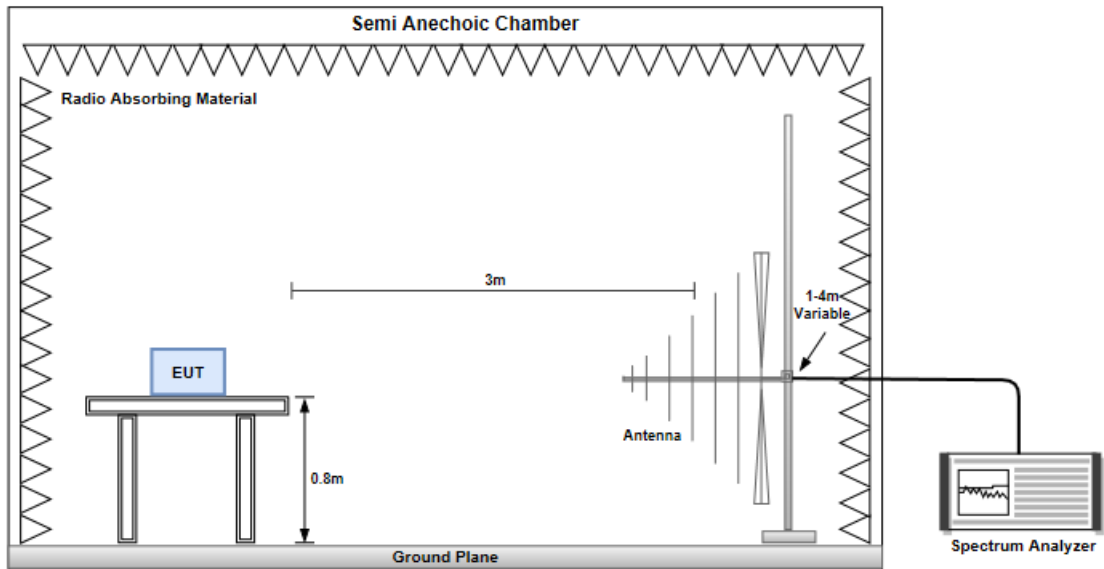
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

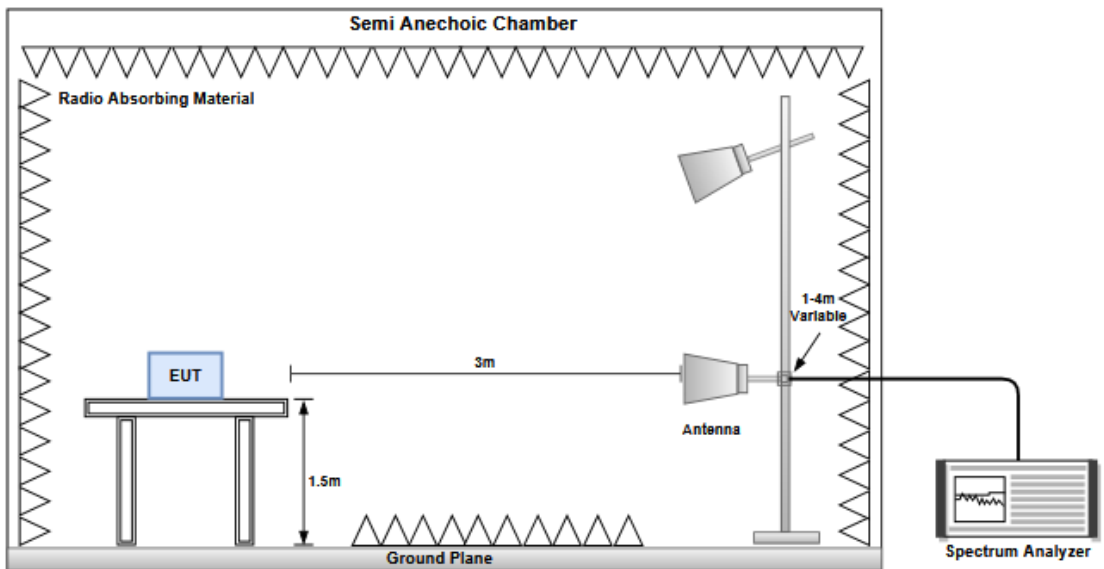
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. Radiated emission above 1GHz / Peak value
RBW=1MHz, VBW=3MHz and Peak detector
Radiated emission above 1GHz / Average value for harmonics
The average value is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula for DH5 packet type which has worst duty factor:
3.
$$20\log(\text{Duty cycle}) = 20\log \frac{1\text{s} / 1600 * 5}{100\text{ ms}} = -30.1\text{dB}$$
4. Radiated emission above 1GHz / Average value for other emissions
RBW=1MHz, VBW=1/T and Peak detector

3.1.3 Test Setup

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz



3.1.4 Test Results

Refer to Appendix A.

3.2 Unwanted Emissions into Non-Restricted Frequency Bands

3.2.1 Limit of Unwanted Emissions into Non-Restricted Frequency Bands

Peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz.

3.2.2 Test Procedures

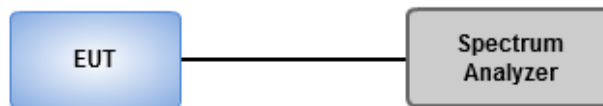
Reference level measurement

1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Use the peak marker function to determine the maximum PSD level

Emission level measurement

1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Scan Frequency range is up to 25GHz
4. Use the peak marker function to determine the maximum amplitude level

3.2.3 Test Setup



3.2.4 Test Results

Ambient Condition	23°C / 64%	Tested By	Brad Wu
--------------------------	------------	------------------	---------

Refer to Appendix B.

3.3 Conducted Output Power

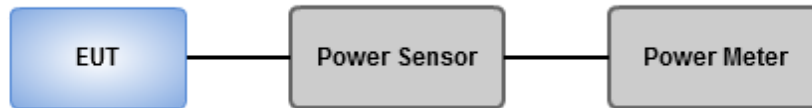
3.3.1 Limit of Conducted Output Power

- 1 Watt
For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band.
- 0.125 Watt
For all other frequency hopping systems in the 2400–2483.5 MHz band.
- 0.125 Watt
For Frequency hopping systems operating in the 2400–2483.5 MHz band have hopping channel carrier frequencies that are separated by two-thirds of the 20 dB bandwidth of the hopping channel.

3.3.2 Test Procedures

1. A wideband power meter is used for power measurement. Bandwidth of power sensor and meter is 50MHz
2. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power

3.3.3 Test Setup



3.3.4 Test Results

Ambient Condition	23°C / 64%	Tested By	Brad Wu
--------------------------	------------	------------------	---------

Refer to Appendix C.

3.4 Number of Hopping Frequency

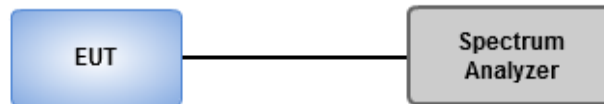
3.4.1 Limit of Number of Hopping Frequency

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

3.4.2 Test Procedures

1. Set RBW = 100kHz, VBW = 300kHz, Sweep time = Auto, Detector = Peak Trace max hold.
2. Allow trace to stabilize.

3.4.3 Test Setup



3.4.4 Test Results

Ambient Condition	23°C / 64%	Tested By	Brad Wu
--------------------------	------------	------------------	---------

Refer to Appendix D.

3.5 20dB and Occupied Bandwidth

3.5.1 Test Procedures

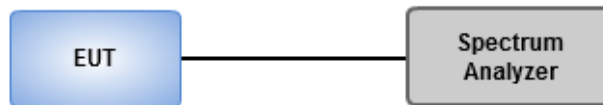
20dB Bandwidth

1. Set RBW=20kHz, VBW=100kHz, Sweep time = Auto, Detector=Peak , Trace max hold
2. Allow trace to stabilize
3. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

Occupied Bandwidth

1. Set RBW=20kHz, VBW=100kHz, Sweep time = Auto, Detector=Sample , Trace max hold
2. Allow trace to stabilize
3. Use Occupied bandwidth function of spectrum analyzer to measuring 99% occupied bandwidth

3.5.2 Test Setup



3.5.3 Test Results

Ambient Condition	23°C / 64%	Tested By	Brad Wu
--------------------------	------------	------------------	---------

Refer to Appendix E.

3.6 Channel Separation

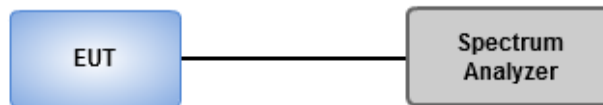
3.6.1 Limit of Channel Separation

- Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.
- Frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

3.6.2 Test Procedures

1. Set RBW=30kHz, VBW=100kHz, Sweep time = Auto, Detector=Peak Trace max hold
2. Allow trace to stabilize
3. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The EUT shall show compliance with the appropriate regulatory limit

3.6.3 Test Setup



3.6.4 Test Results

Ambient Condition	23°C / 64%	Tested By	Brad Wu
--------------------------	------------	------------------	---------

Refer to Appendix F.

3.7 Number of Dwell Time

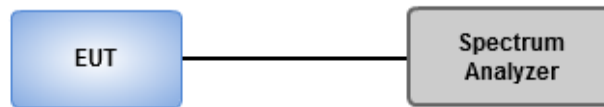
3.7.1 Limit of Dwell time

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

3.7.2 Test Procedures

1. Set RBW=300 kHz, VBW=1 MHz, Sweep time=8 ms, Detector=Peak, Span=0 Hz, Trace max hold.
2. Enable gating and trigger function of spectrum analyzer to measure burst on time.
3. Set RBW=300 kHz, VBW=1 MHz, Sweep time=5 s / 2 s, Detector=Peak, Span=0 Hz, Trace max hold.
4. Enable gating and trigger function of spectrum analyzer to measure burst on number of transmission.
5. Set RBW=300 kHz, VBW=1 MHz, Sweep time=31.6 s / 8 s, Detector=Peak, Span=0 Hz, Trace max hold.
6. Enable gating and trigger function of spectrum analyzer to measure burst on number of transmission of entire time cycle.

3.7.3 Test Setup



3.7.4 Test Results

Ambient Condition	23°C / 64%	Tested By	Brad Wu
--------------------------	------------	------------------	---------

Refer to Appendix G.

3.8 AC Power Line Conducted Emissions

3.8.1 Limit of AC Power Line Conducted Emissions

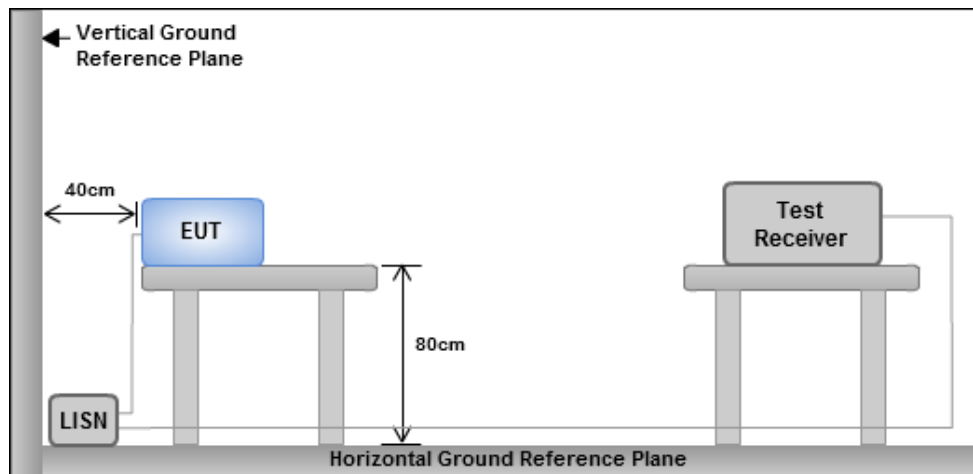
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: * Decreases with the logarithm of the frequency.

3.8.2 Test Procedures

1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50 Ω LISN port.
3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
4. This measurement was performed with AC 120V/60Hz

3.8.3 Test Setup



- Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.8.4 Test Results

Refer to Appendix H.

4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corporation (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <http://www.icertifi.com.tw>.

Linkou

Tel: 886-2-2601-1640

No.30-2, Ding Fwu Tsuen, Lin Kou
District, New Taipei City, Taiwan
(R.O.C.)

Kwei Shan

Tel: 886-3-271-8666

No.3-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)
No.2-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)

Kwei Shan Site II

Tel: 886-3-271-8640

No.14-1, Lane 19, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 333, Taiwan (R.O.C.)

If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666

Fax: 886-3-318-0345

Email: ICC_Service@icertifi.com.tw

==END==



Emissions (Below 1GHz)

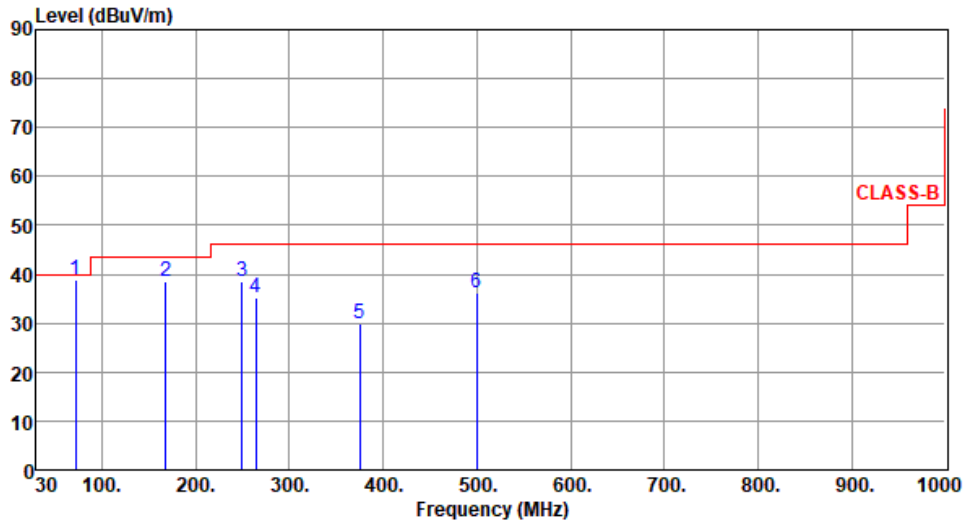
Modulation	GFSK	Test Freq. (MHz)	2441						
Polarization	Horizontal								
Test By : Roger Lu Temperature(°C):23 Humidity(%):65									
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	70.45	36.59	40.00	-3.41	47.57	-10.98	Peak	---	---
2	167.45	38.15	43.50	-5.35	47.11	-8.96	Peak	---	---
3	215.59	33.58	43.50	-9.92	45.52	-11.94	Peak	---	---
4	249.58	35.19	46.00	-10.81	45.26	-10.07	Peak	---	---
5	264.12	36.12	46.00	-9.88	45.59	-9.47	Peak	---	---
6	545.15	33.59	46.00	-12.41	36.25	-2.66	Peak	---	---

Note 1: Emission Level (dBUV/m) = SA Reading (dBUV) + Factor* (dB/m)
 *Factor includes antenna factor , cable loss and amplifier gain
 Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).
 Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.



Modulation	GFSK	Test Freq. (MHz)	2441
Polarization	Vertical		

Test By : Roger Lu Temperature(°C):23 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	71.64	38.84	40.00	-1.16	49.99	-11.15	QP	119	263
2	167.64	38.41	43.50	-5.09	47.37	-8.96	Peak	---	---
3	249.55	38.54	46.00	-7.46	48.61	-10.07	Peak	---	---
4	264.18	35.19	46.00	-10.81	44.66	-9.47	Peak	---	---
5	374.85	29.78	46.00	-16.22	36.11	-6.33	Peak	---	---
6	500.15	36.29	46.00	-9.71	39.58	-3.29	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.



Emissions (Above 1GHz) for GFSK

Modulation	GFSK	Test Freq. (MHz)	2402						
Polarization	Horizontal								
Test By :Brad Wu Temperature(°C):23 Humidity(%):65									
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2342.00	42.72	54.00	-11.28	45.32	-2.60	Average	181	238
2	2342.00	52.74	74.00	-21.26	55.34	-2.60	Peak	181	238
3	2390.00	37.61	54.00	-16.39	40.36	-2.75	Average	181	238
4	2390.00	51.36	74.00	-22.64	54.11	-2.75	Peak	181	238
5	4804.00	19.86	54.00	-34.14			Average	145	106
6	4804.00	49.96	74.00	-24.04	45.83	4.13	Peak	145	106
7	12010.00	25.01	54.00	-28.99			Average	100	35
8	12010.00	55.11	74.00	-18.89	41.49	13.62	Peak	100	35

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

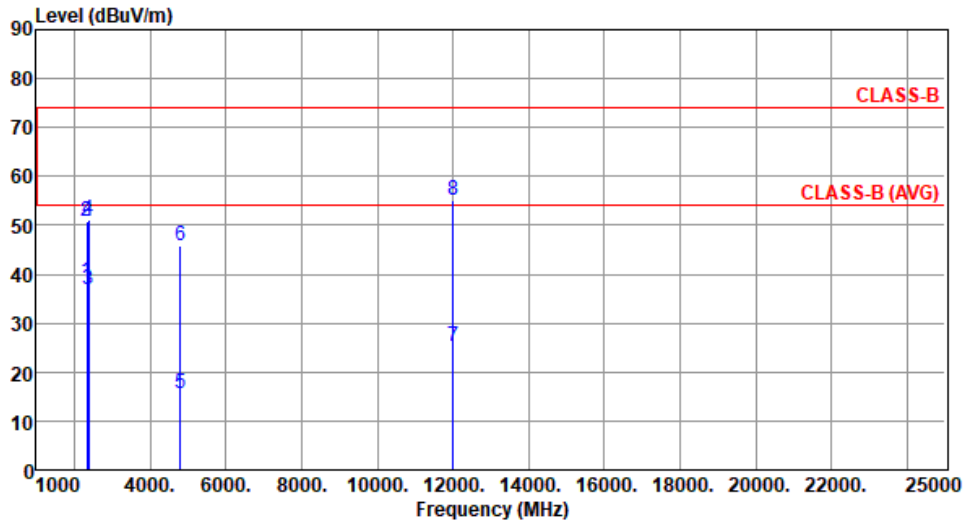
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: When average value is calculated not measured, no SA reading and factor value are listed.



Modulation	GFSK	Test Freq. (MHz)	2402
Polarization	Vertical		

Test By :Brad Wu Temperature(°C):23 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2342.00	38.36	54.00	-15.64	40.96	-2.60	Average	225	272
2	2342.00	50.91	74.00	-23.09	53.51	-2.60	Peak	225	272
3	2390.00	37.02	54.00	-16.98	39.77	-2.75	Average	225	272
4	2390.00	51.25	74.00	-22.75	54.00	-2.75	Peak	225	272
5	4804.00	15.68	54.00	-38.32			Average	100	175
6	4804.00	45.78	74.00	-28.22	41.65	4.13	Peak	100	175
7	12010.00	25.08	54.00	-28.92			Average	100	21
8	12010.00	55.18	74.00	-18.82	41.56	13.62	Peak	100	21

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

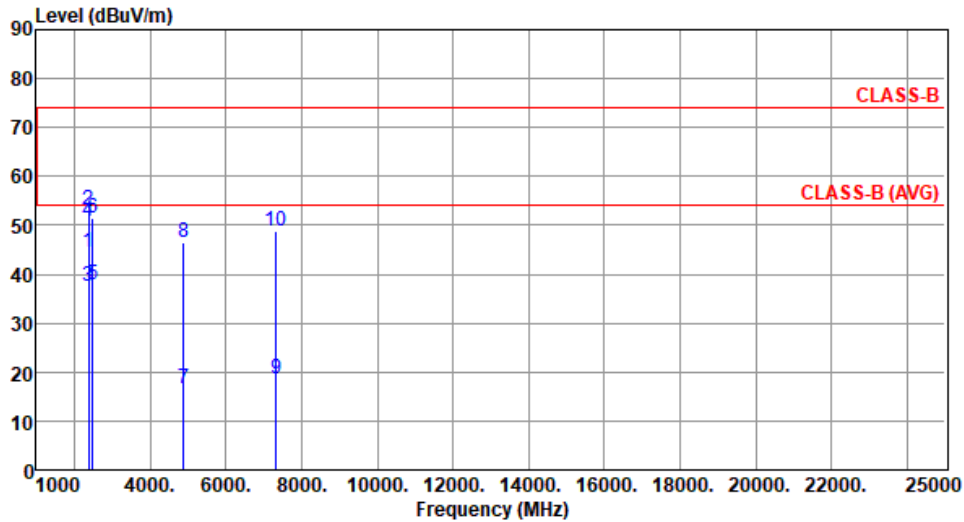
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: When average value is calculated not measured, no SA reading and factor value are listed.



Modulation	GFSK	Test Freq. (MHz)	2441
Polarization	Horizontal		

Test By :Brad Wu Temperature(°C):23 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2381.00	44.39	54.00	-9.61	47.11	-2.72	Average	176	239
2	2381.00	53.17	74.00	-20.83	55.89	-2.72	Peak	176	239
3	2390.00	37.37	54.00	-16.63	40.12	-2.75	Average	176	239
4	2390.00	50.70	74.00	-23.30	53.45	-2.75	Peak	176	239
5	2483.50	37.79	54.00	-16.21	40.49	-2.70	Average	176	239
6	2483.50	51.56	74.00	-22.44	54.26	-2.70	Peak	176	239
7	4882.00	16.44	54.00	-37.56			Average	150	110
8	4882.00	46.54	74.00	-27.46	42.42	4.12	Peak	150	110
9	7323.00	18.59	54.00	-35.41			Average	100	52
10	7323.00	48.69	74.00	-25.31	39.42	9.27	Peak	100	52

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

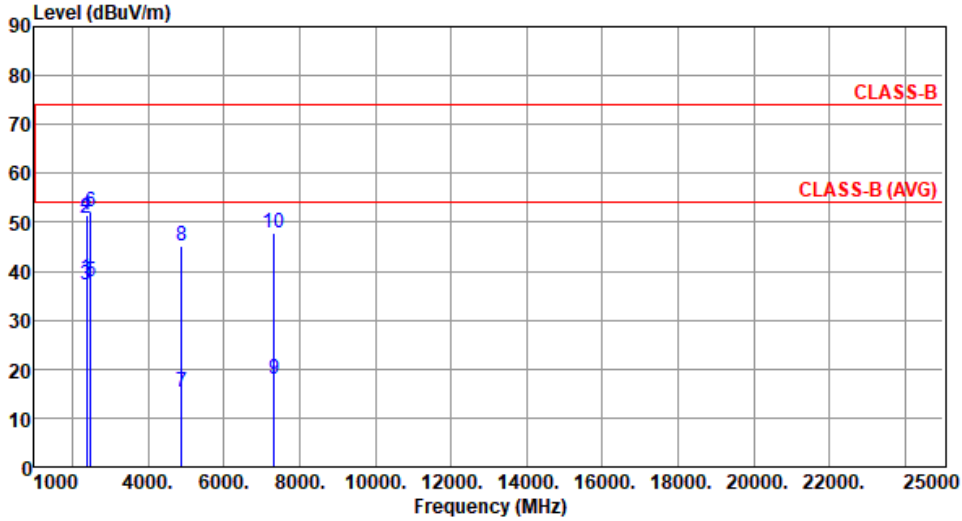
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: When average value is calculated not measured, no SA reading and factor value are listed.



Modulation	GFSK	Test Freq. (MHz)	2441
Polarization	Vertical		

Test By :Brad Wu Temperature(°C):23 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2381.00	38.54	54.00	-15.46	41.26	-2.72	Average	227	271
2	2381.00	50.97	74.00	-23.03	53.69	-2.72	Peak	227	271
3	2390.00	37.11	54.00	-16.89	39.86	-2.75	Average	227	271
4	2390.00	51.51	74.00	-22.49	54.26	-2.75	Peak	227	271
5	2483.50	37.71	54.00	-16.29	40.41	-2.70	Average	227	271
6	2483.50	52.01	74.00	-21.99	54.71	-2.70	Peak	227	271
7	4882.00	15.14	54.00	-38.86			Average	100	182
8	4882.00	45.24	74.00	-28.76	41.12	4.12	Peak	100	182
9	7323.00	17.87	54.00	-36.13			Average	100	44
10	7323.00	47.97	74.00	-26.03	38.70	9.27	Peak	100	44

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

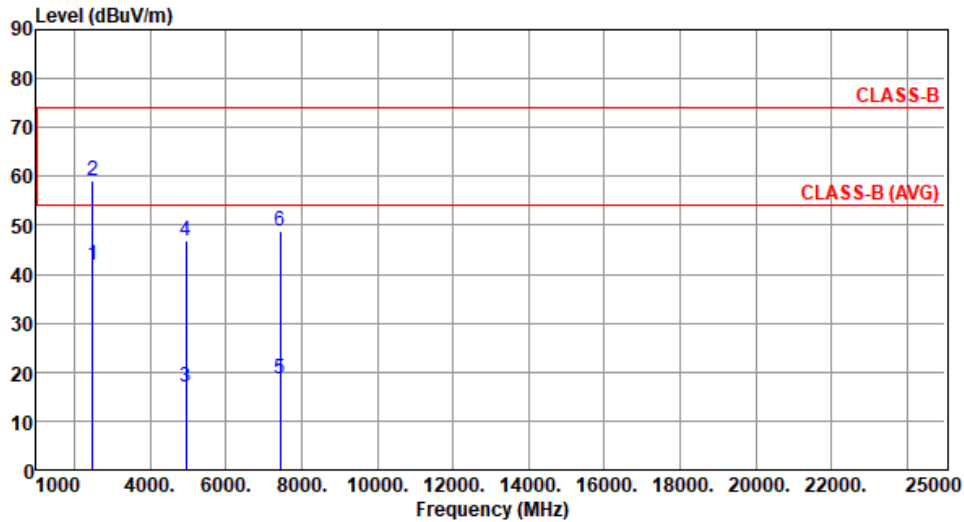
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: When average value is calculated not measured, no SA reading and factor value are listed.



Modulation	GFSK	Test Freq. (MHz)	2480
Polarization	Horizontal		

Test By :Brad Wu Temperature(°C):23 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2483.50	41.90	54.00	-12.10	44.60	-2.70	Average	192	237
2	2483.50	59.08	74.00	-14.92	61.78	-2.70	Peak	192	237
3	4960.00	16.85	54.00	-37.15			Average	151	114
4	4960.00	46.95	74.00	-27.05	42.92	4.03	Peak	151	114
5	7440.00	18.72	54.00	-35.28			Average	100	59
6	7440.00	48.82	74.00	-25.18	39.45	9.37	Peak	100	59

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

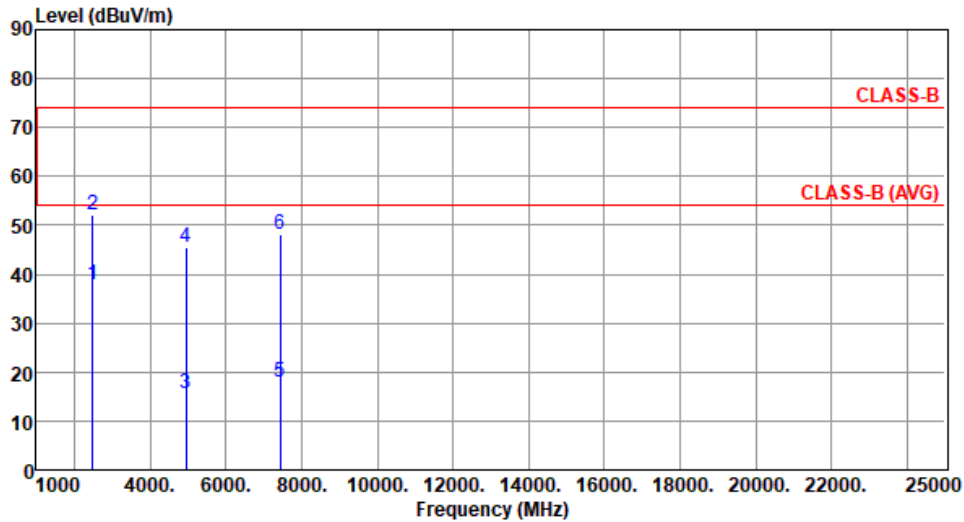
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: When average value is calculated not measured, no SA reading and factor value are listed.



Modulation	GFSK	Test Freq. (MHz)	2480
Polarization	Vertical		

Test By :Brad Wu Temperature(°C):23 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2483.50	37.84	54.00	-16.16	40.54	-2.70	Average	226	265
2	2483.50	52.16	74.00	-21.84	54.86	-2.70	Peak	226	265
3	4960.00	15.52	54.00	-38.48			Average	100	184
4	4960.00	45.62	74.00	-28.38	41.59	4.03	Peak	100	184
5	7440.00	18.02	54.00	-35.98			Average	100	49
6	7440.00	48.12	74.00	-25.88	38.75	9.37	Peak	100	49

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

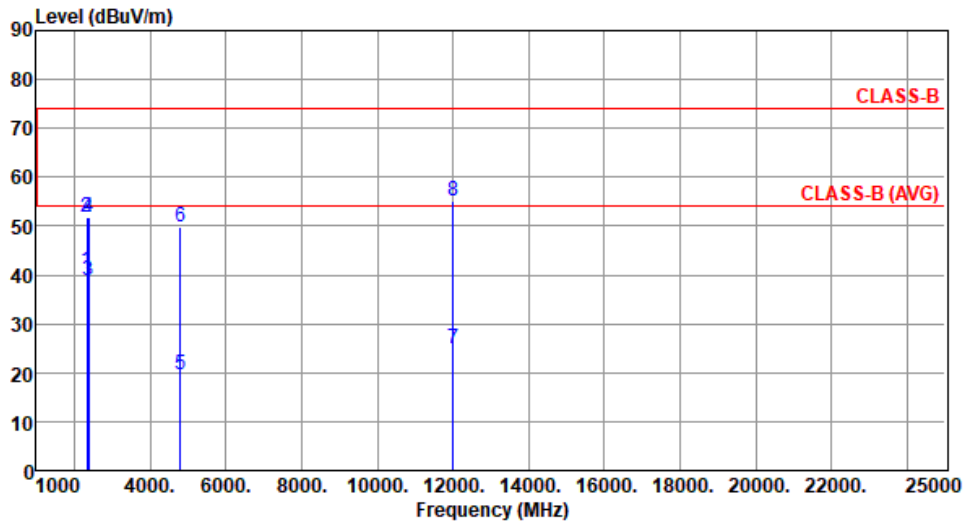
Note 3: When average value is calculated not measured, no SA reading and factor value are listed.



Emissions (Above 1GHz) for 8DPSK

Modulation	8DPSK	Test Freq. (MHz)	2402
Polarization	Horizontal		

Test By :Brad Wu Temperature(°C):23 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2342.00	40.98	54.00	-13.02	43.58	-2.60	Average	178	238
2	2342.00	51.75	74.00	-22.25	54.35	-2.60	Peak	178	238
3	2390.00	38.76	54.00	-15.24	41.51	-2.75	Average	178	238
4	2390.00	51.83	74.00	-22.17	54.58	-2.75	Peak	178	238
5	4804.00	19.75	54.00	-34.25			Average	144	108
6	4804.00	49.85	74.00	-24.15	45.72	4.13	Peak	144	108
7	12010.00	25.05	54.00	-28.95			Average	100	36
8	12010.00	55.15	74.00	-18.85	41.53	13.62	Peak	100	36

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

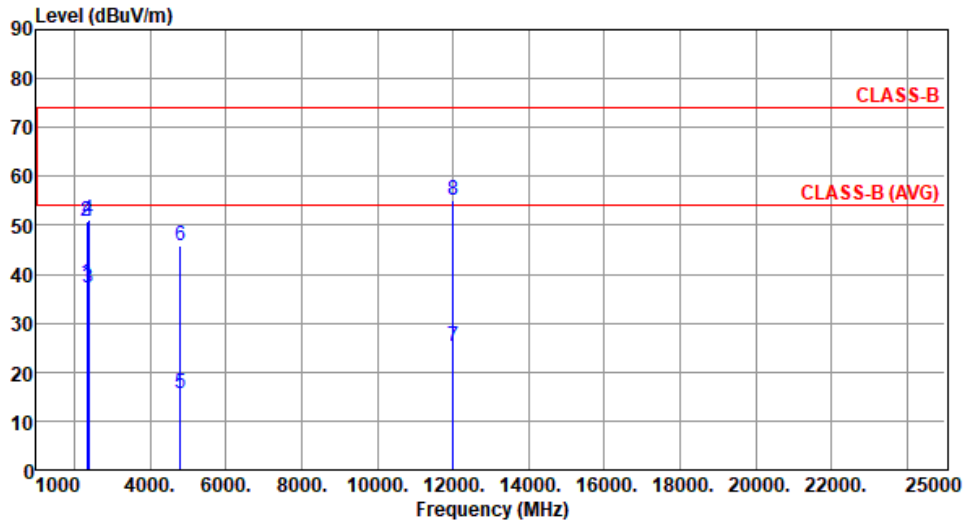
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: When average value is calculated not measured, no SA reading and factor value are listed.



Modulation	8DPSK	Test Freq. (MHz)	2402
Polarization	Vertical		

Test By :Brad Wu Temperature(°C):23 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2342.00	38.25	54.00	-15.75	40.85	-2.60	Average	226	274
2	2342.00	50.84	74.00	-23.16	53.44	-2.60	Peak	226	274
3	2390.00	37.11	54.00	-16.89	39.86	-2.75	Average	226	274
4	2390.00	51.29	74.00	-22.71	54.04	-2.75	Peak	226	274
5	4804.00	15.62	54.00	-38.38			Average	100	176
6	4804.00	45.72	74.00	-28.28	41.59	4.13	Peak	100	176
7	12010.00	25.14	54.00	-28.86			Average	100	25
8	12010.00	55.24	74.00	-18.76	41.62	13.62	Peak	100	25

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

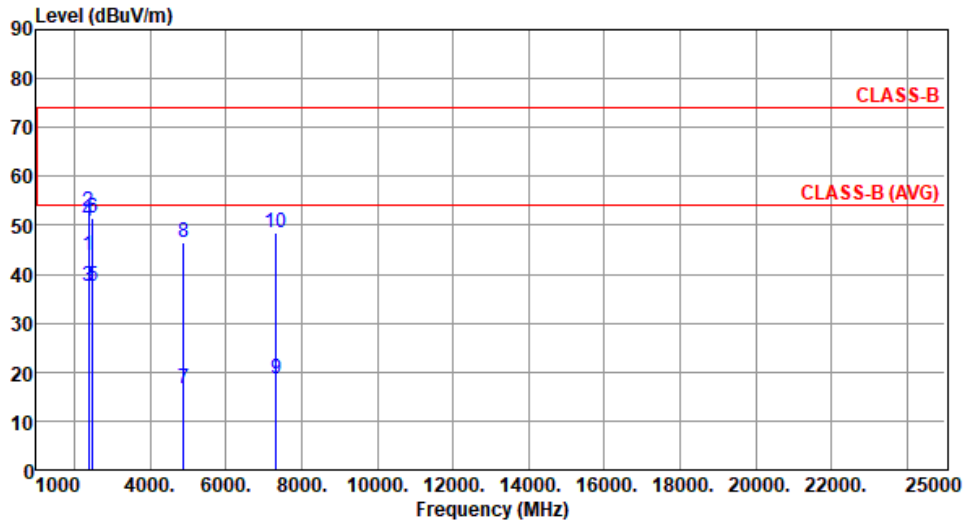
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: When average value is calculated not measured, no SA reading and factor value are listed.



Modulation	8DPSK	Test Freq. (MHz)	2441
Polarization	Horizontal		

Test By :Brad Wu Temperature(°C):23 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2381.00	43.85	54.00	-10.15	46.57	-2.72	Average	175	238
2	2381.00	52.69	74.00	-21.31	55.41	-2.72	Peak	175	238
3	2390.00	37.41	54.00	-16.59	40.16	-2.75	Average	175	238
4	2390.00	50.75	74.00	-23.25	53.50	-2.75	Peak	175	238
5	2483.50	37.59	54.00	-16.41	40.29	-2.70	Average	175	238
6	2483.50	51.62	74.00	-22.38	54.32	-2.70	Peak	175	238
7	4882.00	16.49	54.00	-37.51			Average	148	109
8	4882.00	46.59	74.00	-27.41	42.47	4.12	Peak	148	109
9	7323.00	18.55	54.00	-35.45			Average	100	54
10	7323.00	48.65	74.00	-25.35	39.38	9.27	Peak	100	54

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

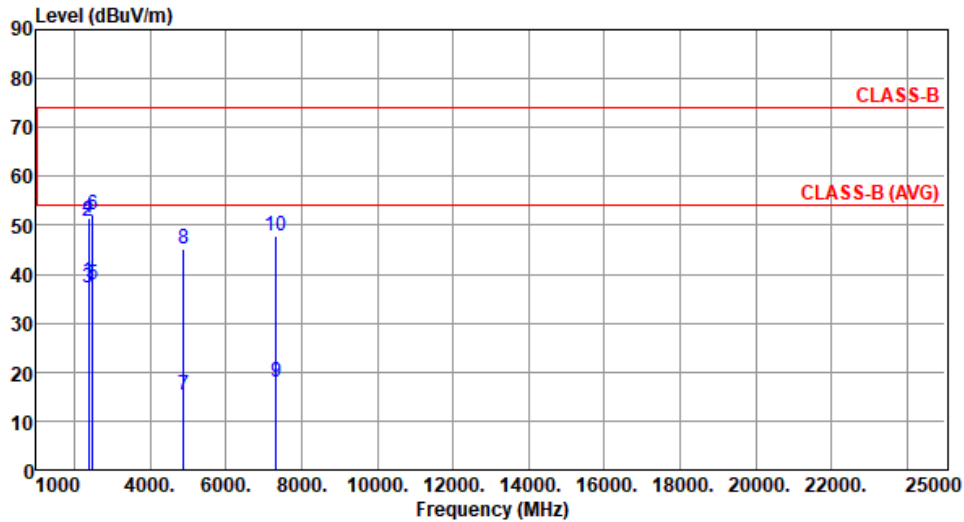
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: When average value is calculated not measured, no SA reading and factor value are listed.



Modulation	8DPSK	Test Freq. (MHz)	2441
Polarization	Vertical		

Test By :Brad Wu Temperature(°C):23 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2381.00	38.49	54.00	-15.51	41.21	-2.72	Average	228	274
2	2381.00	50.92	74.00	-23.08	53.64	-2.72	Peak	228	274
3	2390.00	37.22	54.00	-16.78	39.97	-2.75	Average	228	274
4	2390.00	51.56	74.00	-22.44	54.31	-2.75	Peak	228	274
5	2483.50	37.79	54.00	-16.21	40.49	-2.70	Average	228	274
6	2483.50	52.14	74.00	-21.86	54.84	-2.70	Peak	228	274
7	4882.00	15.22	54.00	-38.78			Average	100	176
8	4882.00	45.32	74.00	-28.68	41.20	4.12	Peak	100	176
9	7323.00	17.84	54.00	-36.16			Average	100	48
10	7323.00	47.94	74.00	-26.06	38.67	9.27	Peak	100	48

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

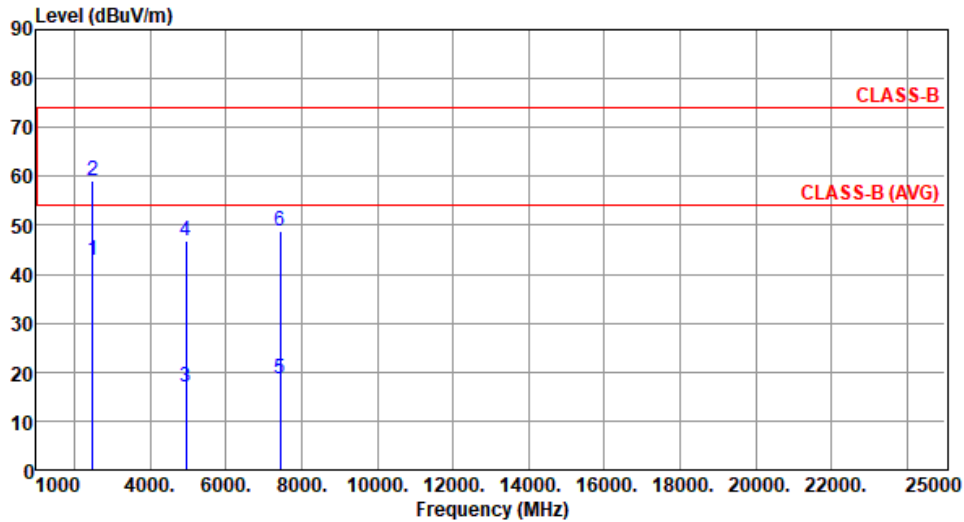
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: When average value is calculated not measured, no SA reading and factor value are listed.



Modulation	8DPSK	Test Freq. (MHz)	2480
Polarization	Horizontal		

Test By :Brad Wu Temperature(°C):23 Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2483.50	42.89	54.00	-11.11	45.59	-2.70	Average	194	238
2	2483.50	59.12	74.00	-14.88	61.82	-2.70	Peak	194	238
3	4960.00	16.78	54.00	-37.22			Average	149	115
4	4960.00	46.88	74.00	-27.12	42.85	4.03	Peak	149	115
5	7440.00	18.65	54.00	-35.35			Average	100	63
6	7440.00	48.75	74.00	-25.25	39.38	9.37	Peak	100	63

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

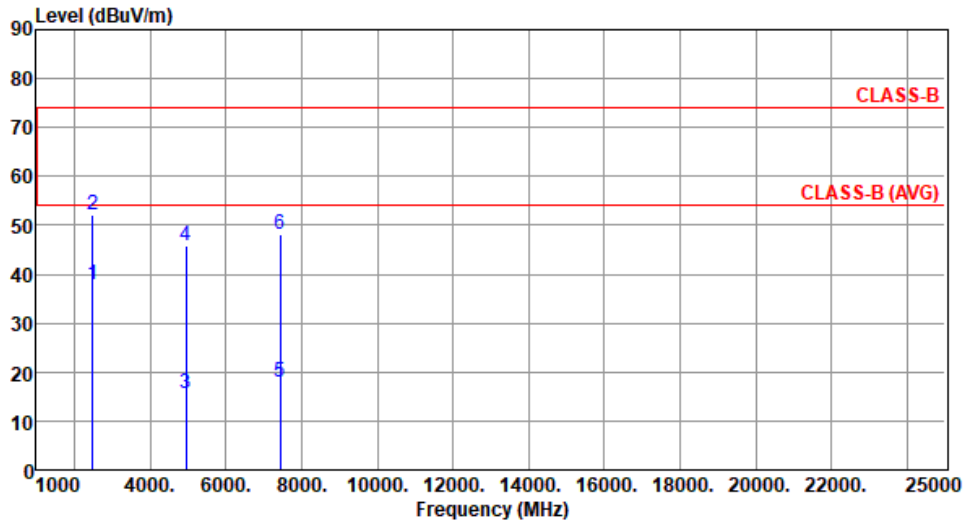
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: When average value is calculated not measured, no SA reading and factor value are listed.



Modulation	8DPSK	Test Freq. (MHz)	2480
Polarization	Vertical		

Test By :Brad Wu Temperature(°C):23 Humidity(%):65



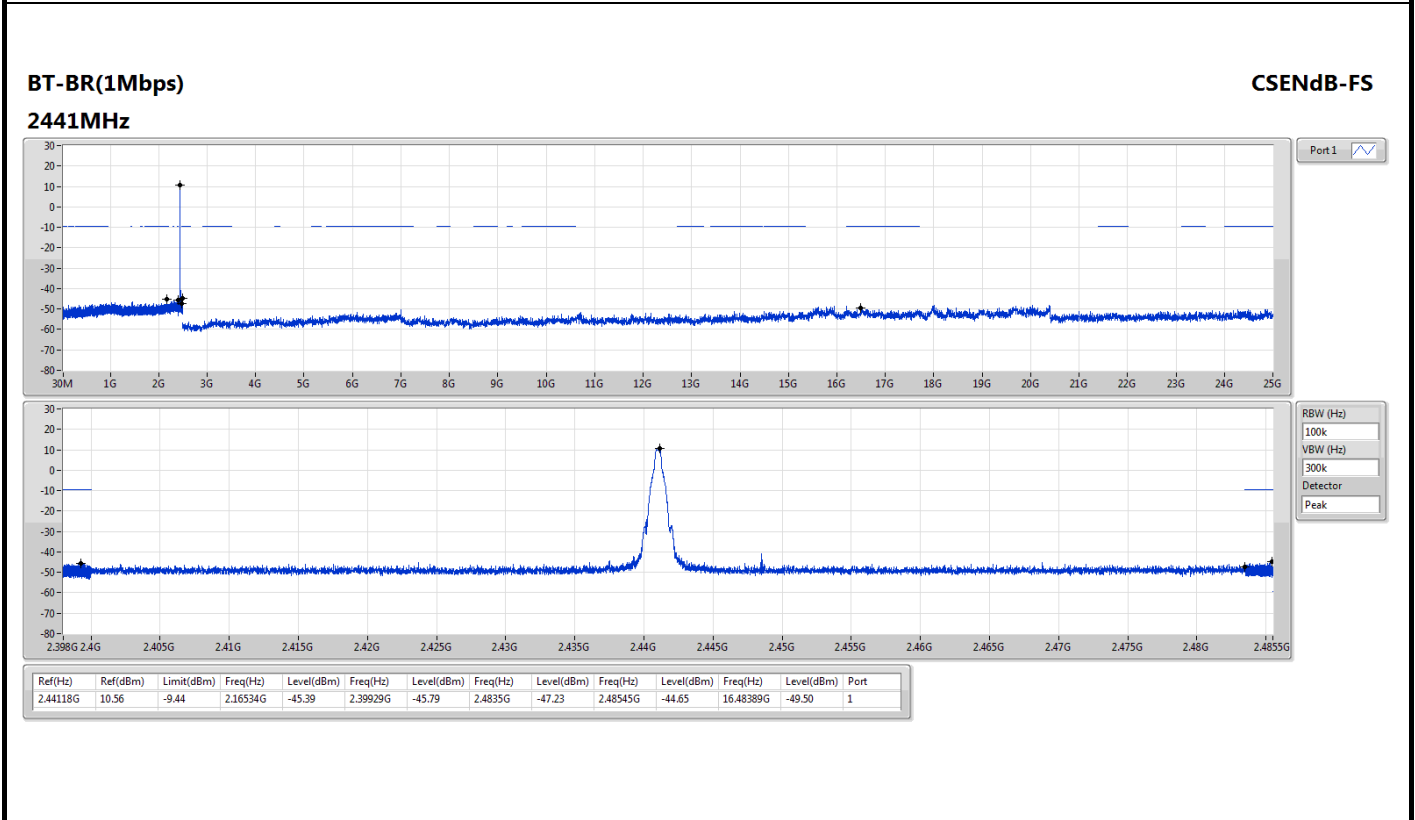
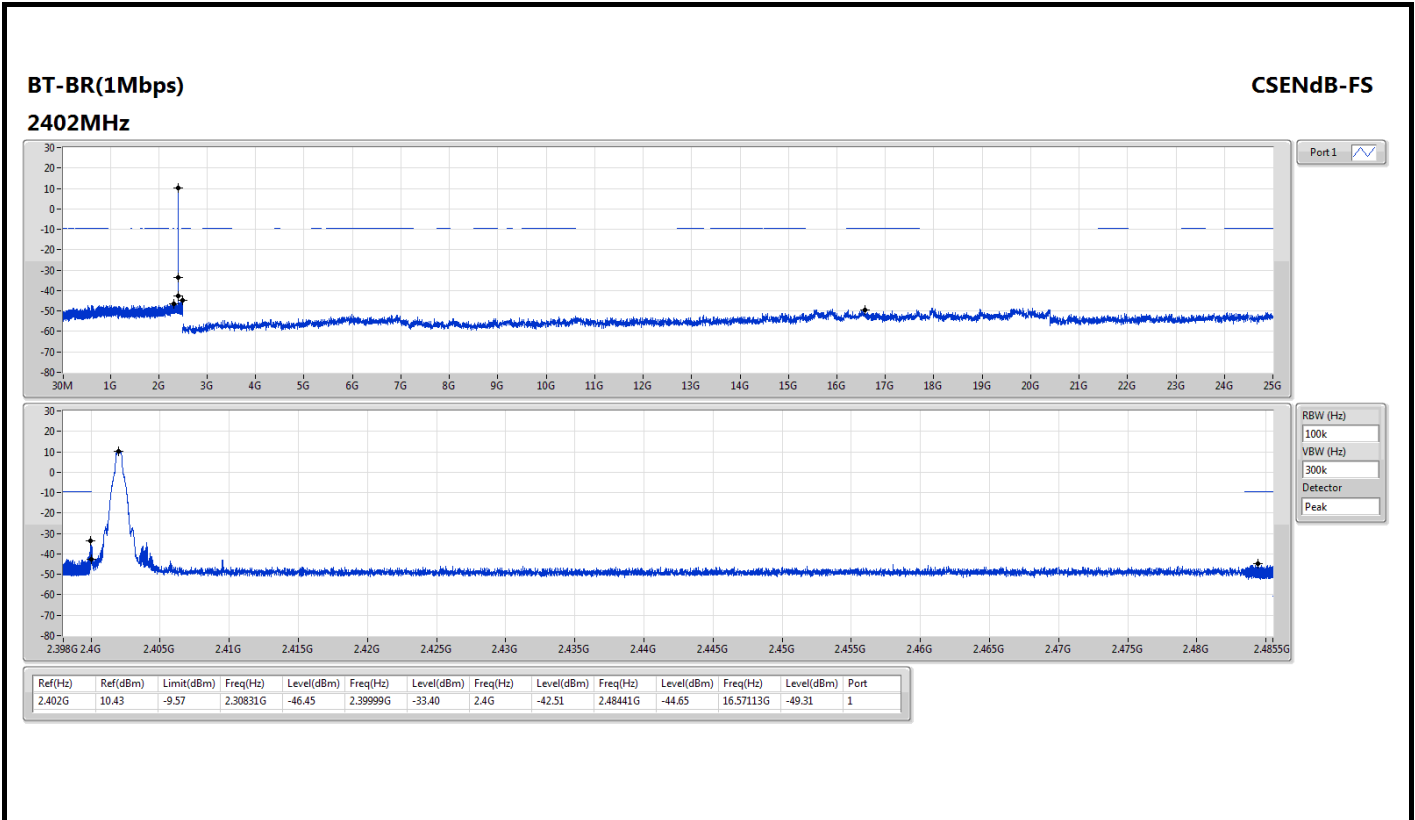
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2483.50	37.96	54.00	-16.04	40.66	-2.70	Average	225	264
2	2483.50	52.19	74.00	-21.81	54.89	-2.70	Peak	225	264
3	4960.00	15.58	54.00	-38.42			Average	100	181
4	4960.00	45.68	74.00	-28.32	41.65	4.03	Peak	100	181
5	7440.00	18.05	54.00	-35.95			Average	100	44
6	7440.00	48.15	74.00	-25.85	38.78	9.37	Peak	100	44

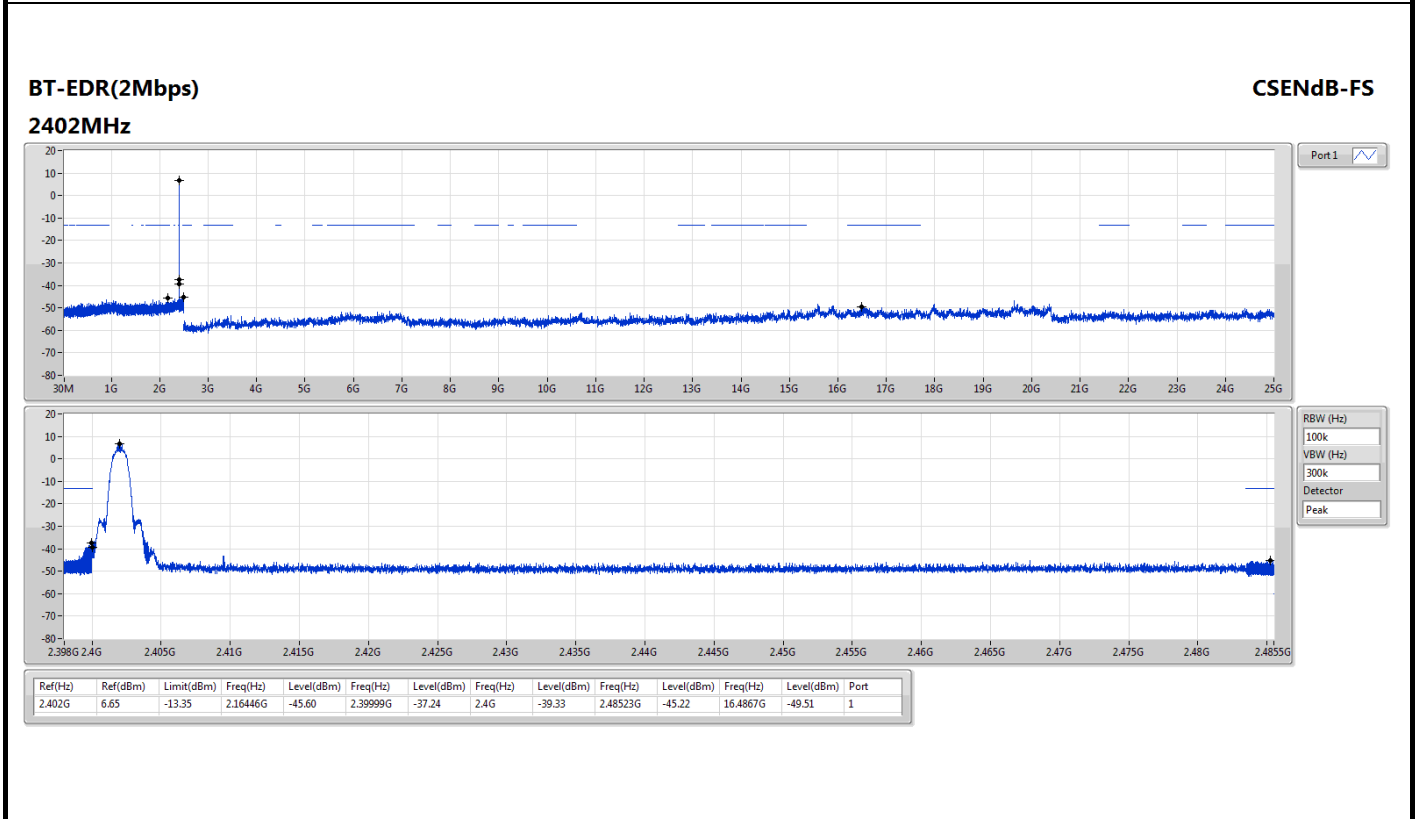
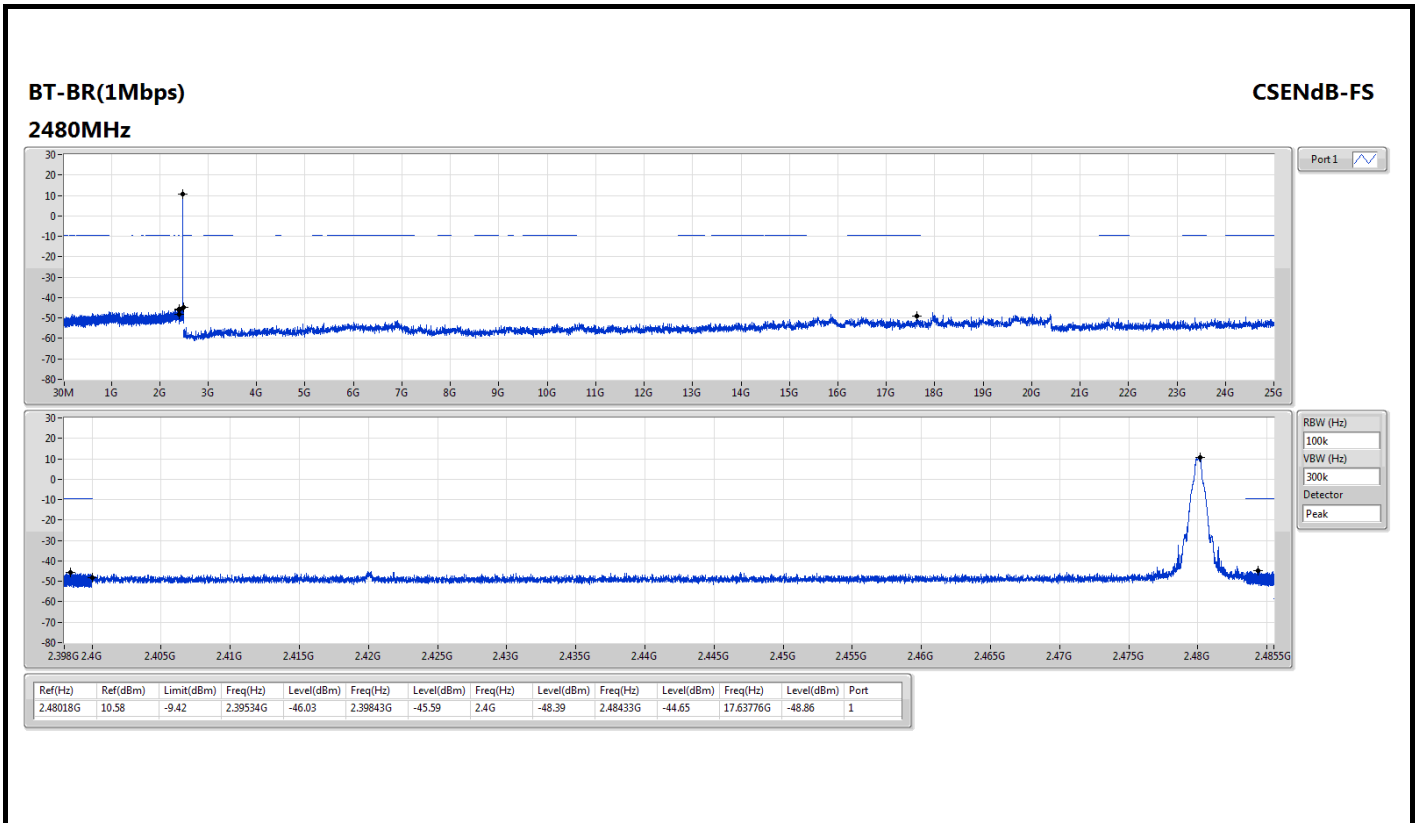
Note 1: Emission Level (dBUV/m) = SA Reading (dBUV) + Factor* (dB/m)

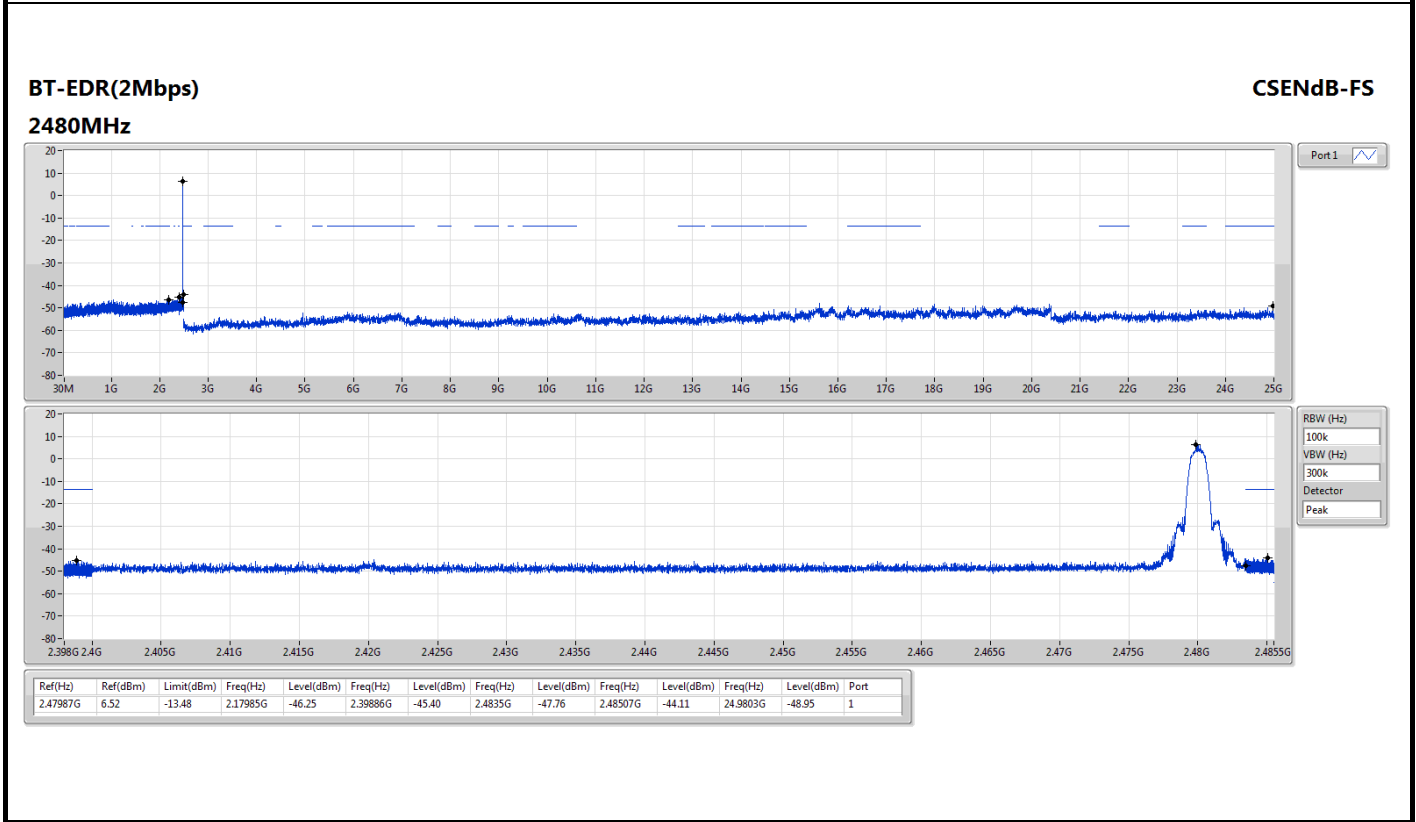
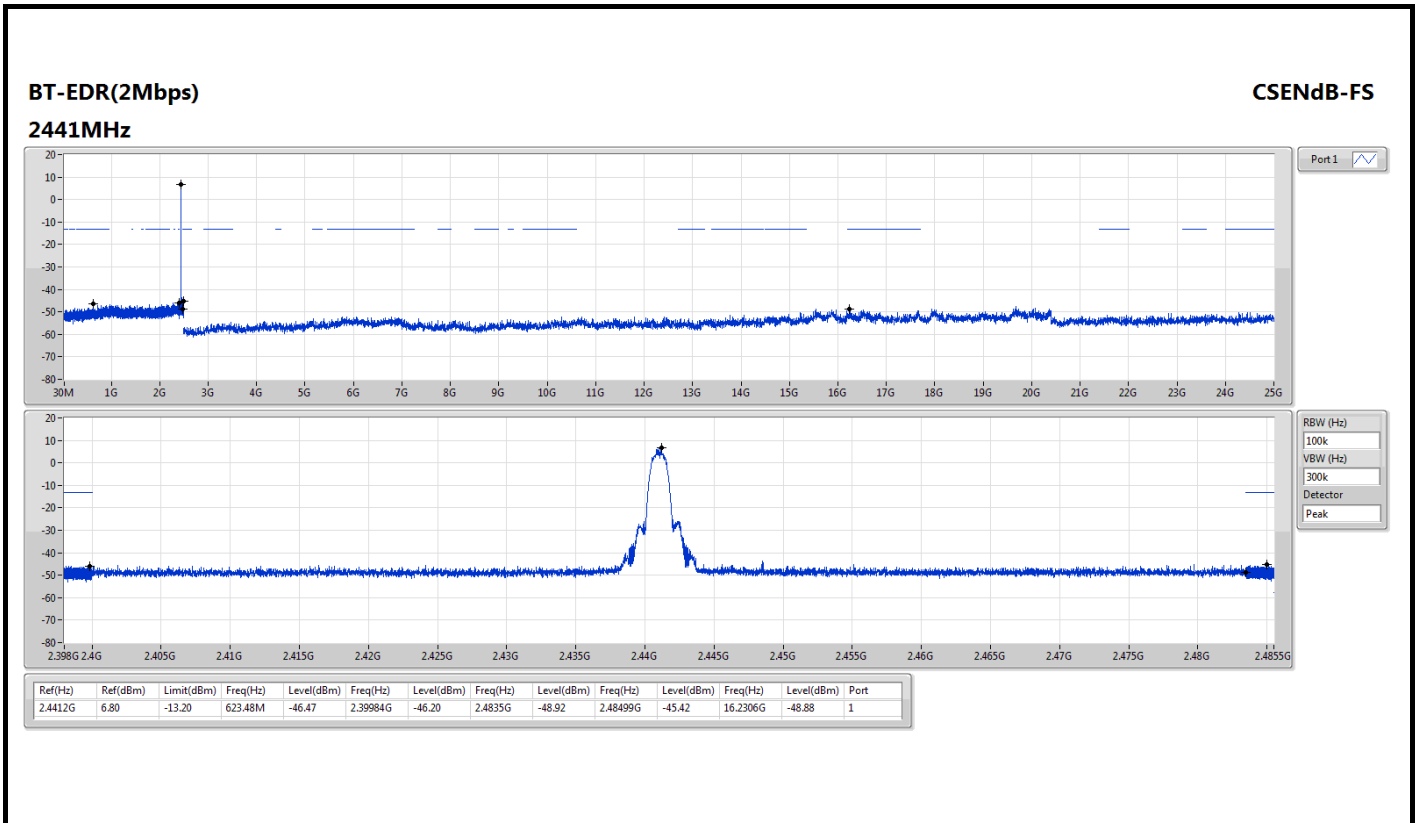
*Factor includes antenna factor , cable loss and amplifier gain

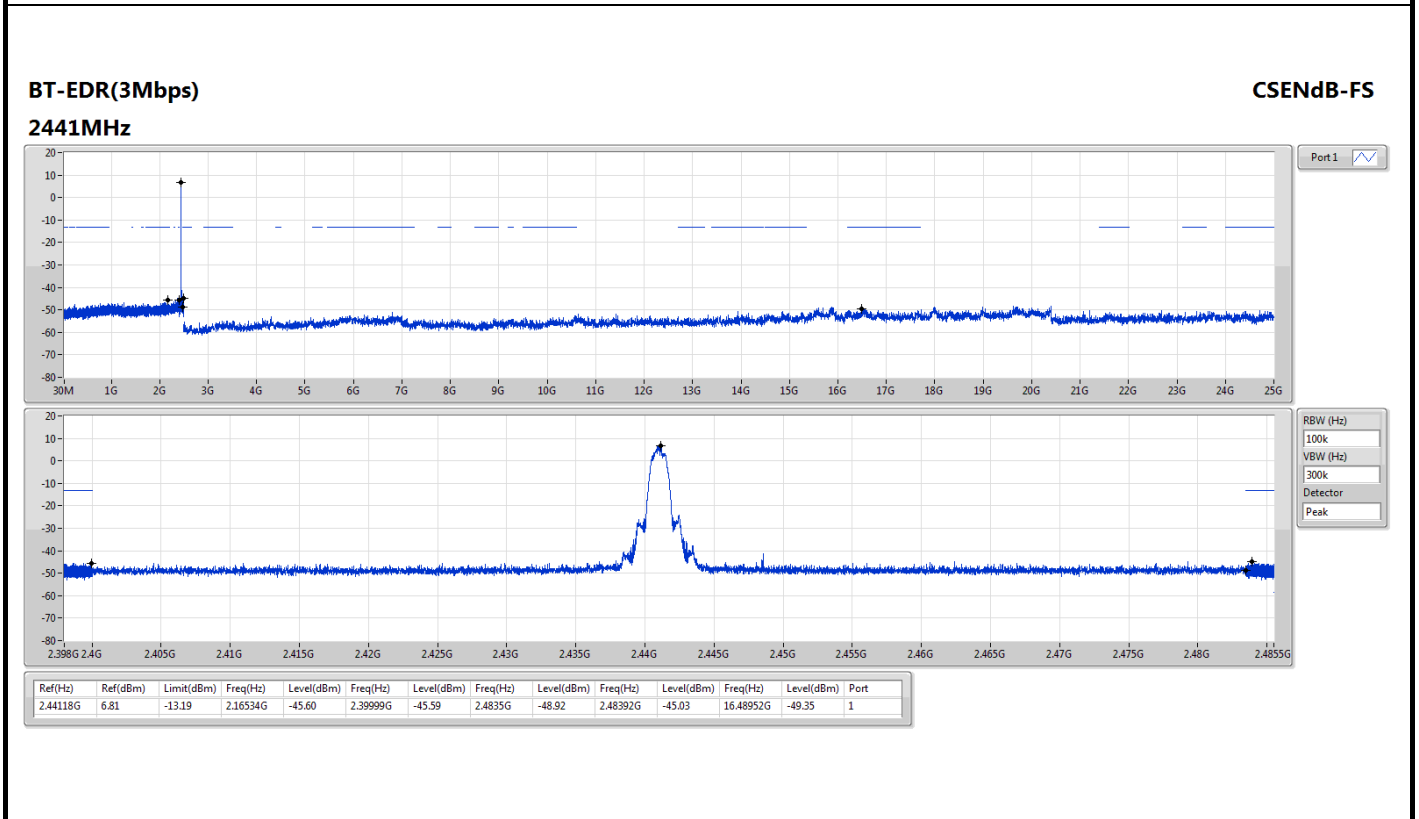
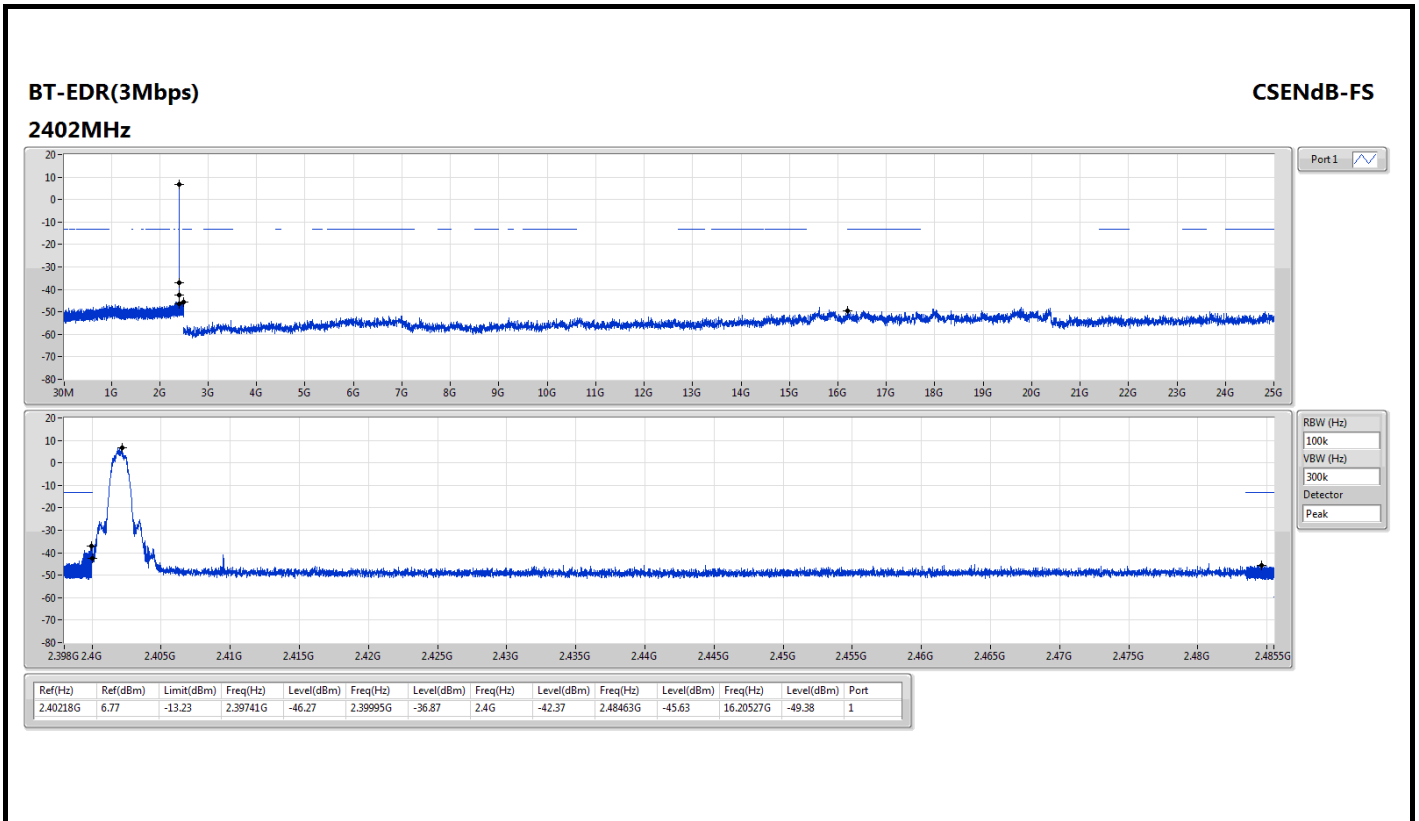
Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).

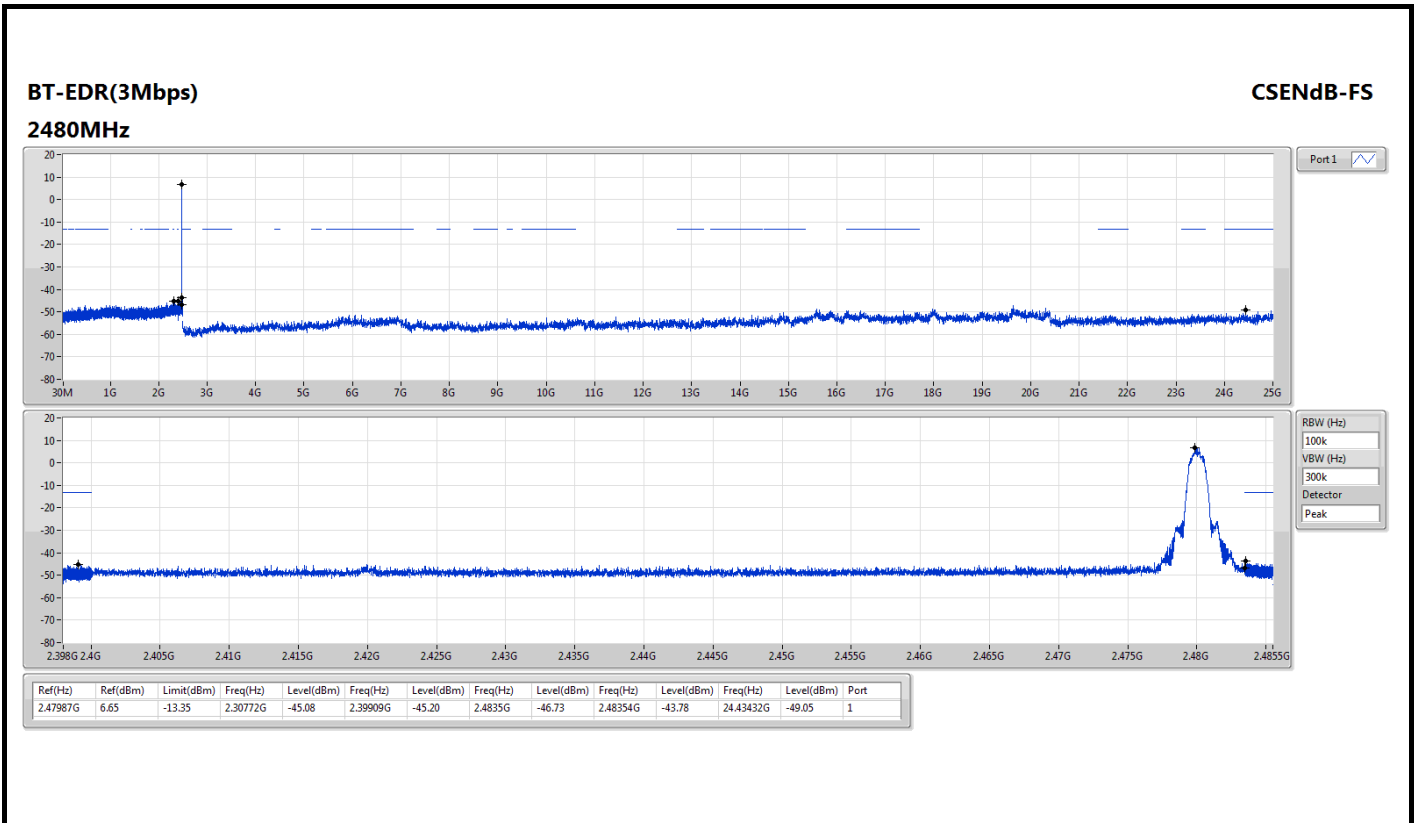
Note 3: When average value is calculated not measured, no SA reading and factor value are listed.



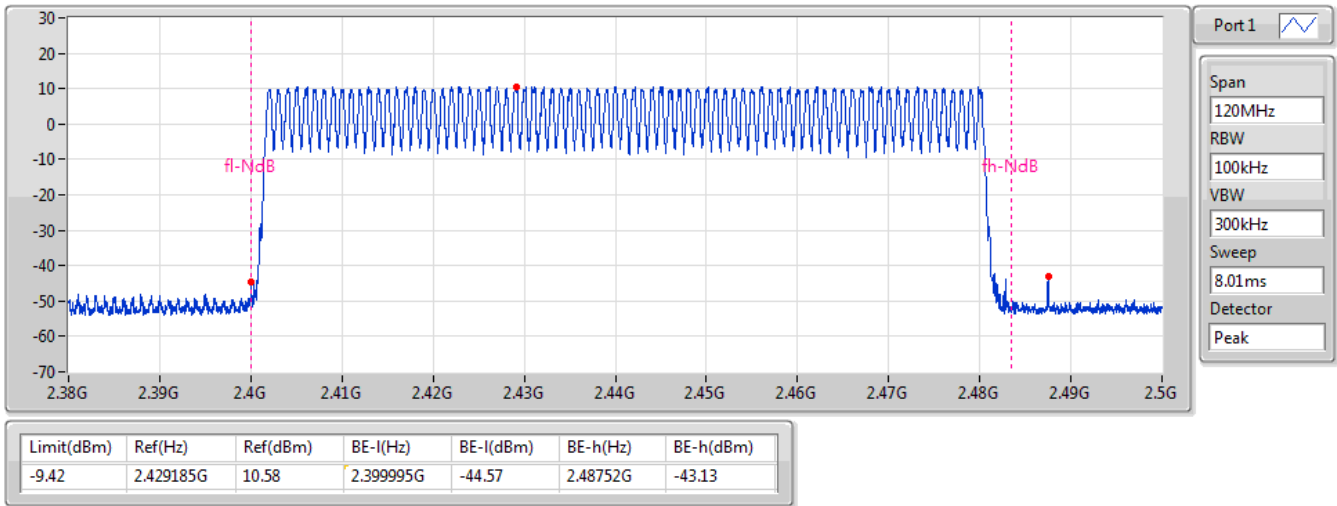




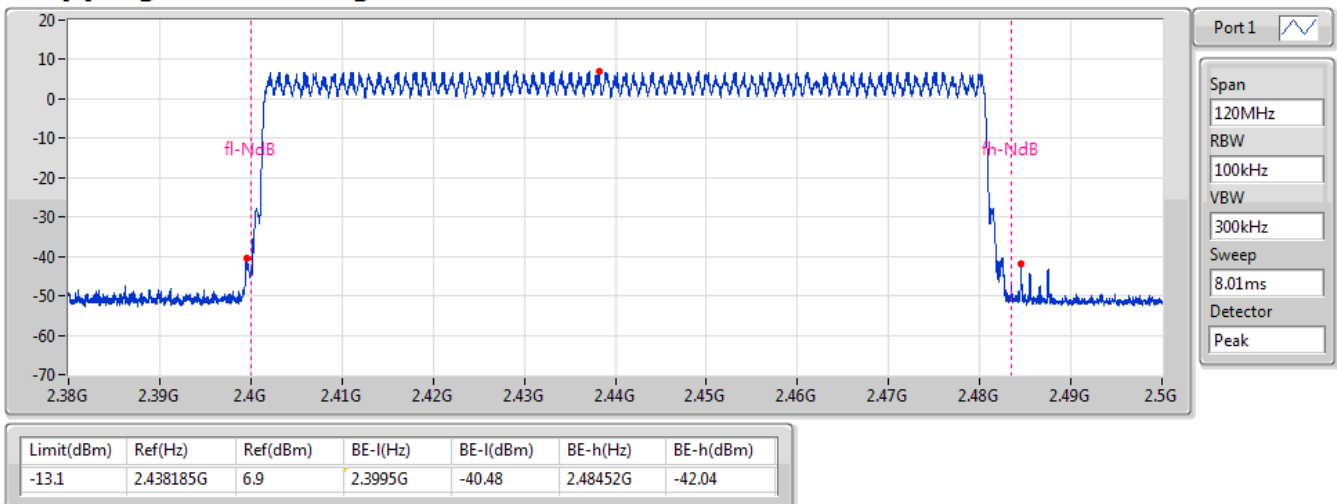




BT-BR(1Mbps)
2402MHz
Hopping Ch Bandedge (Non-restricted Band)



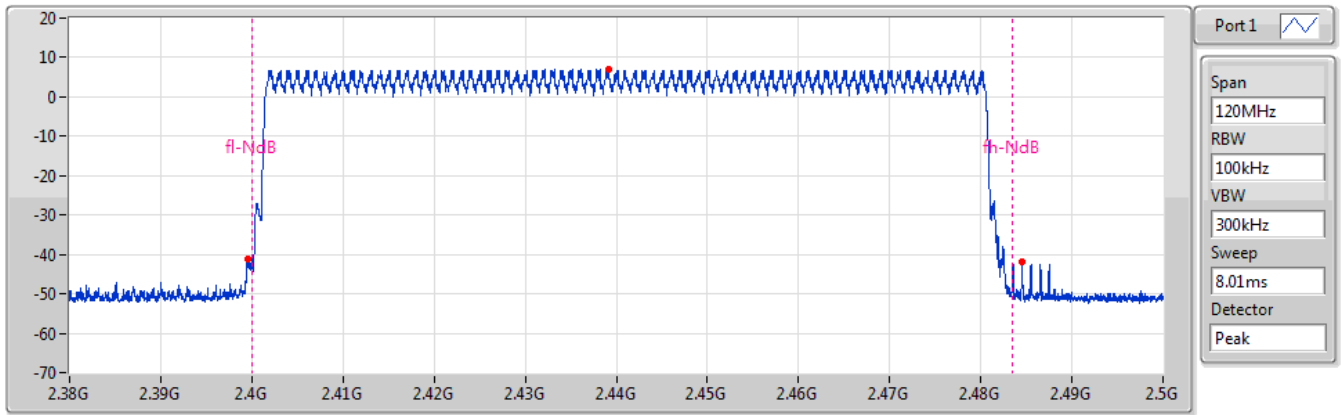
BT-EDR(2Mbps)
2402MHz
Hopping Ch Bandedge (Non-restricted Band)



BT-EDR(3Mbps)

2402MHz

Hopping Ch Bandedge (Non-restricted Band)



Limit(dBm)	Ref(Hz)	Ref(dBm)	BE-l(Hz)	BE-l(dBm)	BE-h(Hz)	BE-h(dBm)
-13.13	2.43919G	6.87	2.39953G	-41.13	2.484535G	-41.95



Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-BR(1Mbps)	10.94	0.01242
BT-EDR(2Mbps)	7.23	0.00528
BT-EDR(3Mbps)	7.21	0.00526

Result

Mode	Result	Antenna Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-BR(1Mbps)	-	-	-	-
2402MHz	Pass	2.68	10.82	-
2441MHz	Pass	2.68	10.94	-
2480MHz	Pass	2.68	10.85	-
BT-EDR(2Mbps)	-	-	-	-
2402MHz	Pass	2.68	7.21	-
2441MHz	Pass	2.68	7.23	-
2480MHz	Pass	2.68	7.05	-
BT-EDR(3Mbps)	-	-	-	-
2402MHz	Pass	2.68	7.21	-
2441MHz	Pass	2.68	7.21	-
2480MHz	Pass	2.68	7.06	-

Note: Average power is for reference only.



Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-BR(1Mbps)	10.98	0.01253
BT-EDR(2Mbps)	9.45	0.00881
BT-EDR(3Mbps)	9.66	0.00925

Result

Mode	Result	Antenna Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-BR(1Mbps)	-	-	-	-
2402MHz	Pass	2.68	10.87	21.00
2441MHz	Pass	2.68	10.98	21.00
2480MHz	Pass	2.68	10.89	21.00
BT-EDR(2Mbps)	-	-	-	-
2402MHz	Pass	2.68	9.45	21.00
2441MHz	Pass	2.68	9.45	21.00
2480MHz	Pass	2.68	9.33	21.00
BT-EDR(3Mbps)	-	-	-	-
2402MHz	Pass	2.68	9.65	21.00
2441MHz	Pass	2.68	9.66	21.00
2480MHz	Pass	2.68	9.52	21.00



Summary

Mode	Max-Hop No
2.4-2.4835GHz	-
BT-BR(1Mbps)	79
BT-EDR(2Mbps)	79
BT-EDR(3Mbps)	79

Result

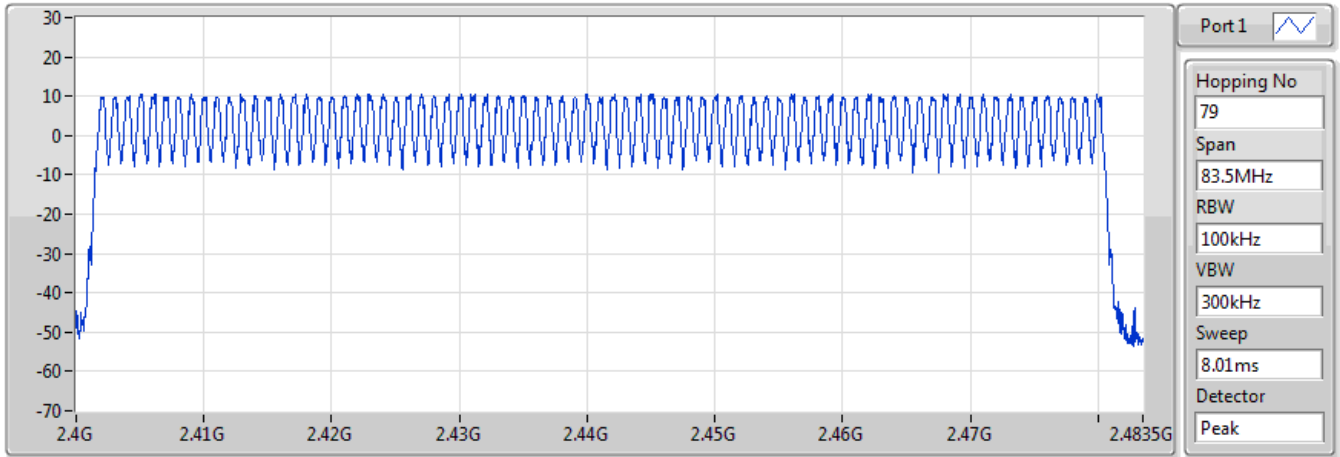
Mode	Result	Hopping No	Limit
BT-BR(1Mbps)	-	-	-
2402MHz	Pass	79	15
BT-EDR(2Mbps)	-	-	-
2402MHz	Pass	79	15
BT-EDR(3Mbps)	-	-	-
2402MHz	Pass	79	15



BT-BR(1Mbps)

Hopping-FS

2402MHz

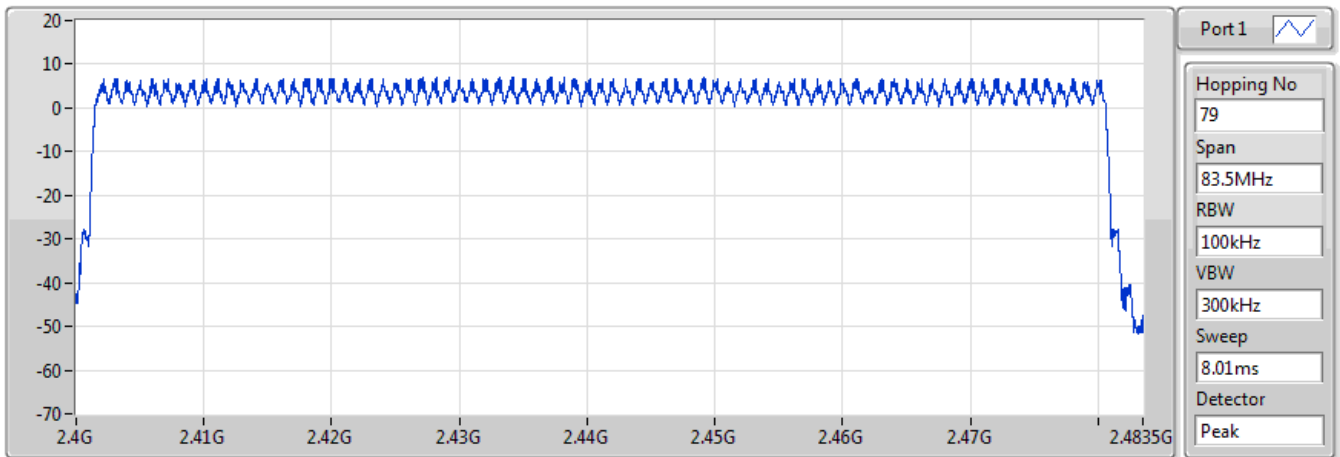


Hopping No	Limit
79	15

BT-EDR(2Mbps)

Hopping-FS

2402MHz

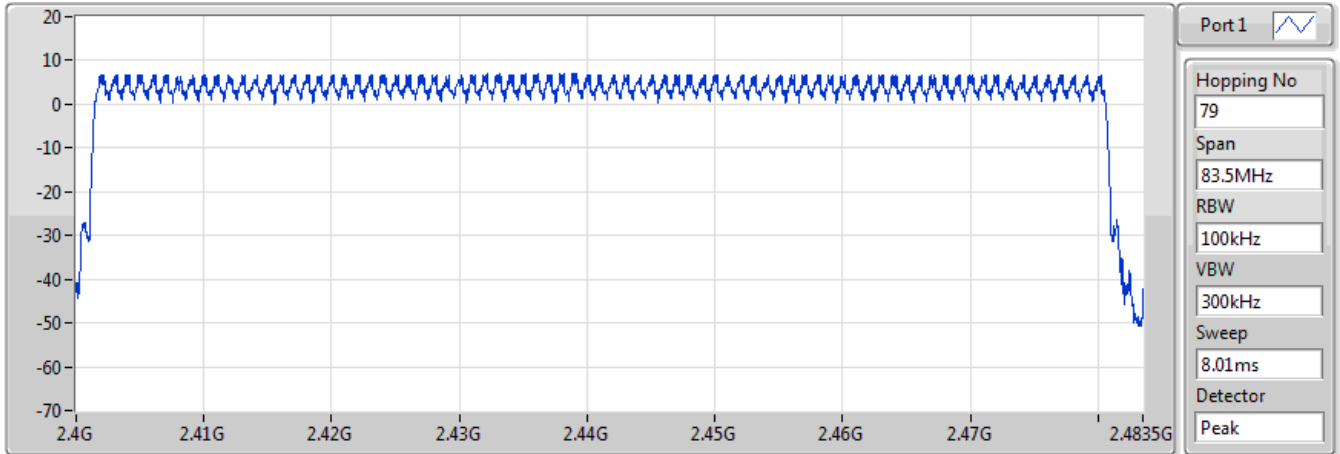


Hopping No	Limit
79	15



BT-EDR(3Mbps)
2402MHz

Hopping-FS



Hopping No	Limit
79	15



Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
BT-BR(1Mbps)	934.783k	882.779k	883KF1D	931.159k	875.543k
BT-EDR(2Mbps)	1.431M	1.364M	1M36G1D	1.42M	1.353M
BT-EDR(3Mbps)	1.442M	1.364M	1M36G1D	1.409M	1.353M

Max-N dB = Maximum 20dB down bandwidth; Max-OBW = Maximum 99% occupied bandwidth;
Min-N dB = Minimum 20dB down bandwidth; Min-OBW = Minimum 99% occupied bandwidth

Result

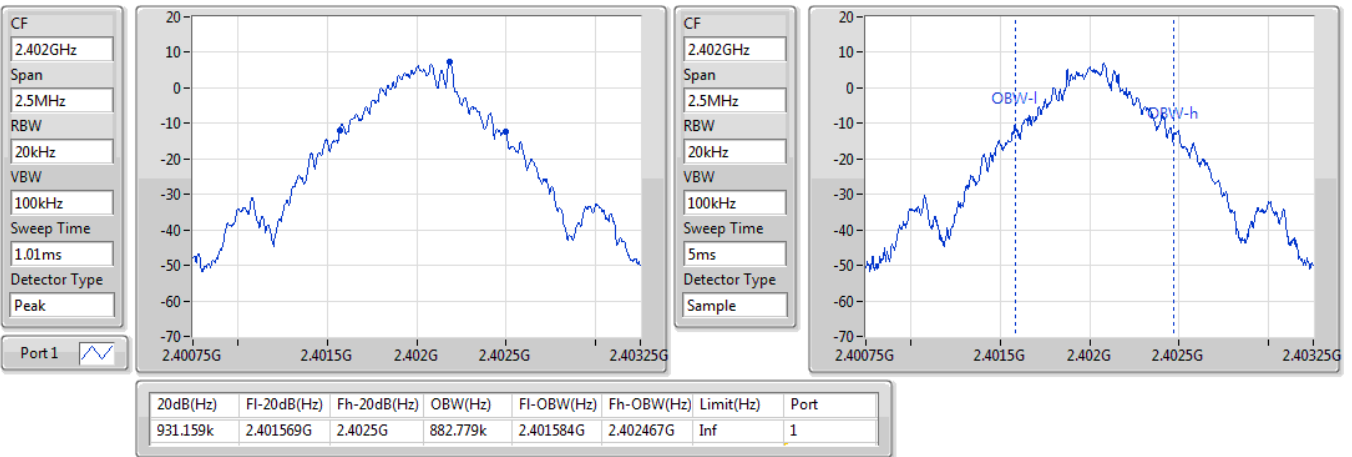
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-BR(1Mbps)	-	-	-	-
2402MHz	Pass	Inf	931.159k	882.779k
2441MHz	Pass	Inf	931.159k	875.543k
2480MHz	Pass	Inf	934.783k	882.779k
BT-EDR(2Mbps)	-	-	-	-
2402MHz	Pass	Inf	1.431M	1.364M
2441MHz	Pass	Inf	1.42M	1.357M
2480MHz	Pass	Inf	1.431M	1.353M
BT-EDR(3Mbps)	-	-	-	-
2402MHz	Pass	Inf	1.409M	1.364M
2441MHz	Pass	Inf	1.442M	1.353M
2480MHz	Pass	Inf	1.409M	1.357M

Port X-N dB = Port X 20dB down bandwidth;
Port X-OBW = Port X 99% occupied bandwidth

BT-BR(1Mbps)

EBW-FS

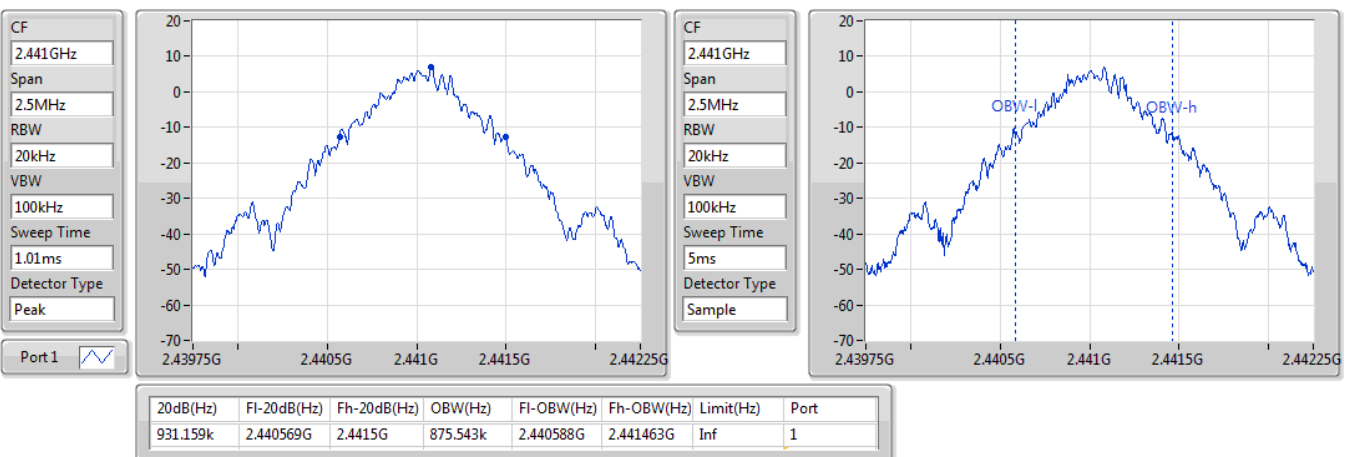
2402MHz

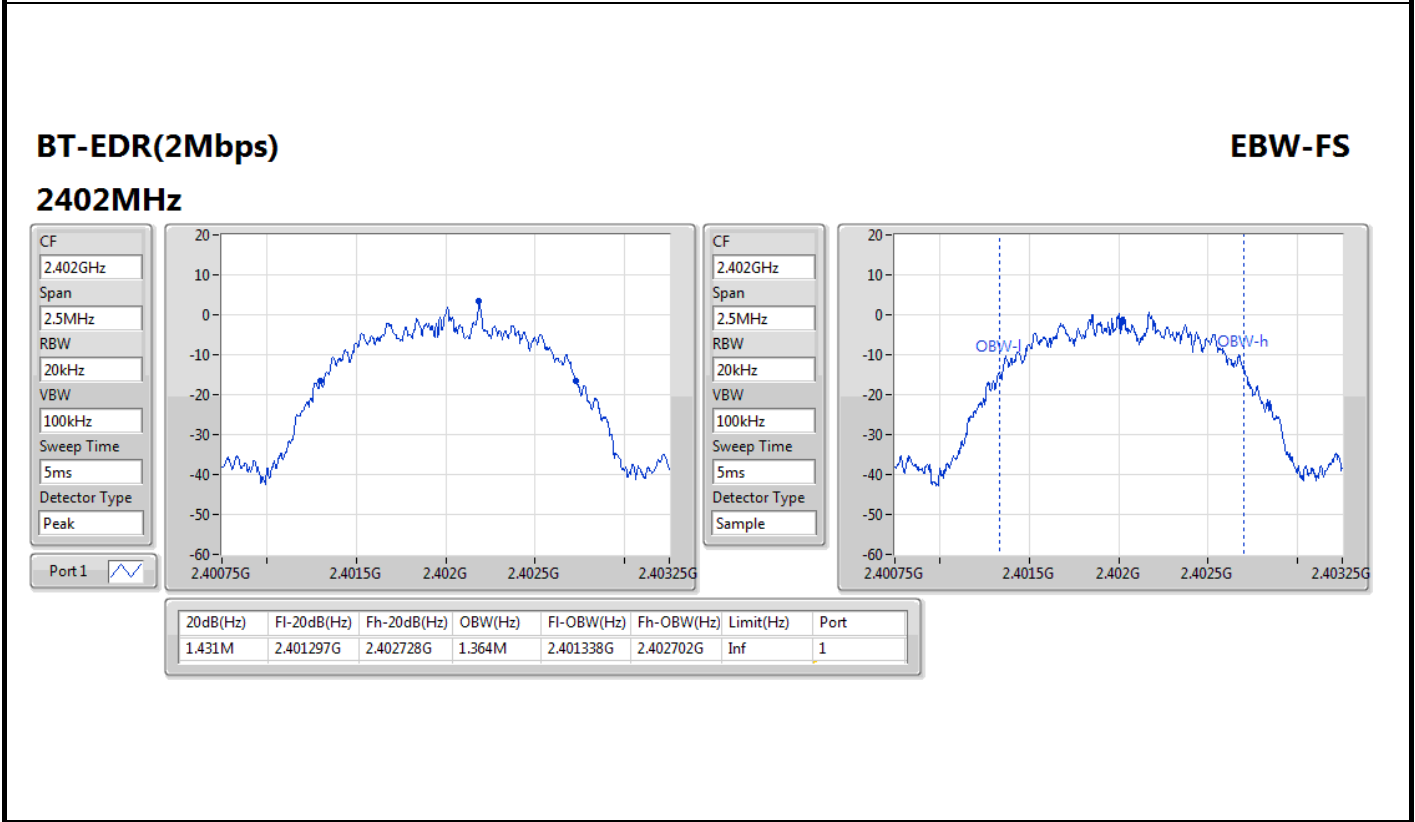
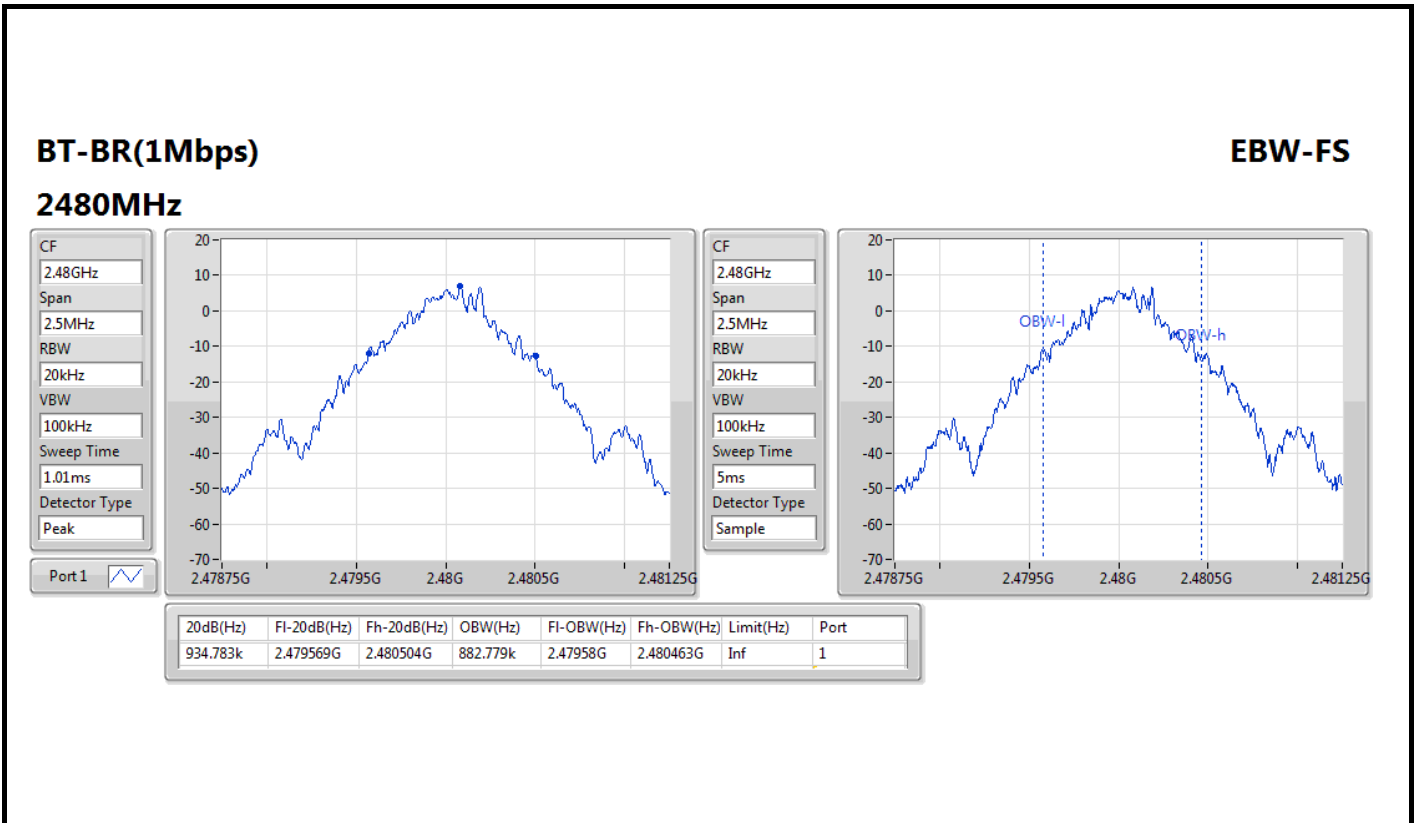


BT-BR(1Mbps)

EBW-FS

2441MHz



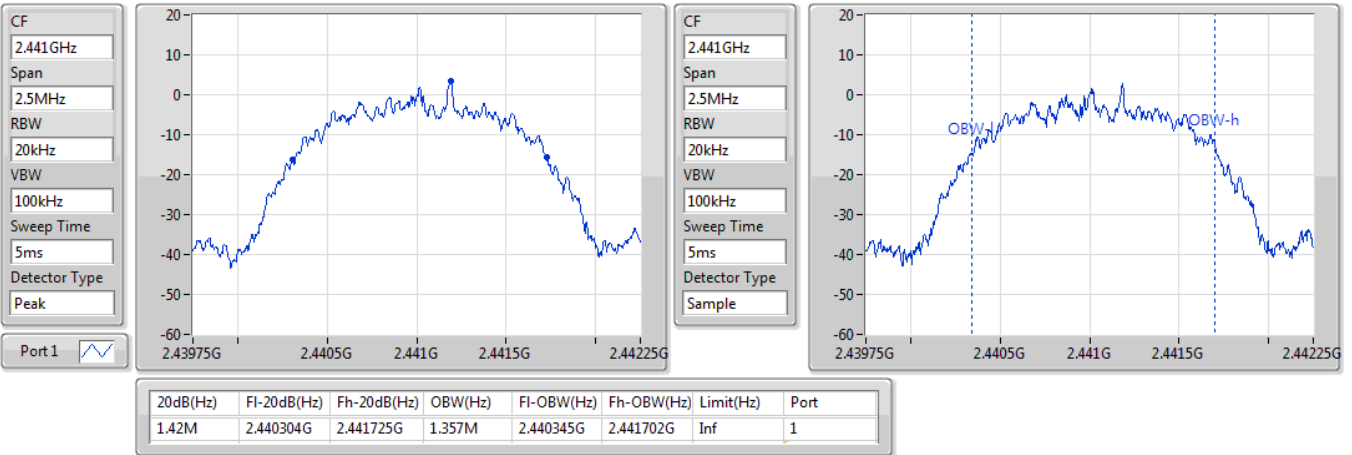




BT-EDR(2Mbps)

EBW-FS

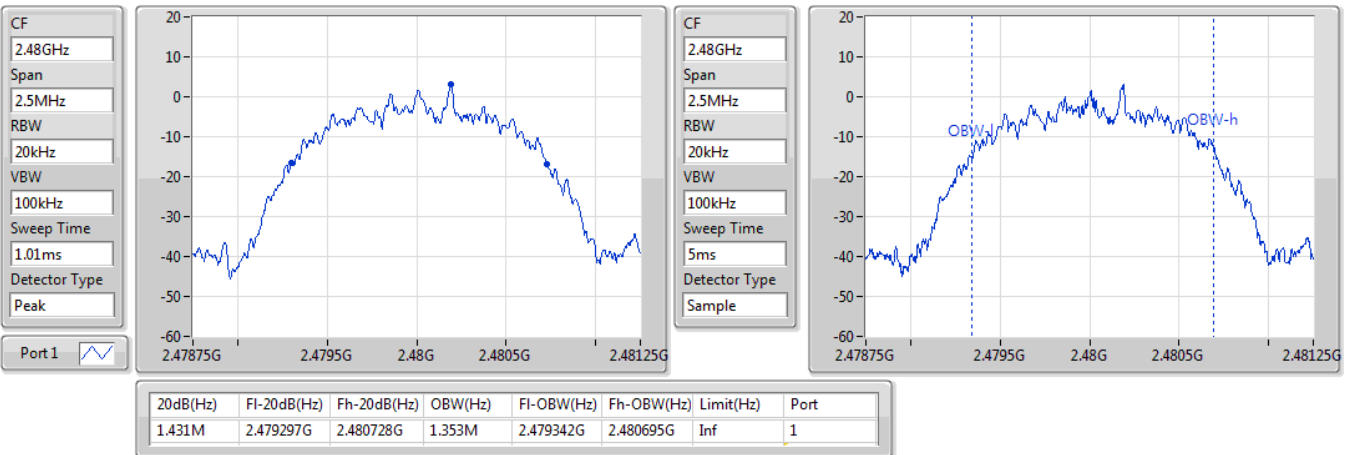
2441MHz



BT-EDR(2Mbps)

EBW-FS

2480MHz

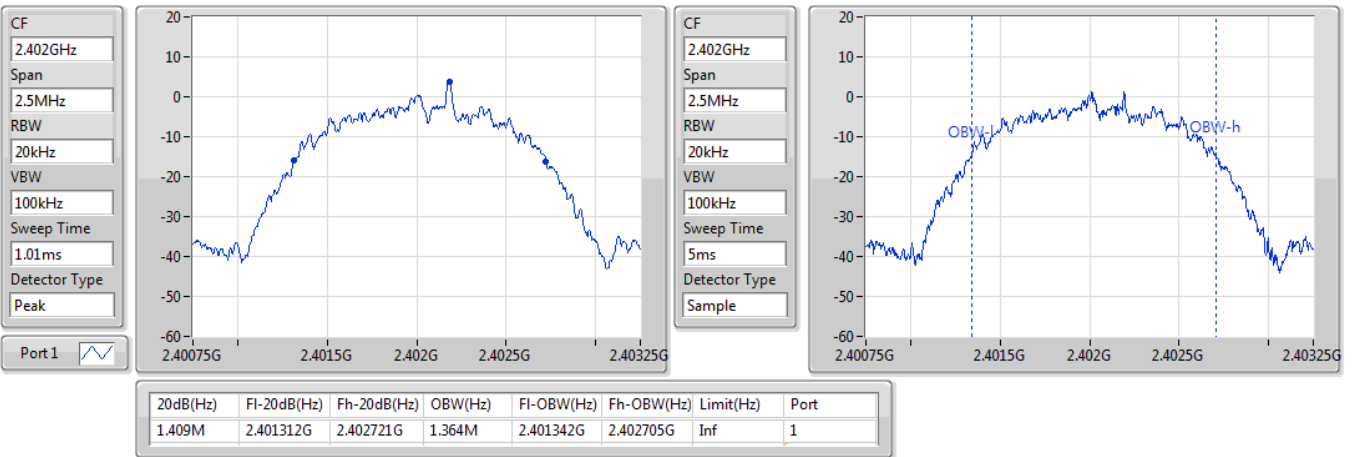




BT-EDR(3Mbps)

EBW-FS

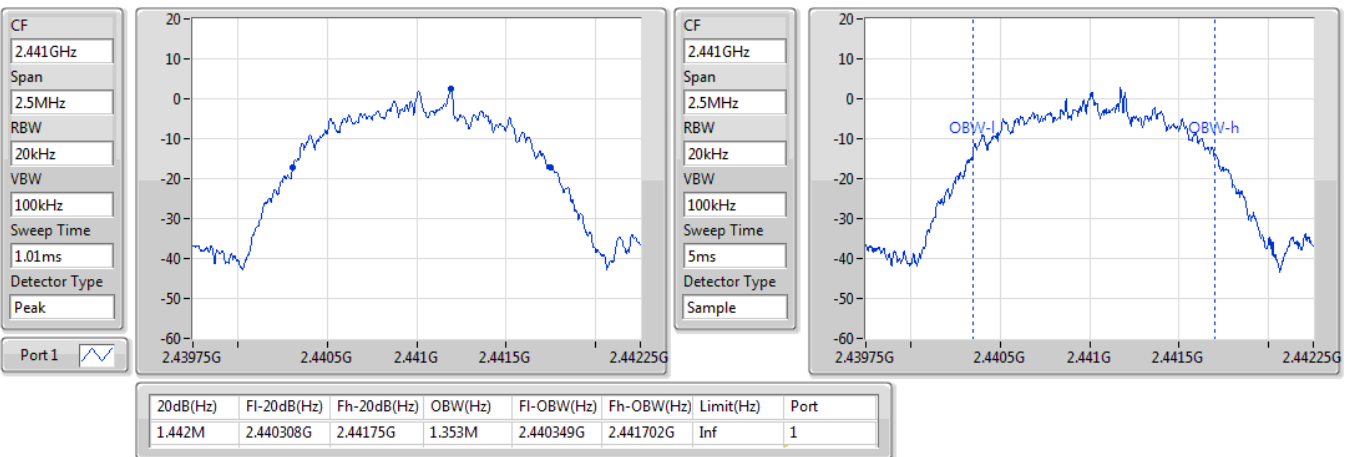
2402MHz

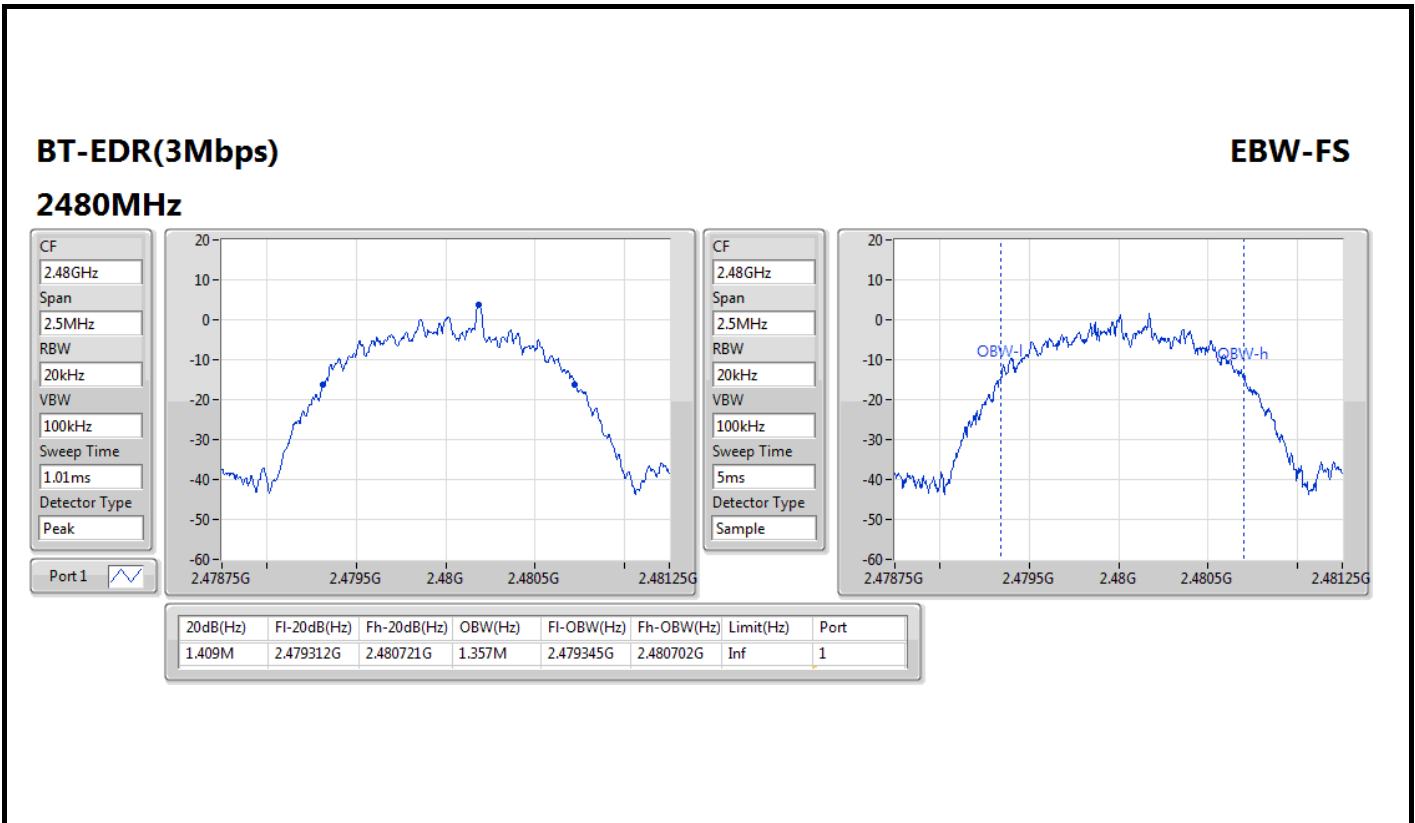


BT-EDR(3Mbps)

EBW-FS

2441MHz







Summary

Mode	Max-Space (Hz)	Min-Space (Hz)
2.4-2.4835GHz	-	-
BT-BR(1Mbps)	1.004348M	1M
BT-EDR(2Mbps)	1.004348M	1M
BT-EDR(3Mbps)	1.004348M	1M

Result

Mode	Result	Fl (Hz)	Fh (Hz)	Ch.Space (Hz)	Limit (Hz)
BT-BR(1Mbps)	-	-	-	-	-
2402MHz	Pass	2.402178G	2.403178G	1M	620.151894k
2441MHz	Pass	2.441183G	2.442187G	1.004348M	620.151894k
2480MHz	Pass	2.479187G	2.480187G	1M	622.565478k
BT-EDR(2Mbps)	-	-	-	-	-
2402MHz	Pass	2.402183G	2.403187G	1.004348M	953.046k
2441MHz	Pass	2.441187G	2.442187G	1M	945.72k
2480MHz	Pass	2.479187G	2.480187G	1M	953.046k
BT-EDR(3Mbps)	-	-	-	-	-
2402MHz	Pass	2.402178G	2.403178G	1M	938.394k
2441MHz	Pass	2.441183G	2.442183G	1M	960.372k
2480MHz	Pass	2.479183G	2.480187G	1.004348M	938.394k



BT-BR(1Mbps)

Channel Separation-FS

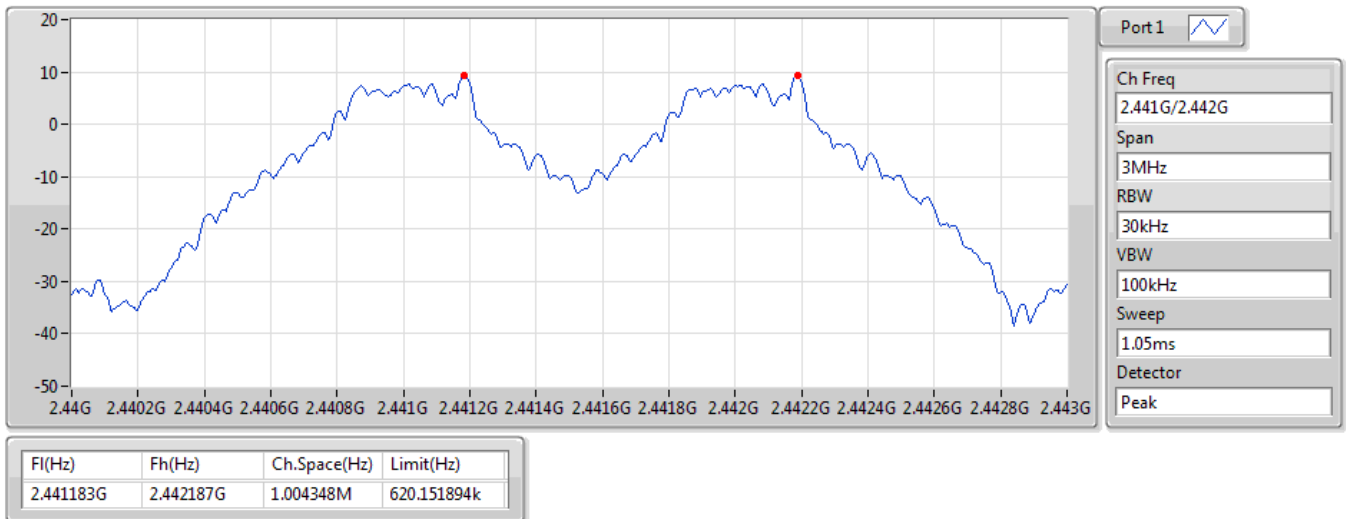
2.402G/2.403GHz



BT-BR(1Mbps)

Channel Separation-FS

2.441G/2.442GHz





BT-BR(1Mbps)

Channel Separation-FS

2.48G/2.479GHz



Port 1

Ch Freq
2.48G/2.479G

Span
3MHz

RBW
30kHz

VBW
100kHz

Sweep
1.05ms

Detector
Peak

F1(Hz)	Fh(Hz)	Ch.Space(Hz)	Limit(Hz)
2.479187G	2.480187G	1M	622.565478k

BT-EDR(2Mbps)

Channel Separation-FS

2.402G/2.403GHz



Port 1

Ch Freq
2.402G/2.403G

Span
3MHz

RBW
30kHz

VBW
100kHz

Sweep
1.05ms

Detector
Peak

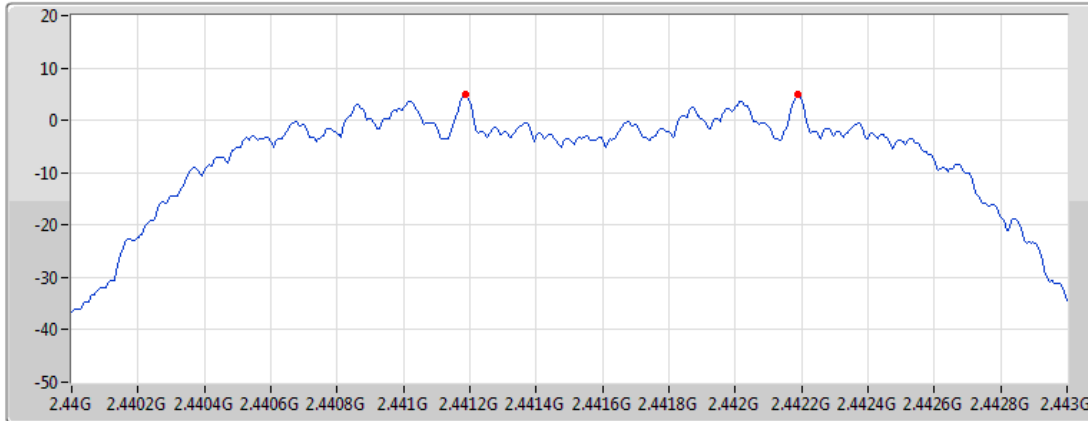
F1(Hz)	Fh(Hz)	Ch.Space(Hz)	Limit(Hz)
2.402183G	2.403187G	1.004348M	953.046k



BT-EDR(2Mbps)

Channel Separation-FS

2.441G/2.442GHz



Port 1

Ch Freq
2.441G/2.442G

Span
3MHz

RBW
30kHz

VBW
100kHz

Sweep
1.05ms

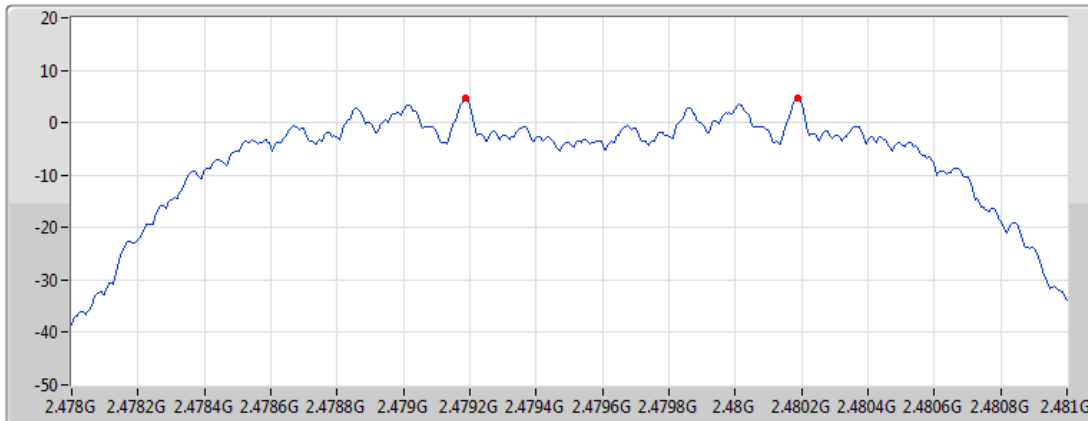
Detector
Peak

F1(Hz)	Fh(Hz)	Ch.Space(Hz)	Limit(Hz)
2.441187G	2.442187G	1M	945.72k

BT-EDR(2Mbps)

Channel Separation-FS

2.48G/2.479GHz



Port 1

Ch Freq
2.48G/2.479G

Span
3MHz

RBW
30kHz

VBW
100kHz

Sweep
1.05ms

Detector
Peak

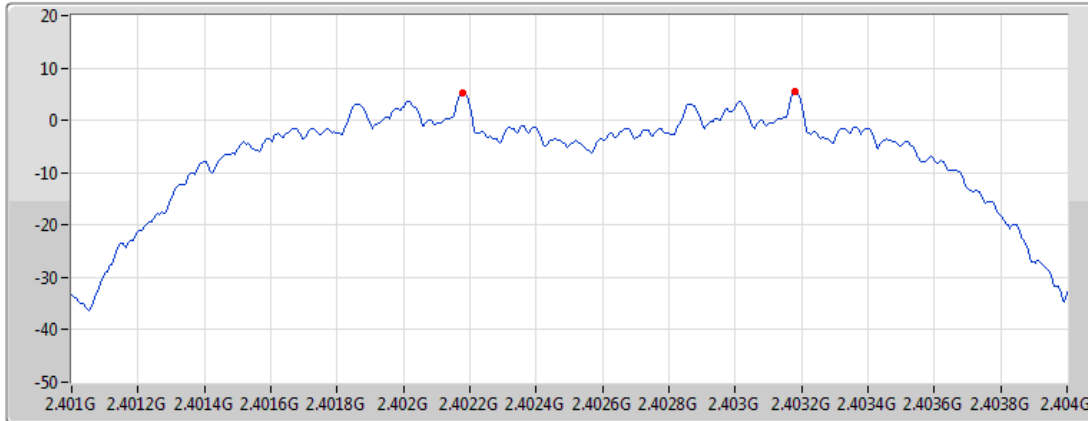
F1(Hz)	Fh(Hz)	Ch.Space(Hz)	Limit(Hz)
2.479187G	2.480187G	1M	953.046k



BT-EDR(3Mbps)

Channel Separation-FS

2.402G/2.403GHz



Port 1

Ch Freq
2.402G/2.403G

Span
3MHz

RBW
30kHz

VBW
100kHz

Sweep
1.05ms

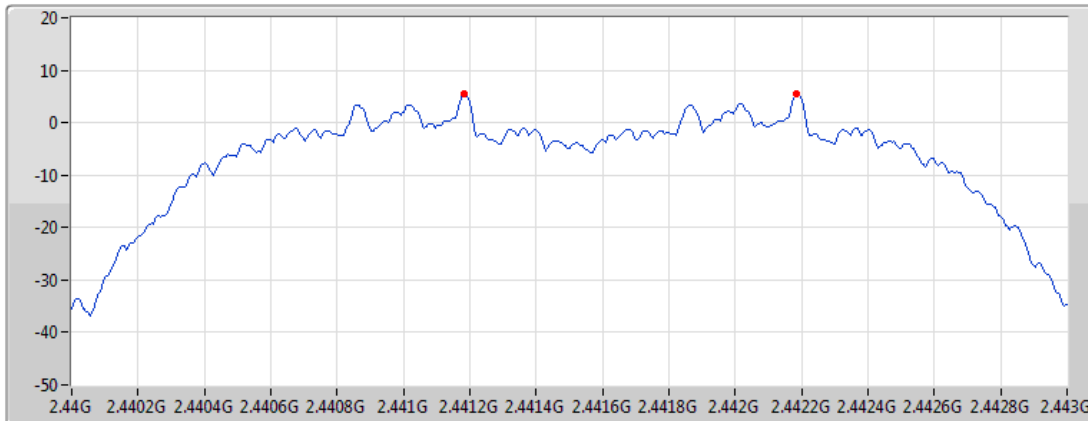
Detector
Peak

Ff(Hz)	Fh(Hz)	Ch.Space(Hz)	Limit(Hz)
2.402178G	2.403178G	1M	938.394k

BT-EDR(3Mbps)

Channel Separation-FS

2.441G/2.442GHz



Port 1

Ch Freq
2.441G/2.442G

Span
3MHz

RBW
30kHz

VBW
100kHz

Sweep
1.05ms

Detector
Peak

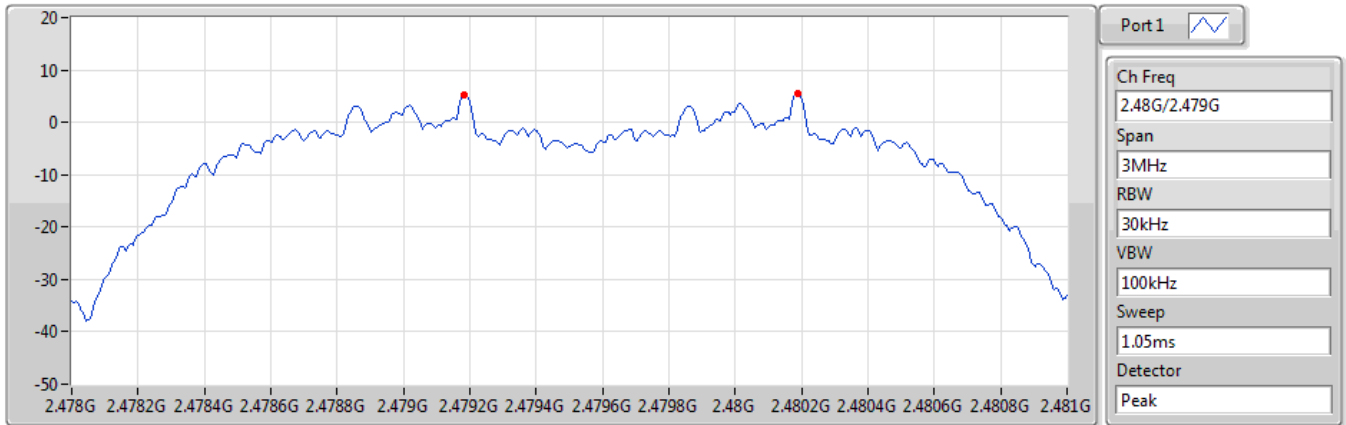
Ff(Hz)	Fh(Hz)	Ch.Space(Hz)	Limit(Hz)
2.441183G	2.442183G	1M	960.372k



BT-EDR(3Mbps)

Channel Separation-FS

2.48G/2.479GHz



F1(Hz)	Fh(Hz)	Ch.Space(Hz)	Limit(Hz)
2.479183G	2.480187G	1.004348M	938.394k



Summary

Mode	Max-Dwell (s)
2.4-2.4835GHz	-
BT-BR(1Mbps)	310.42102m_DH5
BT-EDR(2Mbps)	310.85078m_DH5
BT-EDR(3Mbps)	311.06566m_DH5
BT-BR-AFH(1Mbps)	312.012m_DH5-AFH
BT-EDR-AFH(2Mbps)	289.325m_DH5-AFH
BT-EDR-AFH(3Mbps)	289.525m_DH5-AFH



Result/ Non AFH mode

Mode	Result	Period (s)	Dwell (s)	Limit (s)	Tx On (ms)	Number of transmission in a 5 s
BT-BR(1Mbps)	-	-	-	-	-	-
2402MHz_DH5	PASS	31.6	0.31042	0.4	2.88925	17
BT-EDR(2Mbps)	-	-	-	-	-	-
2402MHz_DH5	PASS	31.6	0.31085	0.4	2.89325	17
BT-EDR(3Mbps)	-	-	-	-	-	-
2402MHz_DH5	PASS	31.6	0.31107	0.4	2.89525	17

Note 1: Dwell time =Number of transmission in a 5 second x Tx On
Time x 6.32

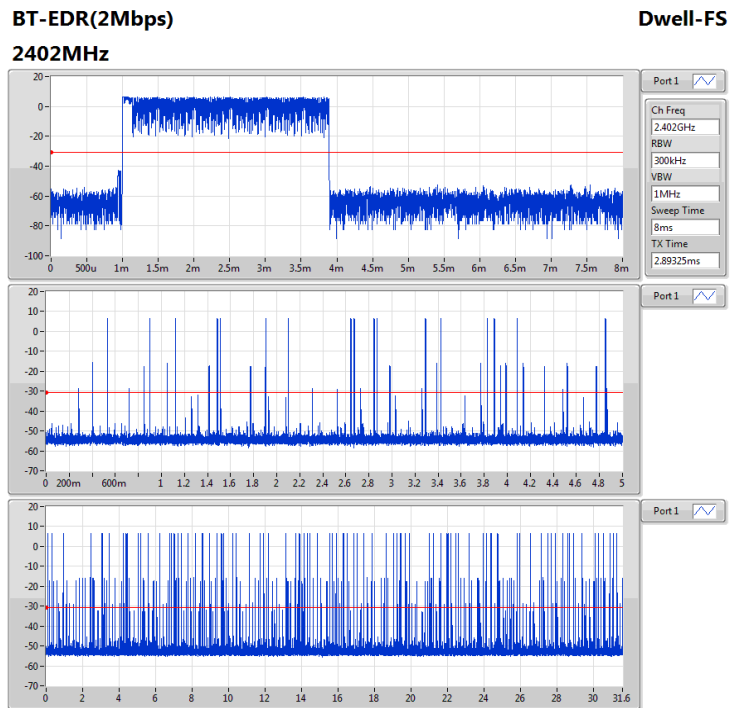
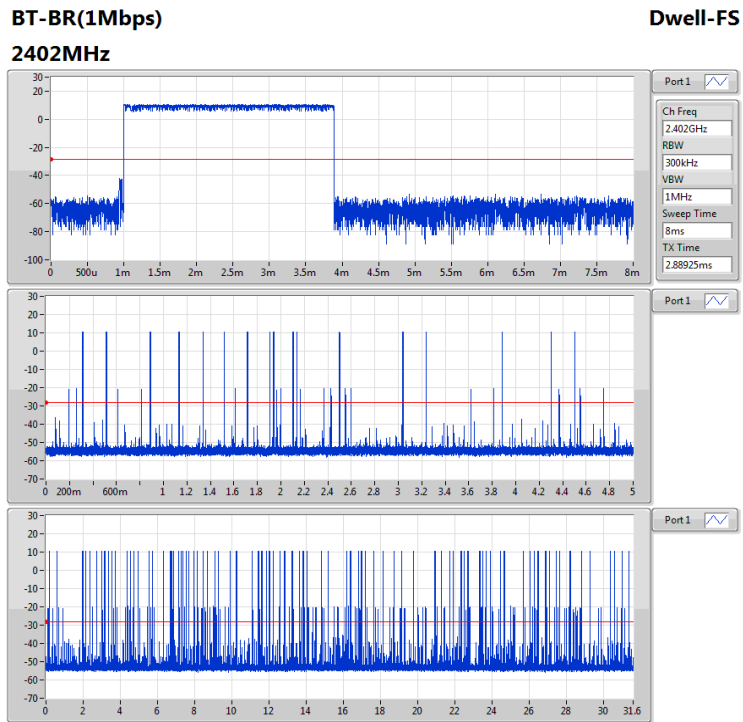
Note 2: DH5 was the worst mode.

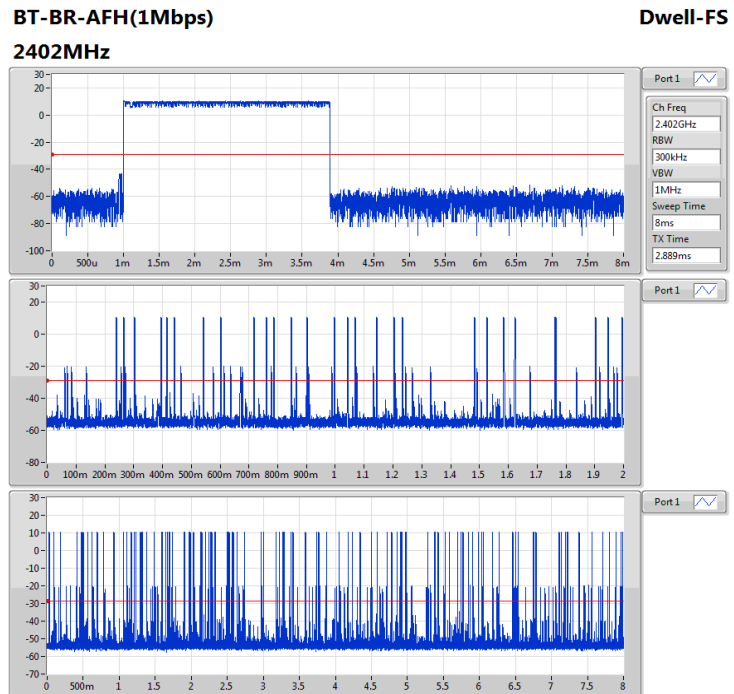
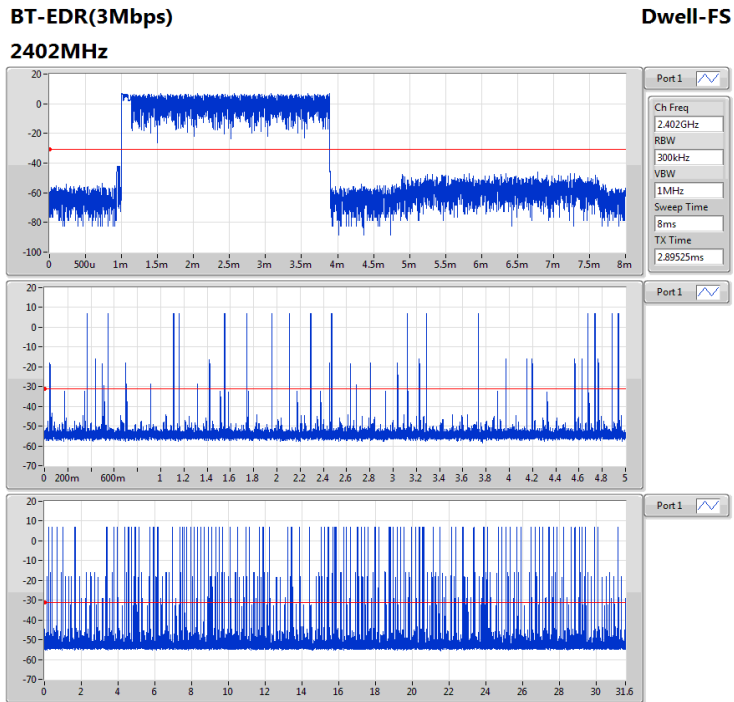
Result/ AFH mode

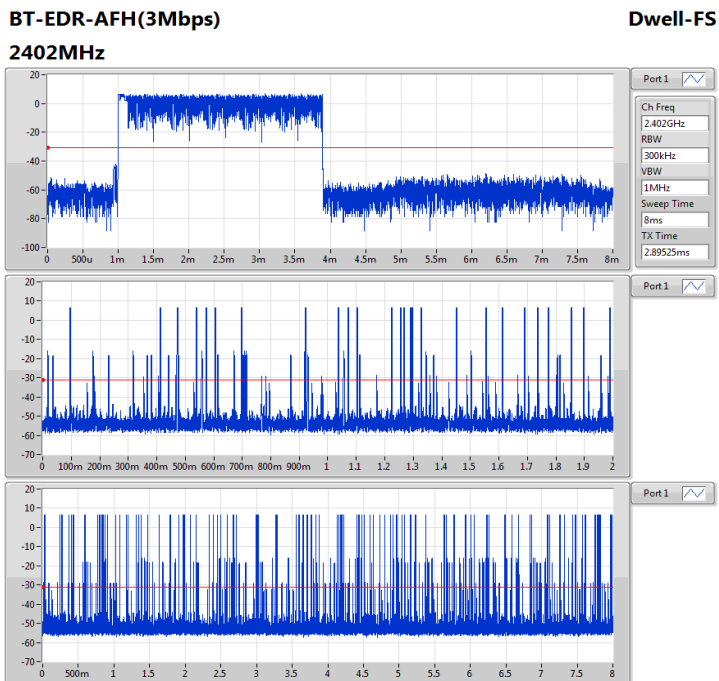
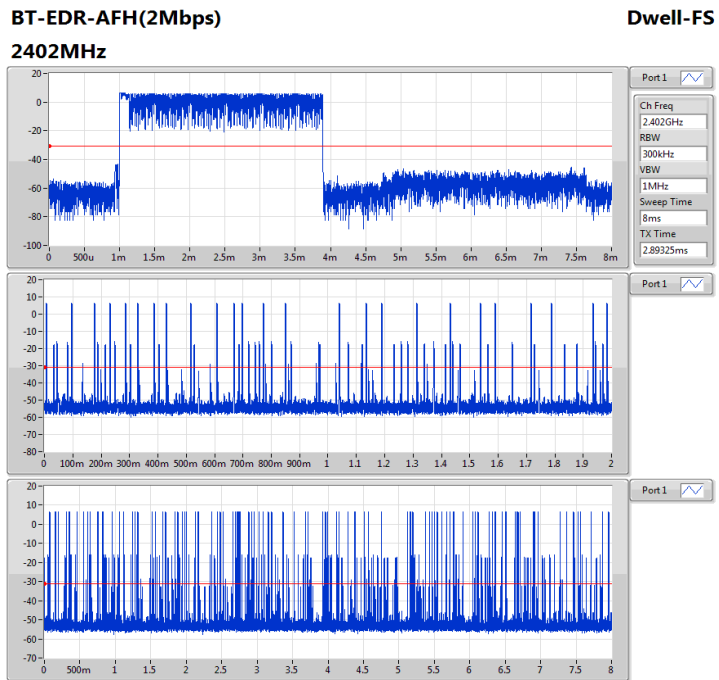
Mode	Result	Period (s)	Dwell (s)	Limit (s)	Tx On (ms)	Number of transmission in a 2 s
BT-BR-AFH(1Mbps)	-	-	-	-	-	-
2402MHz_DH5	PASS	8	0.31201	0.4	2.88900	27
BT-EDR-AFH(2Mbps)	-	-	-	-	-	-
2402MHz_DH5	PASS	8	0.28933	0.4	2.89325	25
BT-EDR-AFH(3Mbps)	-	-	-	-	-	-
2402MHz_DH5	PASS	8	0.28953	0.4	2.89525	25

Note 1: Dwell time =Number of transmission in a 2 second x Tx On
Time x 4

Note 2: DH5 was the worst mode.



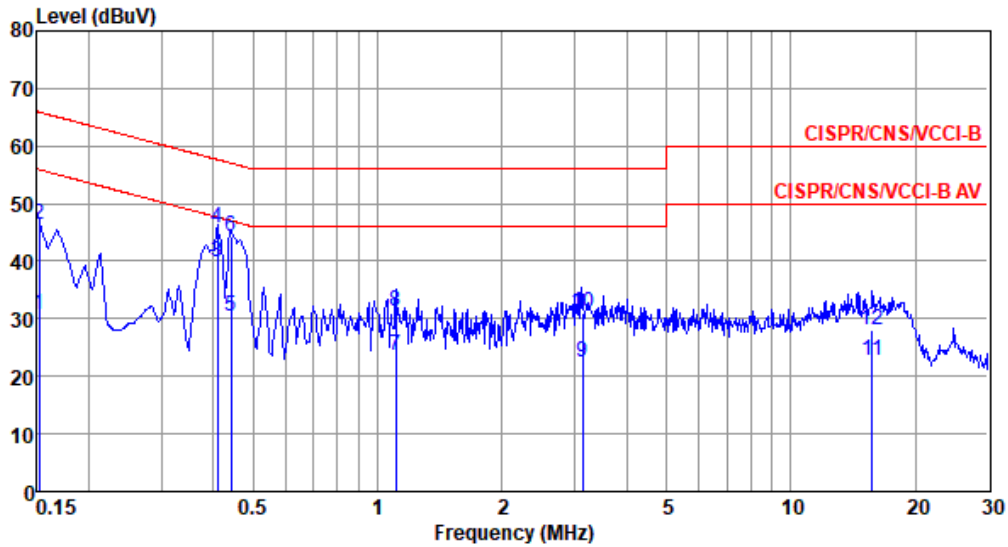






Modulation	GFSK	Test Freq. (MHz)	2441
Power Phase	Line		

Test by : Joe Liao Temperature: 19°C Humidity: 62%



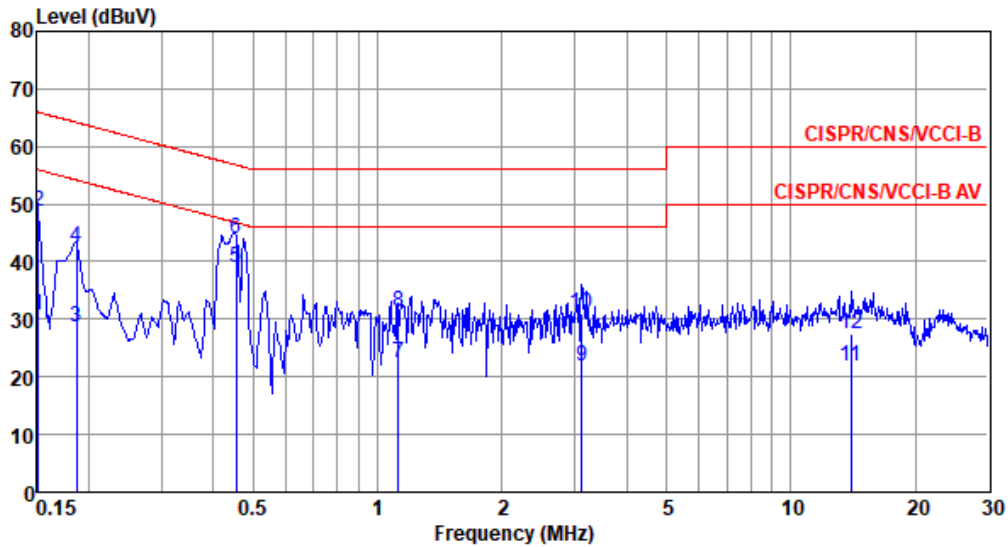
	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Aux dB	Remark
1	0.152	30.64	55.91	-25.27	20.88	9.68	0.08	0.00	Average
2	0.152	46.26	65.91	-19.65	36.50	9.68	0.08	0.00	QP
3*	0.410	39.79	47.64	-7.85	30.04	9.67	0.08	0.00	Average
4	0.410	45.74	57.64	-11.90	35.99	9.67	0.08	0.00	QP
5	0.441	30.55	47.04	-16.49	20.79	9.67	0.09	0.00	Average
6	0.441	44.23	57.04	-12.81	34.47	9.67	0.09	0.00	QP
7	1.106	23.52	46.00	-22.48	13.67	9.68	0.17	0.00	Average
8	1.106	31.15	56.00	-24.85	21.30	9.68	0.17	0.00	QP
9	3.140	22.40	46.00	-23.60	12.49	9.70	0.21	0.00	Average
10	3.140	31.06	56.00	-24.94	21.15	9.70	0.21	0.00	QP
11	15.718	22.72	50.00	-27.28	12.42	9.73	0.57	0.00	Average
12	15.718	28.04	60.00	-31.96	17.74	9.73	0.57	0.00	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB) + Aux (dB).
 Note 2: Over Limit (dB) = Level (dBuV) - Limit Line (dBuV).



Modulation	GFSK	Test Freq. (MHz)	2441
Power Phase	Neutral		

Test by : Joe Liao Temperature: 19°C Humidity: 62%



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Aux dB	Remark
1	0.151	30.62	55.96	-25.34	20.93	9.61	0.08	0.00	Average
2	0.151	48.72	65.96	-17.24	39.03	9.61	0.08	0.00	QP
3	0.186	28.66	54.20	-25.54	18.97	9.61	0.08	0.00	Average
4	0.186	42.55	64.20	-21.65	32.86	9.61	0.08	0.00	QP
5*	0.455	38.99	46.79	-7.80	29.29	9.61	0.09	0.00	Average
6	0.455	43.97	56.79	-12.82	34.27	9.61	0.09	0.00	QP
7	1.123	22.53	46.00	-23.47	12.75	9.61	0.17	0.00	Average
8	1.123	31.40	56.00	-24.60	21.62	9.61	0.17	0.00	QP
9	3.123	21.77	46.00	-24.23	11.93	9.63	0.21	0.00	Average
10	3.123	31.01	56.00	-24.99	21.17	9.63	0.21	0.00	QP
11	13.989	21.88	50.00	-28.12	11.60	9.74	0.54	0.00	Average
12	13.989	27.44	60.00	-32.56	17.16	9.74	0.54	0.00	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB) + Aux (dB).
 Note 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).