

FCC Test Report

FCC ID : ACQ-STREAMTV
Equipment : Stream TV
Model No. : Stream TV
Brand Name : Verizon
Applicant : ARRIS
Address : 101 Tournament Drive, Horsham
Pennsylvania, United States,19044
Standard : 47 CFR FCC Part 15.247
Received Date : Mar. 11, 2021
Tested Date : Mar. 17 ~ Apr. 20, 2021

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 may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:


Along Chen / Assistant Manager

Approved by:


Gary Chang / Manager



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Release Record

Report No.	Version	Description	Issued Date
FR131101AD	Rev. 01	Initial issue	May 13, 2021

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.611MHz 44.40 (Margin -1.60dB) - AV	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 31.22MHz 36.28 (Margin -3.72dB) - PK	Pass
15.247(d)	Band Edge	Meet the requirement of limit	Pass
15.247(b)(1)	Conducted Output Power	Power [dBm]: 5.10	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

1.1.1 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	2402-2480	0-78 [79]	1 Mbps
2400-2483.5	EDR	2402-2480	0-78 [79]	2 Mbps
2400-2483.5	EDR	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.

1.1.2 Antenna Details

Ant. No.	Type	Connector	Gain (dBi)	Remarks
1	Chip	N/A	2.7	---

1.1.3 USB chip

Two sources for USB chip

Source 1	IC PER 3.3V SMD QFN24 GP USB HUB Brand: GENESYS Model: GL852G
Source 2	IC PER 3.3V SMD QFN24 GP USB HUB Brand: GENESYS Model: GL850G

1.1.4 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	5Vdc from adapter
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1.1.5 Accessories

Accessories		
No.	Equipment	Description
1	AC adapter	Brand: KUANTECH Model: KSC-10C-050200HU I/P: 100-120Vac, 47-63Hz, 0.3A O/P: 5Vdc, 2A Power Line: 1m non-shielded without core (USB-C cable)
2	HDMI	0.95m non-shielded without core
3	Remote control	Model: RC4513101/01BRP Brand: Verizon

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	Tera Term V4.66	
Modulation Mode	Duty Cycle Of Test Signal (%)	Duty Factor (dB)
DH5	78.08%	1.07
2DH5	77.61%	1.10
3DH5	76.45%	1.17

1.1.8 Power Index of Test Tool

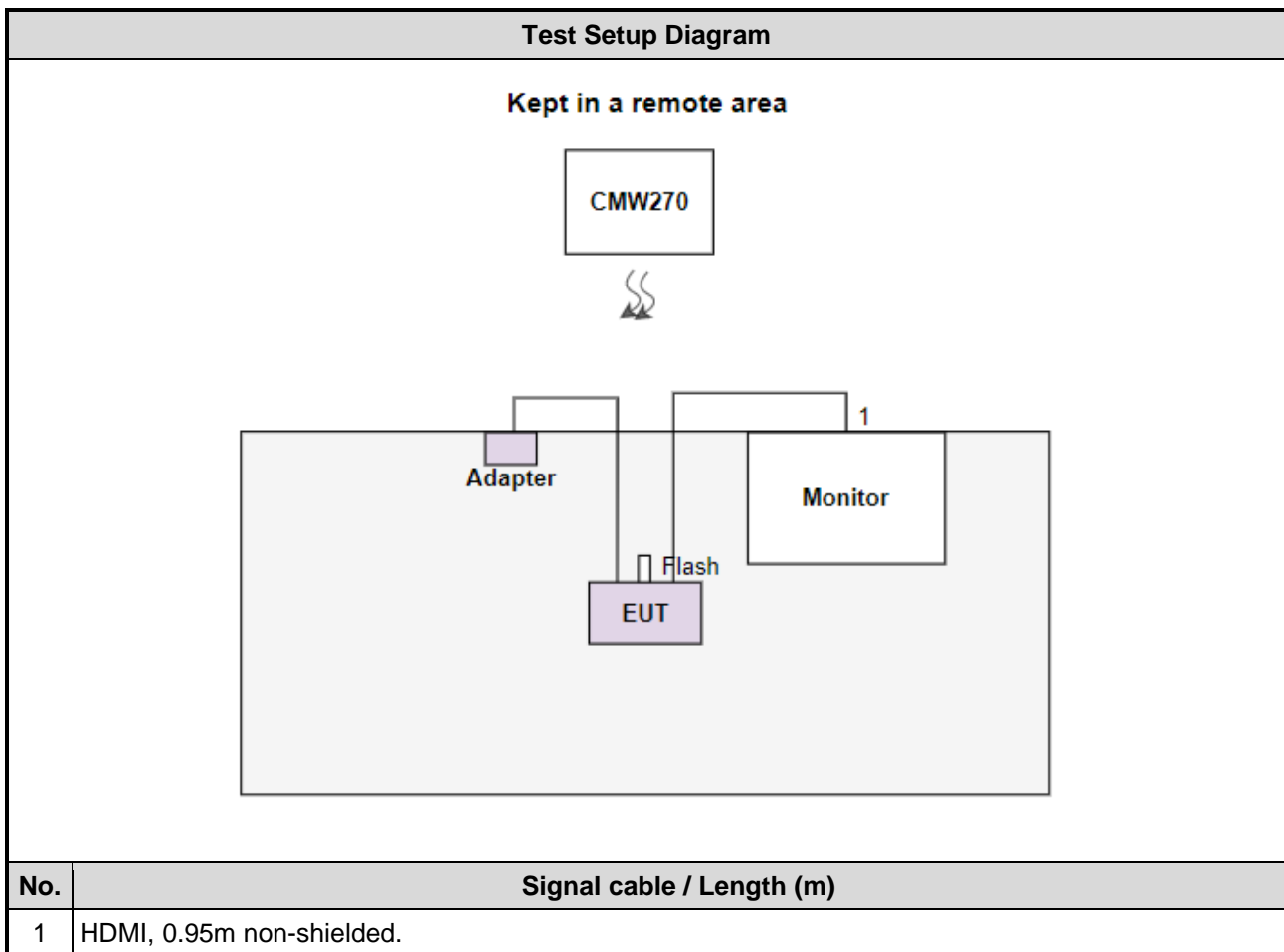
Modulation Mode	Test Frequency (MHz)		
	2402	2441	2480
GFSK/1Mbps	09 00 00	09 00 00	09 00 00
$\pi/4$ -DQPSK /2Mbps	09 00 00	09 00 00	09 00 00
8DPSK/3Mbps	09 00 00	09 00 00	09 00 00

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Remarks
1	LCD Monitor	ASUS	MX27UCS	---	---
2	USB 3.0 flash	Transcend	JetFlash 700	---	---
3	Notebook	DELL	Latitude E5470	DoC	---

Note: The support notebook is connected to EUT via fixture and is disconnected from EUT and removed from test table after sending RF command to control EUT to transmit continuously.

1.3 Test Setup Chart



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	Apr. 16 ~ Apr. 20, 2021				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101658	Feb. 08, 2021	Feb. 07, 2022
LISN	R&S	ENV216	101579	Mar. 17, 2021	Mar. 16, 2022
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 21, 2020	Oct. 20, 2021
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	Mar. 17 ~ Apr. 14, 2021				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101658	Feb. 08, 2021	Feb. 07, 2022
Spectrum Analyzer	R&S	FSV40	101498	Dec. 04, 2020	Dec. 03, 2021
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 17, 2020	Nov. 16, 2021
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jul. 10, 2020	Jul. 09, 2021
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 11, 2020	Dec. 10, 2021
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 06, 2020	Nov. 05, 2021
Preamplifier	EMC	EMC02325	980225	Jul. 03, 2020	Jul. 02, 2021
Preamplifier	Agilent	83017A	MY39501308	Sep. 26, 2020	Sep. 25, 2021
Preamplifier	EMC	EMC184045B	980192	Jul. 21, 2020	Jul. 20, 2021
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 06, 2020	Oct. 05, 2021
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 06, 2020	Oct. 05, 2021
LF cable 11M	EMC	EMCCFD400-NW-N W-11000	200801	Oct. 06, 2020	Oct. 05, 2021
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	160502	Oct. 06, 2020	Oct. 05, 2021
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Oct. 06, 2020	Oct. 05, 2021
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Oct. 06, 2020	Oct. 05, 2021
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	Apr. 16, 2021				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Wireless connectivity tester	R&S	CMW270	100856	Nov. 02, 2020	Nov. 01, 2021
Spectrum Analyzer	R&S	FSV40	101063	Apr. 30, 2020	Apr. 29, 2021
Power Meter	Anritsu	ML2495A	1241002	Nov. 04, 2020	Nov. 03, 2021
Power Sensor	Anritsu	MA2411B	1207366	Nov. 04, 2020	Nov. 03, 2021
Measurement Software	-	SENSE-15247_FS	V5.10.7.11	NA	NA
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
Radiated emission ≤ 1 GHz	± 3.41 dB
Radiated emission > 1 GHz	± 4.59 dB
Time	$\pm 0.1\%$

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
Conducted Emissions Radiated Emissions ≤ 1GHz	8DPSK	2480	3Mbps	1, 2
Radiated Emissions > 1GHz	GFSK 8DPSK	2402, 2441, 2480 2402, 2441, 2480	1Mbps 3Mbps	1
Conducted Output Power	GFSK π/4 DQPSK 8DPSK	2402, 2441, 2480 2402, 2441, 2480 2402, 2441, 2480	1Mbps 2Mbps 3Mbps	1
Number of Hopping Channels	GFSK π/4 DQPSK 8DPSK	2402~2480 2402~2480 2402~2480	1Mbps 2Mbps 3Mbps	1
Hopping Channel Separation 20dB and Occupied bandwidth	GFSK π/4 DQPSK 8DPSK	2402, 2441, 2480 2402, 2441, 2480 2402, 2441, 2480	1Mbps 2Mbps 3Mbps	1
Dwell Time	GFSK π/4 DQPSK 8DPSK	2402 2402 2402	1Mbps 2Mbps 3Mbps	1

NOTE:

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **X-plane** results were found as the worst case and were shown in this report.
2. There are two USB chips provided for the test:
Test Configuration 1: USB chip 1, model GL852G
Test Configuration 2: USB chip 2, model GL850G

3 Transmitter Test Results

3.1 Conducted Emissions

3.1.1 Limit of Conducted Emissions

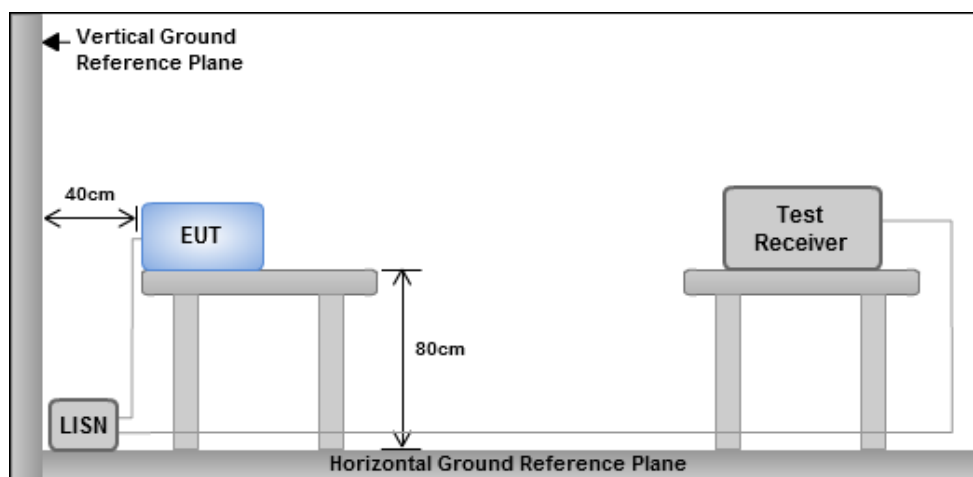
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

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

3.1.2 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

3.1.3 Test Setup

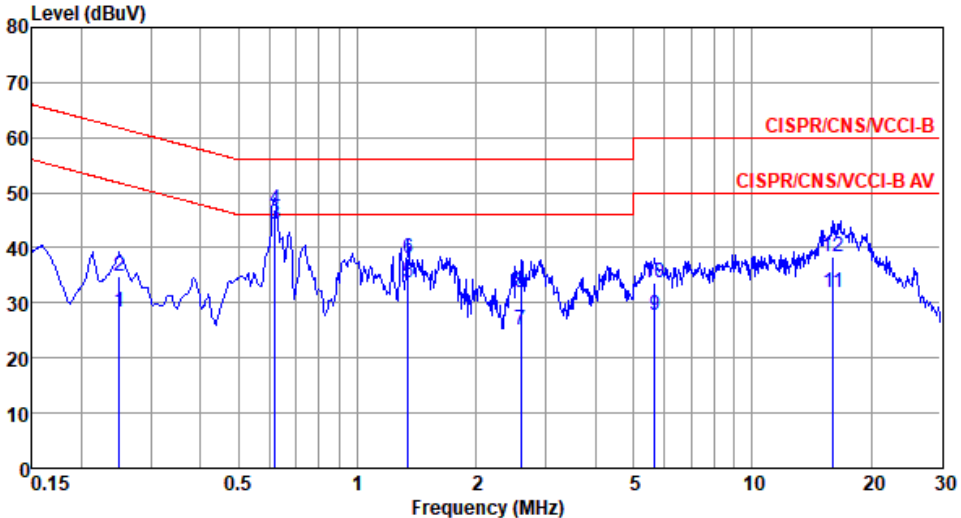


- Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 Test Result of Conducted Emissions

Modulation Mode	8DPSK	Test Freq. (MHz)	2480
Power Phase	Line	Test Configuration	1

Test by : Alex Tsai Temperature: 22°C Humidity: 60%



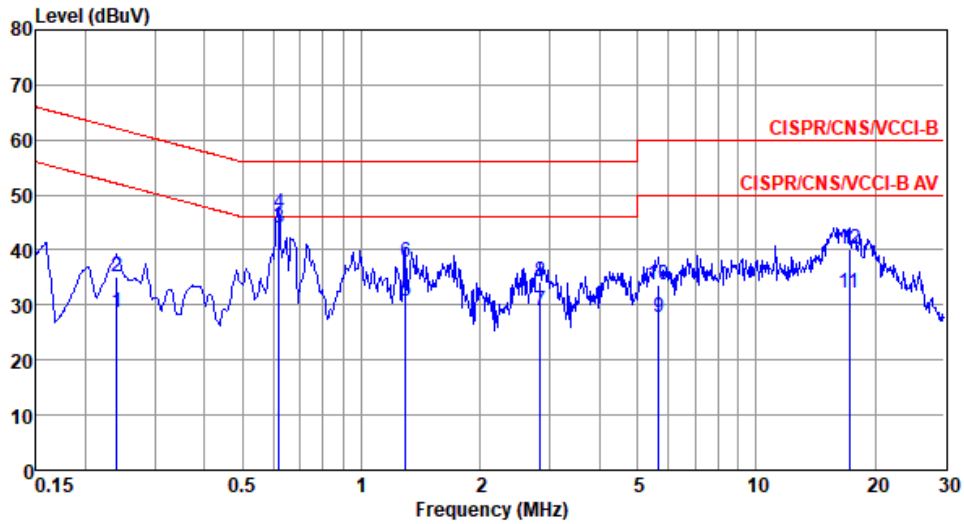
The graph shows the conducted emission level in dBuV versus frequency in MHz. The y-axis ranges from 0 to 80 dBuV, and the x-axis ranges from 0.15 to 30 MHz. Two red lines represent the CISPR/CNS/VCCI-B and CISPR/CNS/VCCI-B AV limits. A blue line shows the measured emission level, which generally stays below the limits but has several peaks, notably around 0.6 MHz and 16 MHz.

	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Remark
1	0.249	28.48	51.78	-23.30	18.55	9.86	0.07	Average
2	0.249	34.76	61.78	-27.02	24.83	9.86	0.07	QP
3*	0.617	44.15	46.00	-1.85	34.11	9.94	0.10	Average
4	0.617	46.82	56.00	-9.18	36.78	9.94	0.10	QP
5	1.345	33.72	46.00	-12.28	23.58	9.99	0.15	Average
6	1.345	38.20	56.00	-17.80	28.06	9.99	0.15	QP
7	2.594	25.24	46.00	-20.76	15.01	10.01	0.22	Average
8	2.594	31.85	56.00	-24.15	21.62	10.01	0.22	QP
9	5.653	27.75	50.00	-22.25	17.35	10.07	0.33	Average
10	5.653	33.78	60.00	-26.22	23.38	10.07	0.33	QP
11	16.055	31.76	50.00	-18.24	20.93	10.21	0.62	Average
12	16.055	38.40	60.00	-21.60	27.57	10.21	0.62	QP

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

Modulation Mode	8DPSK	Test Freq. (MHz)	2480
Power Phase	Neutral	Test Configuration	1

Test by : Alex Tsai Temperature: 22°C Humidity: 60%

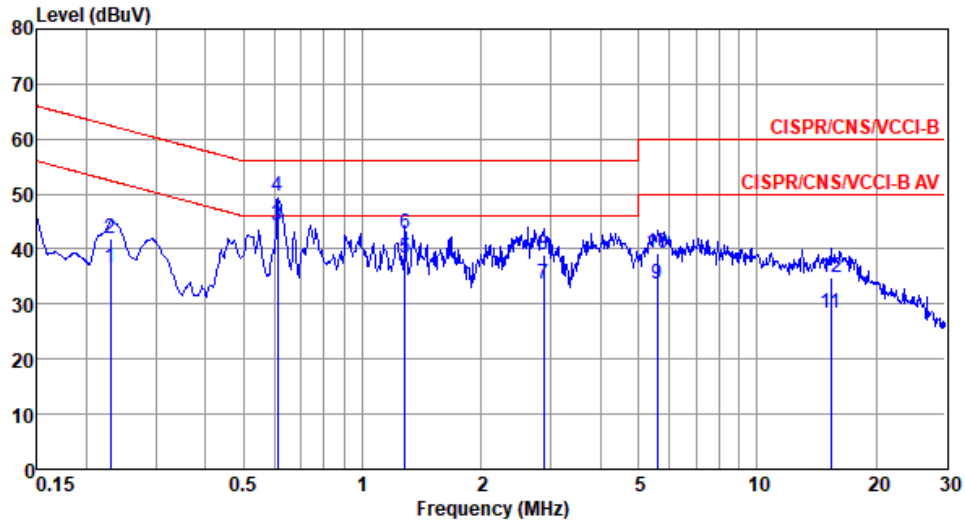


	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Remark
1	0.240	28.52	52.08	-23.56	18.61	9.84	0.07	Average
2	0.240	34.99	62.08	-27.09	25.08	9.84	0.07	QP
3*	0.617	43.92	46.00	-2.08	33.96	9.86	0.10	Average
4	0.617	46.71	56.00	-9.29	36.75	9.86	0.10	QP
5	1.296	30.80	46.00	-15.20	20.75	9.91	0.14	Average
6	1.296	37.65	56.00	-18.35	27.60	9.91	0.14	QP
7	2.839	29.00	46.00	-17.00	18.80	9.96	0.24	Average
8	2.839	34.25	56.00	-21.75	24.05	9.96	0.24	QP
9	5.653	27.88	50.00	-22.12	17.54	10.01	0.33	Average
10	5.653	33.53	60.00	-26.47	23.19	10.01	0.33	QP
11	17.199	32.23	50.00	-17.77	21.33	10.27	0.63	Average
12	17.199	40.17	60.00	-19.83	29.27	10.27	0.63	QP

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

Modulation Mode	8DPSK	Test Freq. (MHz)	2480
Power Phase	Line	Test Configuration	2

Test by : Alex Tsai Temperature: 20°C Humidity: 66%

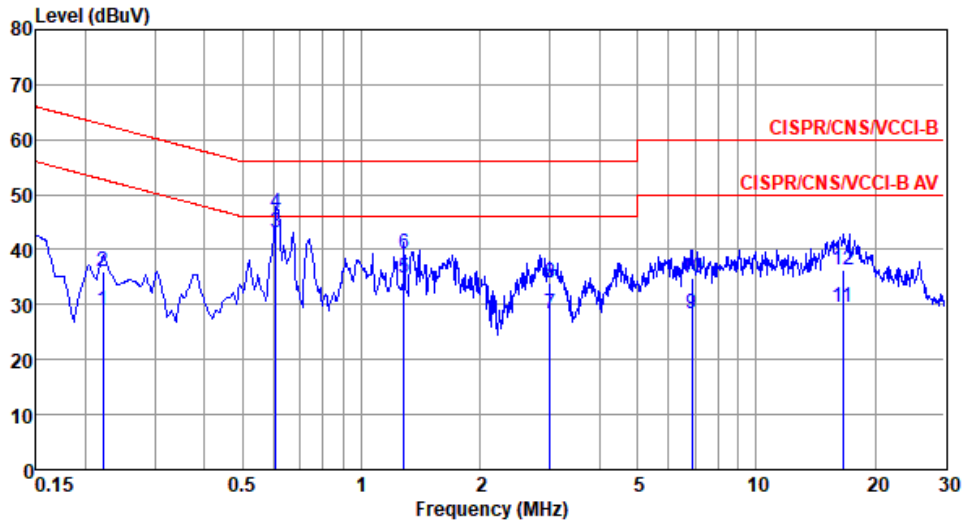


	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Remark
1	0.230	36.53	52.44	-15.91	26.62	9.85	0.06	Average
2	0.230	42.05	62.44	-20.39	32.14	9.85	0.06	QP
3*	0.611	44.40	46.00	-1.60	34.36	9.94	0.10	Average
4	0.611	49.58	56.00	-6.42	39.54	9.94	0.10	QP
5	1.282	38.47	46.00	-7.53	28.34	9.99	0.14	Average
6	1.282	42.76	56.00	-13.24	32.63	9.99	0.14	QP
7	2.884	33.56	46.00	-12.44	23.30	10.02	0.24	Average
8	2.884	38.97	56.00	-17.03	28.71	10.02	0.24	QP
9	5.594	33.58	50.00	-16.42	23.18	10.07	0.33	Average
10	5.594	39.24	60.00	-20.76	28.84	10.07	0.33	QP
11	15.388	28.41	50.00	-21.59	17.60	10.20	0.61	Average
12	15.388	34.79	60.00	-25.21	23.98	10.20	0.61	QP

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

Modulation Mode	8DPSK	Test Freq. (MHz)	2480
Power Phase	Neutral	Test Configuration	2

Test by : Alex Tsai Temperature: 20°C Humidity: 66%



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Remark
1	0.222	29.02	52.74	-23.72	19.13	9.83	0.06	Average
2	0.222	35.93	62.74	-26.81	26.04	9.83	0.06	QP
3*	0.608	43.08	46.00	-2.92	33.12	9.86	0.10	Average
4	0.608	46.68	56.00	-9.32	36.72	9.86	0.10	QP
5	1.282	34.77	46.00	-11.23	24.72	9.91	0.14	Average
6	1.282	39.19	56.00	-16.81	29.14	9.91	0.14	QP
7	3.009	28.45	46.00	-17.55	18.25	9.96	0.24	Average
8	3.009	33.88	56.00	-22.12	23.68	9.96	0.24	QP
9	6.878	28.27	50.00	-21.73	17.87	10.04	0.36	Average
10	6.878	34.93	60.00	-25.07	24.53	10.04	0.36	QP
11	16.573	29.59	50.00	-20.41	18.71	10.26	0.62	Average
12	16.573	36.32	60.00	-23.68	25.44	10.26	0.62	QP

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

3.2 Unwanted Emissions into Restricted Frequency Bands

3.2.1 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.

3.2.2 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

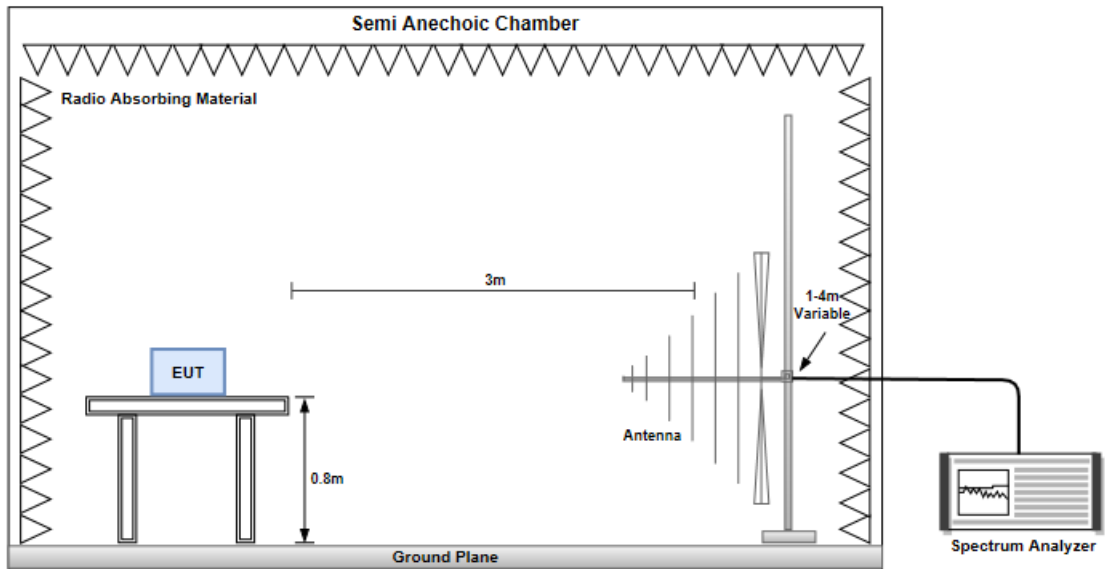
The average value is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula for DH5 packet type which has worst duty factor:

3.
$$20\log(\text{Duty cycle}) = 20\log \frac{1\text{s} / 1600 * 5}{100\text{ ms}} = -30.1\text{dB}$$

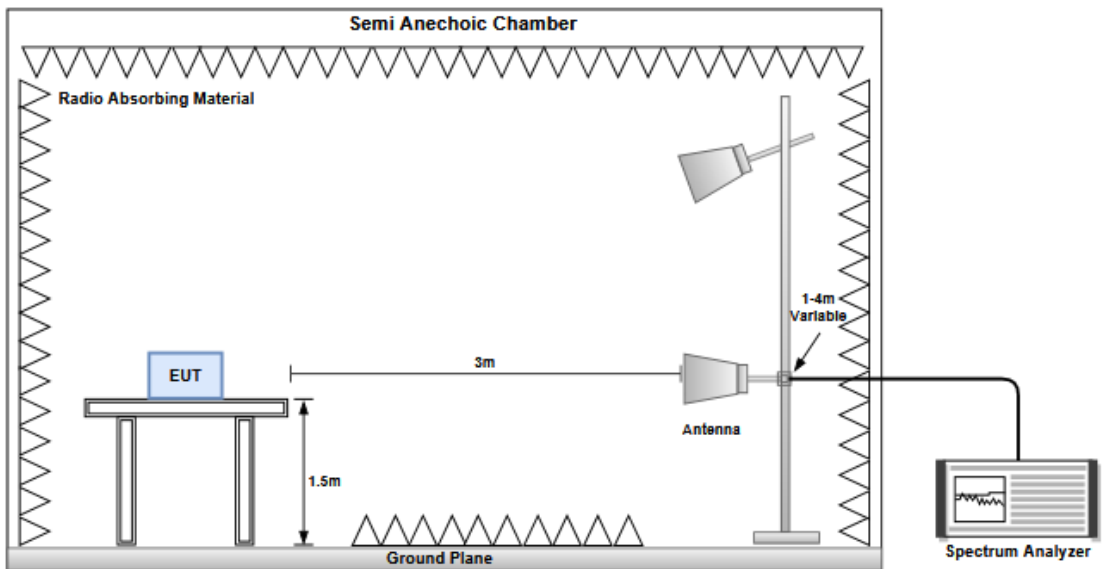
4. Radiated emission above 1GHz / Average value for other emissions
RBW=1MHz, VBW=1/T and Peak detector

3.2.3 Test Setup

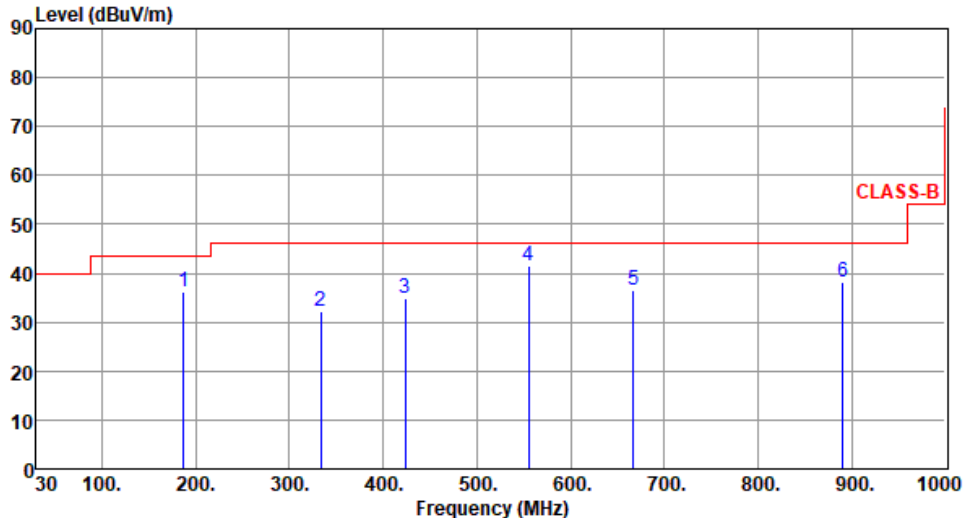
Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz

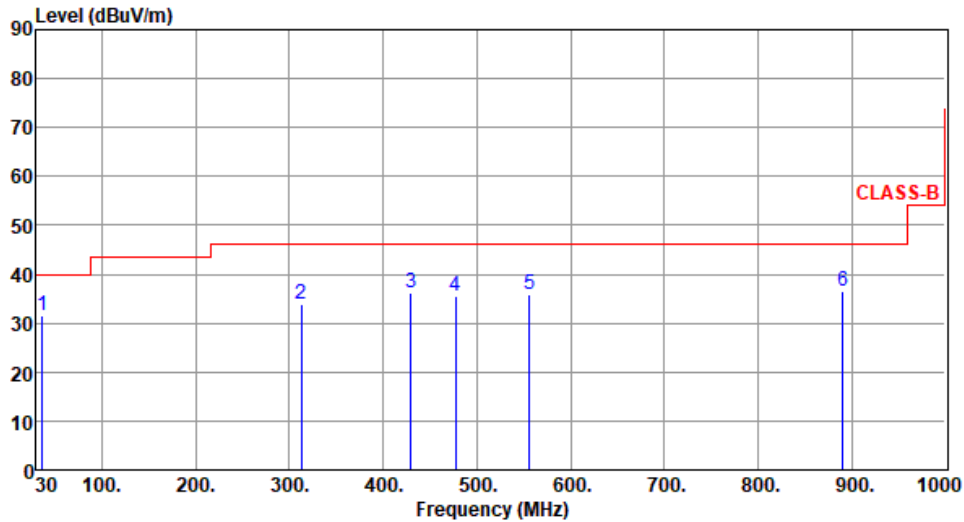


3.2.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	8DPSK	Test Freq. (MHz)	2480																																																																																																																										
Polarization	Horizontal	Test Configuration	1																																																																																																																										
Test By :Akun Chung Temperature(°C):22 Humidity(%):65																																																																																																																													
 <p>The graph plots Level (dBuV/m) on the y-axis (0 to 90) against Frequency (MHz) on the x-axis (30 to 1000). A red line represents the CLASS-B limit, which is constant at 46 dBuV/m from 30 MHz to 900 MHz and then rises to 75 dBuV/m at 1000 MHz. Six blue vertical lines indicate emission peaks at 187.36, 333.65, 423.45, 555.44, 666.97, and 890.48 MHz.</p>																																																																																																																													
	<table border="1"> <thead> <tr> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> </tr> </thead> <tbody> <tr> <td>187.36</td> <td>333.65</td> <td>423.45</td> <td>555.44</td> <td>666.97</td> <td>890.48</td> </tr> <tr> <td>36.18</td> <td>32.08</td> <td>34.88</td> <td>41.45</td> <td>36.44</td> <td>38.04</td> </tr> <tr> <td>43.50</td> <td>46.00</td> <td>46.00</td> <td>46.00</td> <td>46.00</td> <td>46.00</td> </tr> <tr> <td>-7.32</td> <td>-13.92</td> <td>-11.12</td> <td>-4.55</td> <td>-9.56</td> <td>-7.96</td> </tr> <tr> <td>47.34</td> <td>39.19</td> <td>39.96</td> <td>43.66</td> <td>36.61</td> <td>34.41</td> </tr> <tr> <td>-11.16</td> <td>-7.11</td> <td>-5.08</td> <td>-2.21</td> <td>-0.17</td> <td>3.63</td> </tr> <tr> <td>Peak</td> <td>Peak</td> <td>Peak</td> <td>Peak</td> <td>Peak</td> <td>Peak</td> </tr> <tr> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> </tr> <tr> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> </tr> </tbody> </table>	1	2	3	4	5	6	187.36	333.65	423.45	555.44	666.97	890.48	36.18	32.08	34.88	41.45	36.44	38.04	43.50	46.00	46.00	46.00	46.00	46.00	-7.32	-13.92	-11.12	-4.55	-9.56	-7.96	47.34	39.19	39.96	43.66	36.61	34.41	-11.16	-7.11	-5.08	-2.21	-0.17	3.63	Peak	Peak	Peak	Peak	Peak	Peak	---	---	---	---	---	---	---	---	---	---	---	---	<table border="1"> <thead> <tr> <th>Freq. MHz</th> <th>Emission level dBuV/m</th> <th>Limit dBuV/m</th> <th>Margin dB</th> <th>SA reading dBuV</th> <th>Factor dB/m</th> <th>Remark</th> <th>ANT High cm</th> <th>Turn Table deg</th> </tr> </thead> <tbody> <tr> <td>187.36</td> <td>36.18</td> <td>43.50</td> <td>-7.32</td> <td>47.34</td> <td>-11.16</td> <td>Peak</td> <td>---</td> <td>---</td> </tr> <tr> <td>333.65</td> <td>32.08</td> <td>46.00</td> <td>-13.92</td> <td>39.19</td> <td>-7.11</td> <td>Peak</td> <td>---</td> <td>---</td> </tr> <tr> <td>423.45</td> <td>34.88</td> <td>46.00</td> <td>-11.12</td> <td>39.96</td> <td>-5.08</td> <td>Peak</td> <td>---</td> <td>---</td> </tr> <tr> <td>555.44</td> <td>41.45</td> <td>46.00</td> <td>-4.55</td> <td>43.66</td> <td>-2.21</td> <td>Peak</td> <td>---</td> <td>---</td> </tr> <tr> <td>666.97</td> <td>36.44</td> <td>46.00</td> <td>-9.56</td> <td>36.61</td> <td>-0.17</td> <td>Peak</td> <td>---</td> <td>---</td> </tr> <tr> <td>890.48</td> <td>38.04</td> <td>46.00</td> <td>-7.96</td> <td>34.41</td> <td>3.63</td> <td>Peak</td> <td>---</td> <td>---</td> </tr> </tbody> </table>	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg	187.36	36.18	43.50	-7.32	47.34	-11.16	Peak	---	---	333.65	32.08	46.00	-13.92	39.19	-7.11	Peak	---	---	423.45	34.88	46.00	-11.12	39.96	-5.08	Peak	---	---	555.44	41.45	46.00	-4.55	43.66	-2.21	Peak	---	---	666.97	36.44	46.00	-9.56	36.61	-0.17	Peak	---	---	890.48	38.04	46.00	-7.96	34.41	3.63	Peak	---	---
1	2	3	4	5	6																																																																																																																								
187.36	333.65	423.45	555.44	666.97	890.48																																																																																																																								
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423.45	34.88	46.00	-11.12	39.96	-5.08	Peak	---	---																																																																																																																					
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666.97	36.44	46.00	-9.56	36.61	-0.17	Peak	---	---																																																																																																																					
890.48	38.04	46.00	-7.96	34.41	3.63	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	8DPSK	Test Freq. (MHz)	2480
Polarization	Vertical	Test Configuration	1

Test By :Akun Chung Temperature(°C):22 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	36.44	31.52	40.00	-8.48	40.65	-9.13	Peak	---	---
2	312.77	33.88	46.00	-12.12	41.52	-7.64	Peak	---	---
3	429.75	36.21	46.00	-9.79	41.03	-4.82	Peak	---	---
4	477.33	35.37	46.00	-10.63	39.08	-3.71	Peak	---	---
5	555.77	36.01	46.00	-9.99	38.21	-2.20	Peak	---	---
6	890.58	36.44	46.00	-9.56	32.81	3.63	Peak	---	---

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

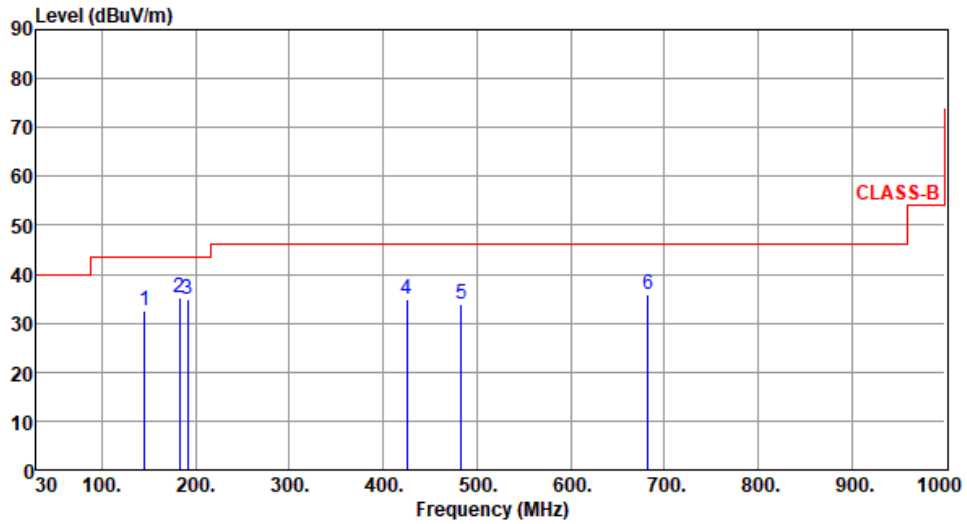
*Factor includes antenna factor , cable loss and amplifier gain

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	8DPSK	Test Freq. (MHz)	2480
Polarization	Horizontal	Test Configuration	2

Test By :Akun Chung Temperature(°C):22 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	145.25	32.56	43.50	-10.94	41.56	-9.00	Peak	---	---
2	182.82	35.15	43.50	-8.35	45.80	-10.65	Peak	---	---
3	191.63	34.82	43.50	-8.68	46.44	-11.62	Peak	---	---
4	425.58	34.91	46.00	-11.09	39.91	-5.00	Peak	---	---
5	483.25	33.72	46.00	-12.28	37.37	-3.65	Peak	---	---
6	682.45	35.72	46.00	-10.28	35.79	-0.07	Peak	---	---

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

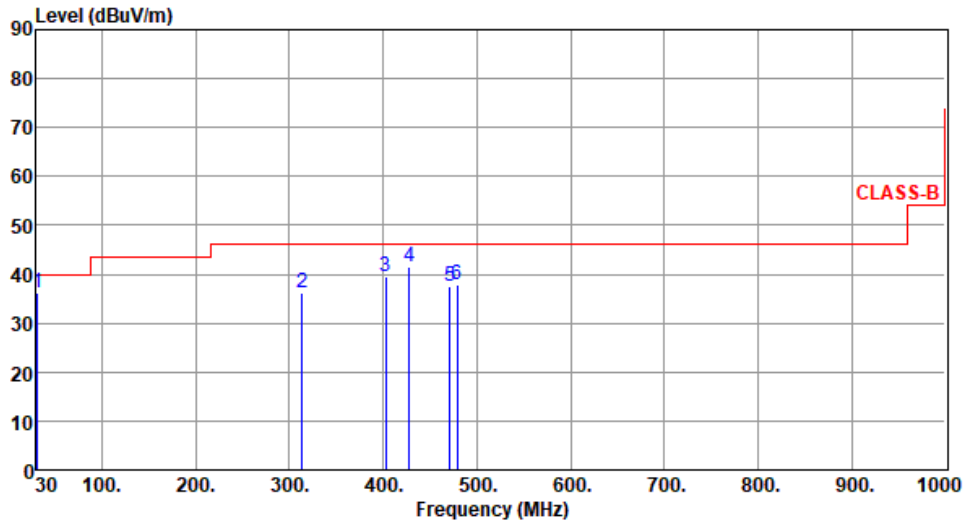
*Factor includes antenna factor , cable loss and amplifier gain

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	8DPSK	Test Freq. (MHz)	2480
Polarization	Vertical	Test Configuration	2

Test By :Akun Chung Temperature(°C):22 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	31.22	36.28	40.00	-3.72	45.99	-9.71	Peak	---	---
2	313.63	36.22	46.00	-9.78	43.81	-7.59	Peak	---	---
3	403.25	39.55	46.00	-6.45	45.28	-5.73	Peak	---	---
4	428.37	41.55	46.00	-4.45	46.43	-4.88	Peak	---	---
5	471.22	37.59	46.00	-8.41	41.44	-3.85	Peak	---	---
6	479.23	37.93	46.00	-8.07	41.61	-3.68	Peak	---	---

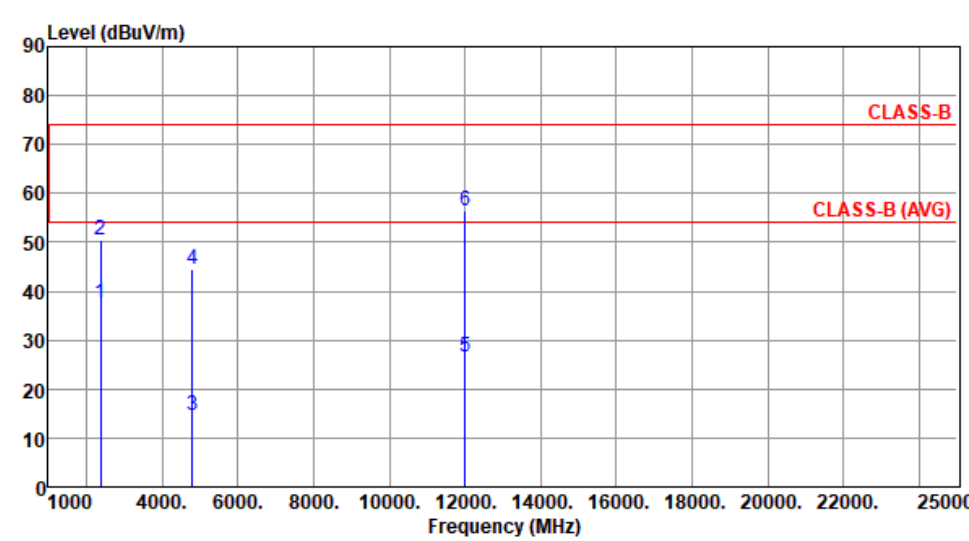
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

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

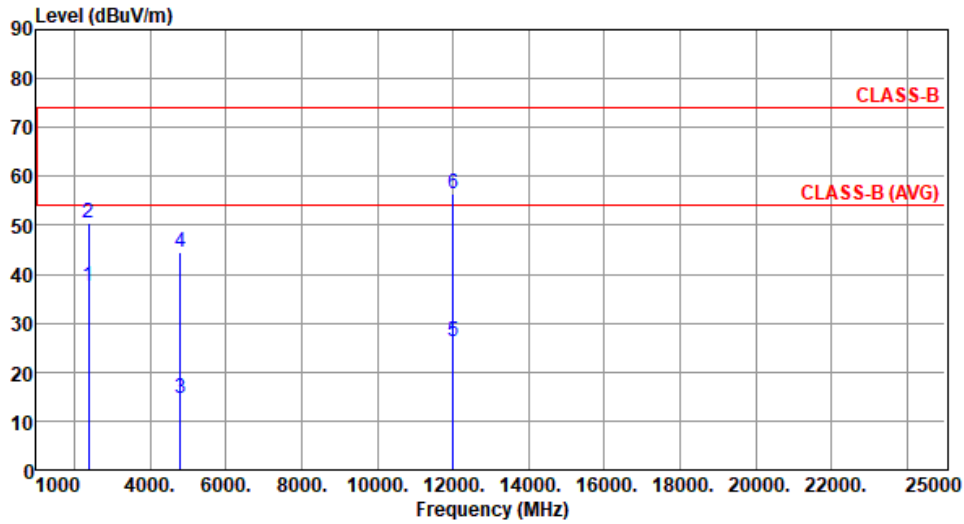
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

3.2.5 Transmitter Radiated Unwanted Emissions (Above 1GHz) for GFSK

Modulation	GFSK	Test Freq. (MHz)	2402						
Polarization	Horizontal								
Test By :BRAD WU Temperature(°C):24 Humidity(%):63									
									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		cm	deg
1	2390.00	37.46	54.00	-16.54	40.25	-2.79	Average	104	333
2	2390.00	50.54	74.00	-23.46	53.33	-2.79	Peak	104	333
3	4804.00	14.55	54.00	-39.45	11.05	3.50	Average	100	55
4	4804.00	44.65	74.00	-29.35	41.15	3.50	Peak	100	55
5	12010.00	26.44	54.00	-27.56	12.17	14.27	Average	100	36
6	12010.00	56.54	74.00	-17.46	42.27	14.27	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).									

Modulation	GFSK	Test Freq. (MHz)	2402
Polarization	Vertical		

Test By :BRAD WU Temperature(°C):24 Humidity(%):63



	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	2390.00	37.42	54.00	-16.58	40.21	-2.79	Average	248	182
2	2390.00	50.49	74.00	-23.51	53.28	-2.79	Peak	248	182
3	4804.00	14.51	54.00	-39.49	11.01	3.50	Average	100	24
4	4804.00	44.61	74.00	-29.39	41.11	3.50	Peak	100	24
5	12010.00	26.32	54.00	-27.68	12.05	14.27	Average	100	18
6	12010.00	56.42	74.00	-17.58	42.15	14.27	Peak	100	18

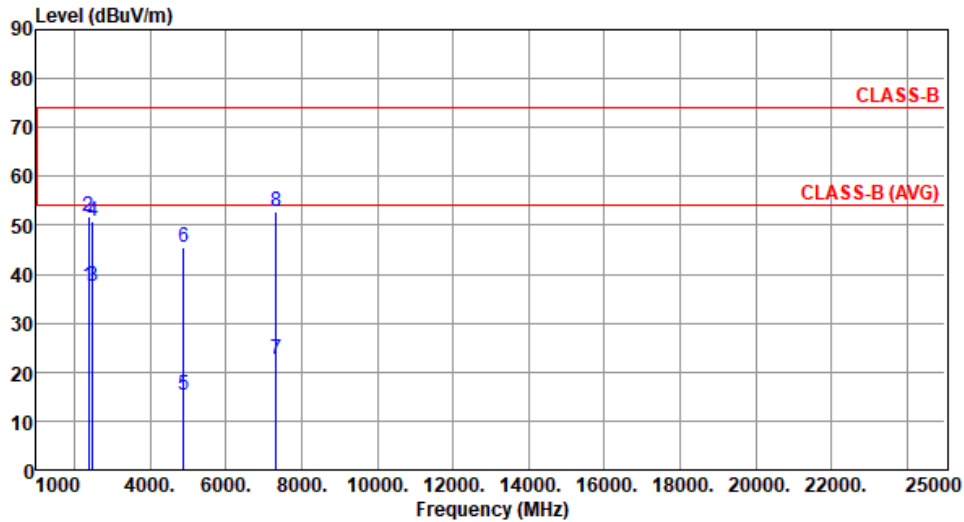
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	GFSK	Test Freq. (MHz)	2441
Polarization	Horizontal		

Test By :BRAD WU Temperature(°C):24 Humidity(%) :63



	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	2390.00	37.63	54.00	-16.37	40.42	-2.79	Average	102	332
2	2390.00	51.76	74.00	-22.24	54.55	-2.79	Peak	102	332
3	2483.50	37.38	54.00	-16.62	40.12	-2.74	Average	102	332
4	2483.50	50.95	74.00	-23.05	53.69	-2.74	Peak	102	332
5	4882.00	15.39	54.00	-38.61	11.92	3.47	Average	100	55
6	4882.00	45.49	74.00	-28.51	42.02	3.47	Peak	100	55
7	7323.00	22.65	54.00	-31.35	13.62	9.03	Average	100	61
8	7323.00	52.75	74.00	-21.25	43.72	9.03	Peak	100	61

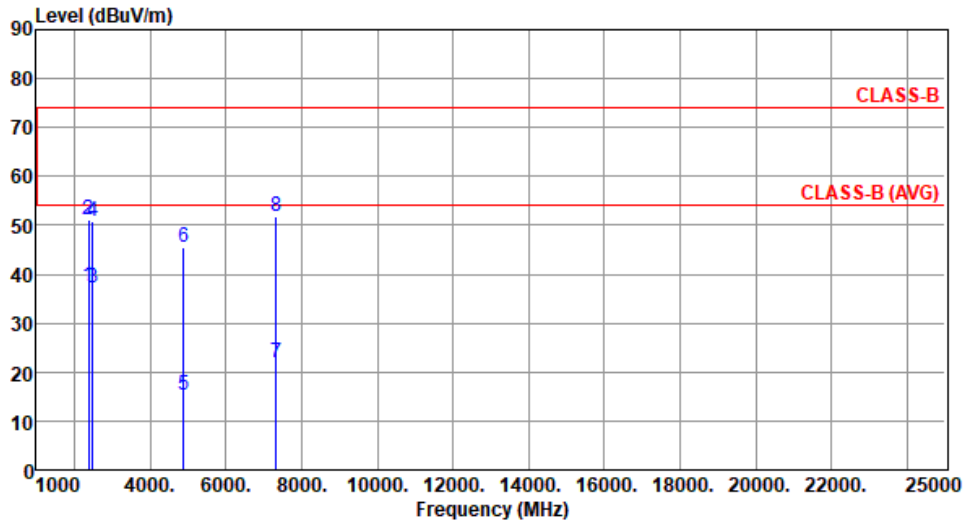
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	GFSK	Test Freq. (MHz)	2441
Polarization	Vertical		

Test By :BRAD WU Temperature(°C):24 Humidity(%) :63



	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	2390.00	37.49	54.00	-16.51	40.28	-2.79	Average	246	181
2	2390.00	51.08	74.00	-22.92	53.87	-2.79	Peak	246	181
3	2483.50	37.35	54.00	-16.65	40.09	-2.74	Average	246	181
4	2483.50	50.68	74.00	-23.32	53.42	-2.74	Peak	246	181
5	4882.00	15.33	54.00	-38.67	11.86	3.47	Average	100	28
6	4882.00	45.43	74.00	-28.57	41.96	3.47	Peak	100	28
7	7323.00	21.81	54.00	-32.19	12.78	9.03	Average	100	56
8	7323.00	51.91	74.00	-22.09	42.88	9.03	Peak	100	56

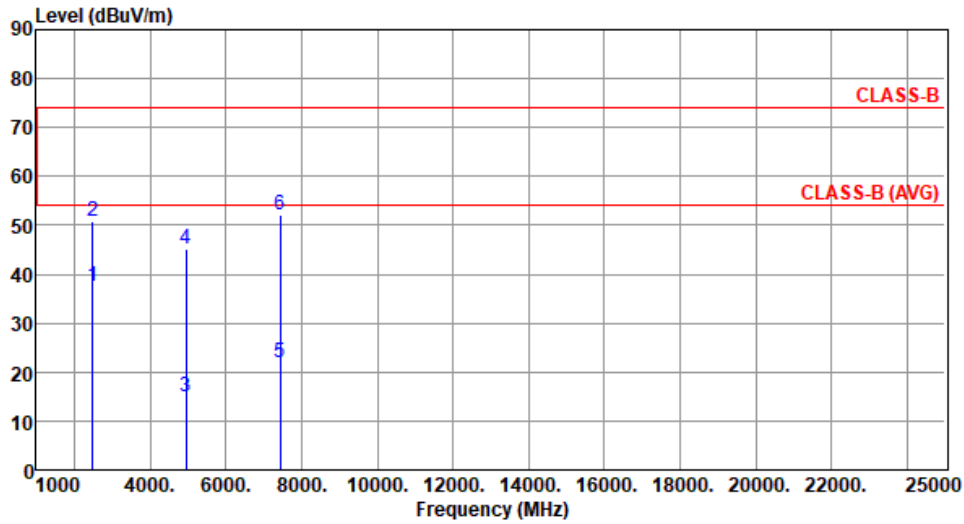
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	GFSK	Test Freq. (MHz)	2480
Polarization	Horizontal		

Test By :BRAD WU Temperature(°C):24 Humidity(%):63



	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	37.55	54.00	-16.45	40.29	-2.74	Average	106	349
2	2483.50	50.68	74.00	-23.32	53.42	-2.74	Peak	106	349
3	4960.00	15.08	54.00	-38.92	11.40	3.68	Average	100	31
4	4960.00	45.18	74.00	-28.82	41.50	3.68	Peak	100	31
5	7440.00	21.88	54.00	-32.12	12.90	8.98	Average	100	24
6	7440.00	51.98	74.00	-22.02	43.00	8.98	Peak	100	24

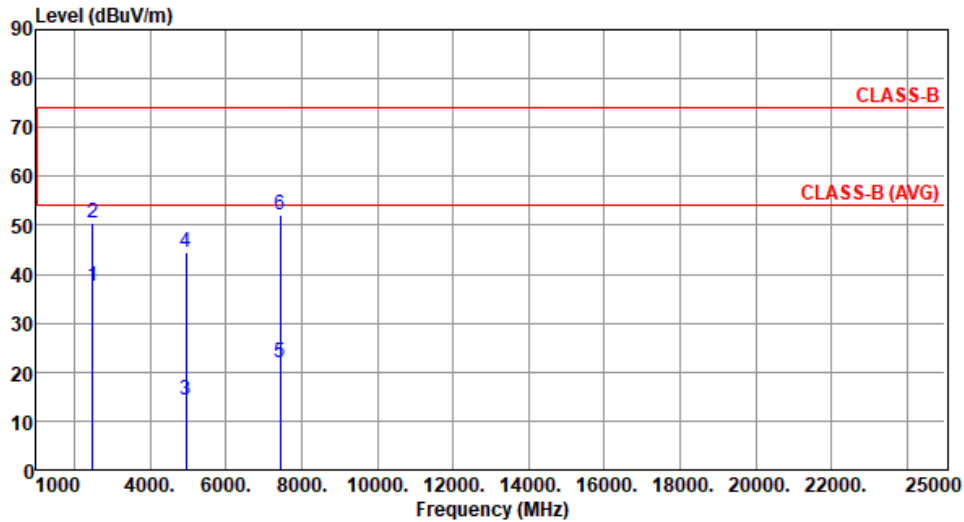
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	GFSK	Test Freq. (MHz)	2480
Polarization	Vertical		

Test By :BRAD WU Temperature(°C):24 Humidity(%):63



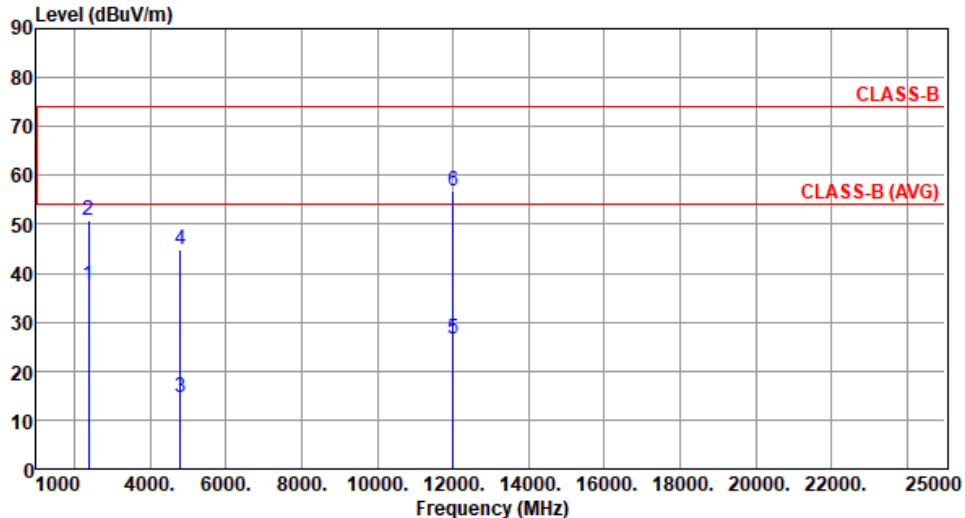
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2483.50	37.41	54.00	-16.59	40.15	-2.74	Average	249	185
2	2483.50	50.56	74.00	-23.44	53.30	-2.74	Peak	249	185
3	4960.00	14.41	54.00	-39.59	10.73	3.68	Average	100	41
4	4960.00	44.51	74.00	-29.49	40.83	3.68	Peak	100	41
5	7440.00	22.03	54.00	-31.97	13.05	8.98	Average	100	66
6	7440.00	52.13	74.00	-21.87	43.15	8.98	Peak	100	66

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).

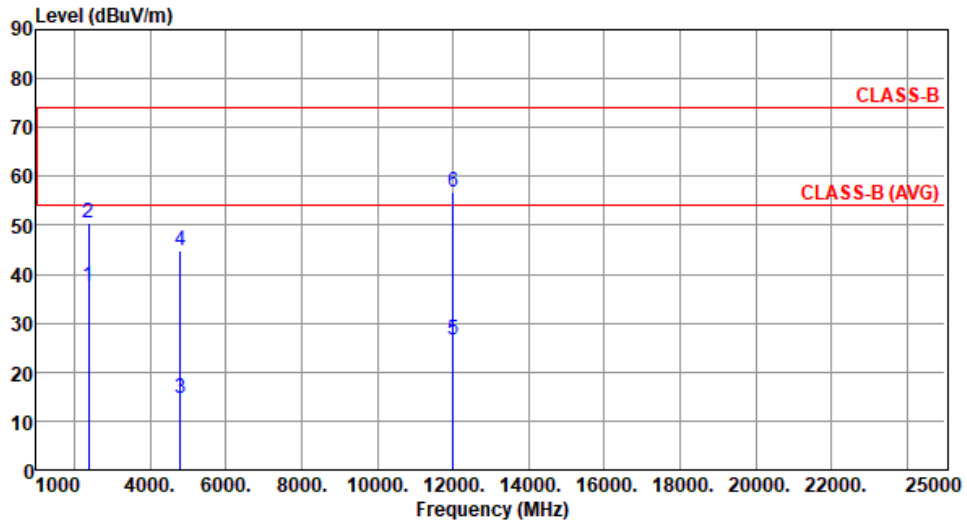
3.2.6 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 8DPSK

Modulation	8DPSK	Test Freq. (MHz)	2402						
Polarization	Horizontal								
Test By :BRAD WU Temperature(°C):24 Humidity(%):63									
									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		cm	deg
1	2390.00	37.57	54.00	-16.43	40.36	-2.79	Average	110	334
2	2390.00	50.82	74.00	-23.18	53.61	-2.79	Peak	110	334
3	4804.00	14.74	54.00	-39.26	11.24	3.50	Average	100	61
4	4804.00	44.84	74.00	-29.16	41.34	3.50	Peak	100	61
5	12010.00	26.59	54.00	-27.41	12.32	14.27	Average	100	31
6	12010.00	56.69	74.00	-17.31	42.42	14.27	Peak	100	31

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).

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

Test By :BRAD WU Temperature(°C):24 Humidity(%):63



	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	2390.00	37.45	54.00	-16.55	40.24	-2.79	Average	249	183
2	2390.00	50.41	74.00	-23.59	53.20	-2.79	Peak	249	183
3	4804.00	14.75	54.00	-39.25	11.25	3.50	Average	100	21
4	4804.00	44.85	74.00	-29.15	41.35	3.50	Peak	100	21
5	12010.00	26.59	54.00	-27.41	12.32	14.27	Average	100	51
6	12010.00	56.69	74.00	-17.31	42.42	14.27	Peak	100	51

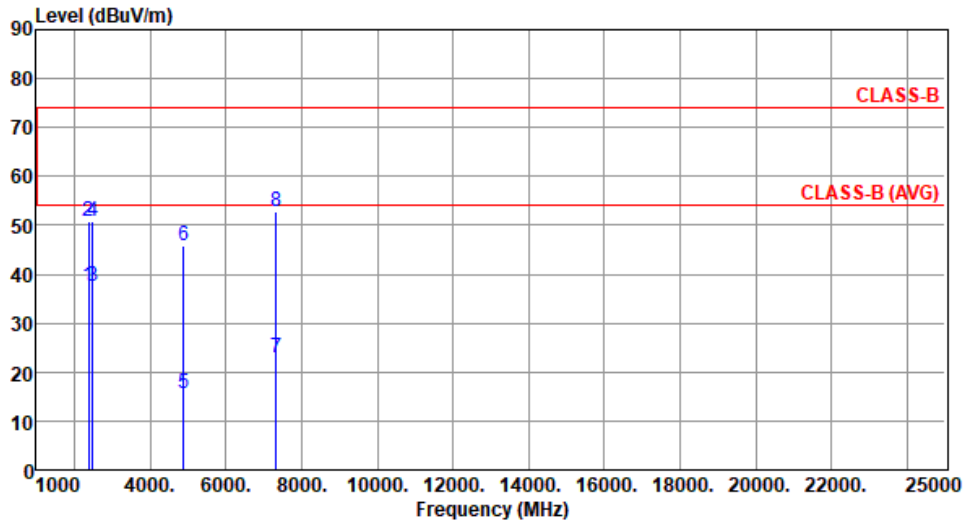
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)

*Factor includes antenna factor , cable loss and amplifier gain

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

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

Test By :BRAD WU Temperature(°C):24 Humidity(%):63

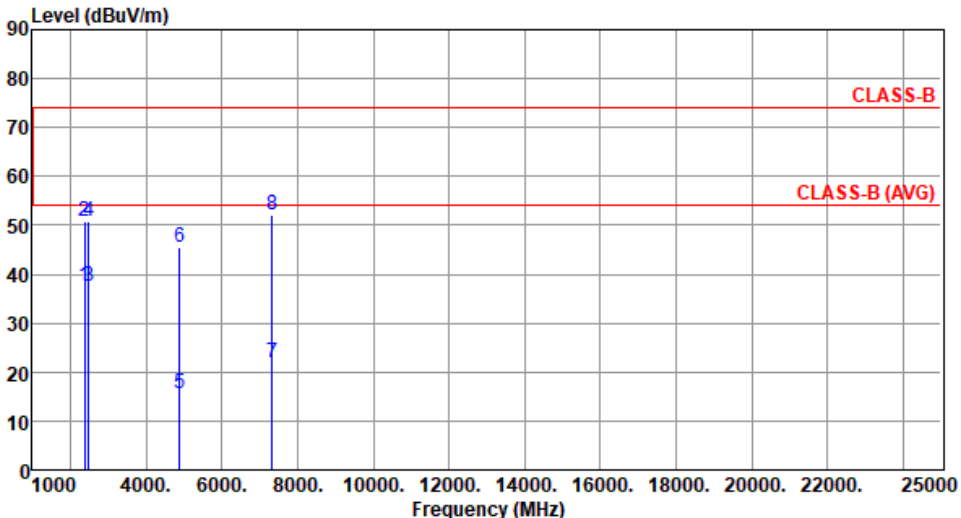


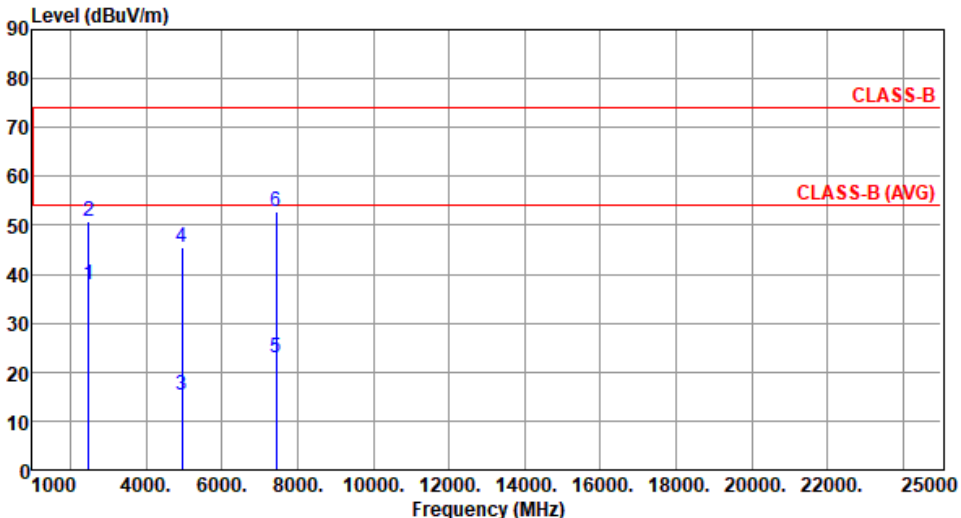
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	37.51	54.00	-16.49	40.30	-2.79	Average	108	326
2	2390.00	50.74	74.00	-23.26	53.53	-2.79	Peak	108	326
3	2483.50	37.45	54.00	-16.55	40.19	-2.74	Average	108	326
4	2483.50	50.81	74.00	-23.19	53.55	-2.74	Peak	108	326
5	4882.00	15.58	54.00	-38.42	12.11	3.47	Average	100	42
6	4882.00	45.68	74.00	-28.32	42.21	3.47	Peak	100	42
7	7323.00	22.84	54.00	-31.16	13.81	9.03	Average	100	29
8	7323.00	52.94	74.00	-21.06	43.91	9.03	Peak	100	29

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

*Factor includes antenna factor , cable loss and amplifier gain

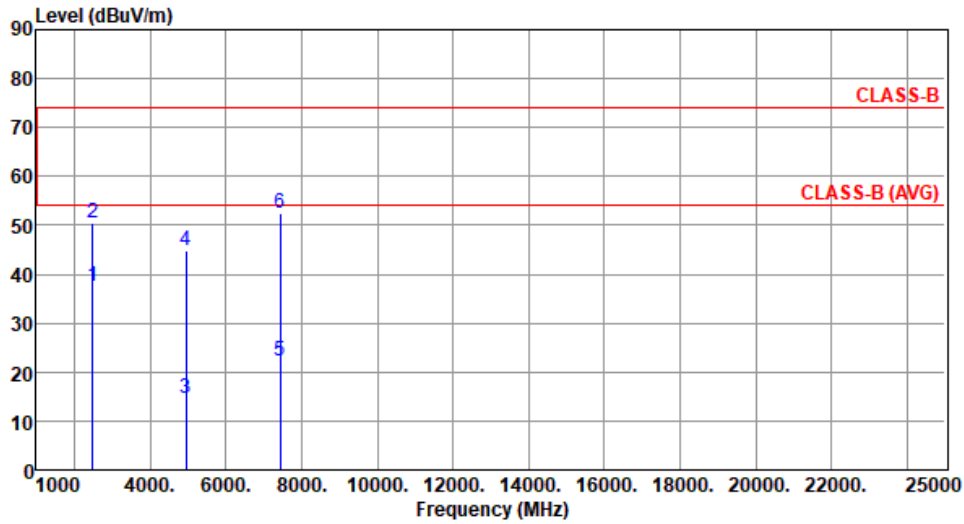
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation	8DPSK	Test Freq. (MHz)	2441						
Polarization	Vertical								
Test By :BRAD WU		Temperature(°C):24	Humidity(%):63						
									
	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	2390.00	37.46	54.00	-16.54	40.25	-2.79	Average	240	182
2	2390.00	50.69	74.00	-23.31	53.48	-2.79	Peak	240	182
3	2483.50	37.44	54.00	-16.56	40.18	-2.74	Average	240	182
4	2483.50	50.76	74.00	-23.24	53.50	-2.74	Peak	240	182
5	4882.00	15.46	54.00	-38.54	11.99	3.47	Average	100	19
6	4882.00	45.56	74.00	-28.44	42.09	3.47	Peak	100	19
7	7323.00	22.04	54.00	-31.96	13.01	9.03	Average	100	35
8	7323.00	52.14	74.00	-21.86	43.11	9.03	Peak	100	35
<p>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).</p>									

Modulation	8DPSK	Test Freq. (MHz)	2480						
Polarization	Horizontal								
Test By	:BRAD WU	Temperature(°C):24	Humidity(%) :63						
									
	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	37.91	54.00	-16.09	40.65	-2.74	Average	105	349
2	2483.50	50.82	74.00	-23.18	53.56	-2.74	Peak	105	349
3	4960.00	15.26	54.00	-38.74	11.58	3.68	Average	100	47
4	4960.00	45.36	74.00	-28.64	41.68	3.68	Peak	100	47
5	7440.00	22.76	54.00	-31.24	13.78	8.98	Average	100	32
6	7440.00	52.86	74.00	-21.14	43.88	8.98	Peak	100	32
<p>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).</p>									

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

Test By :BRAD WU Temperature(°C):24 Humidity(%):63



	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	37.59	54.00	-16.41	40.33	-2.74	Average	251	188
2	2483.50	50.62	74.00	-23.38	53.36	-2.74	Peak	251	188
3	4960.00	14.58	54.00	-39.42	10.90	3.68	Average	100	39
4	4960.00	44.68	74.00	-29.32	41.00	3.68	Peak	100	39
5	7440.00	22.26	54.00	-31.74	13.28	8.98	Average	100	48
6	7440.00	52.36	74.00	-21.64	43.38	8.98	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).

3.3 Unwanted Emissions into Non-Restricted Frequency Bands

3.3.1 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.

3.3.2 Test Procedures

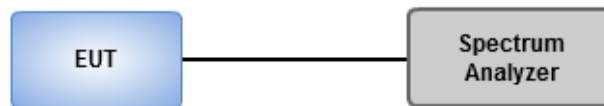
Reference level measurement

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

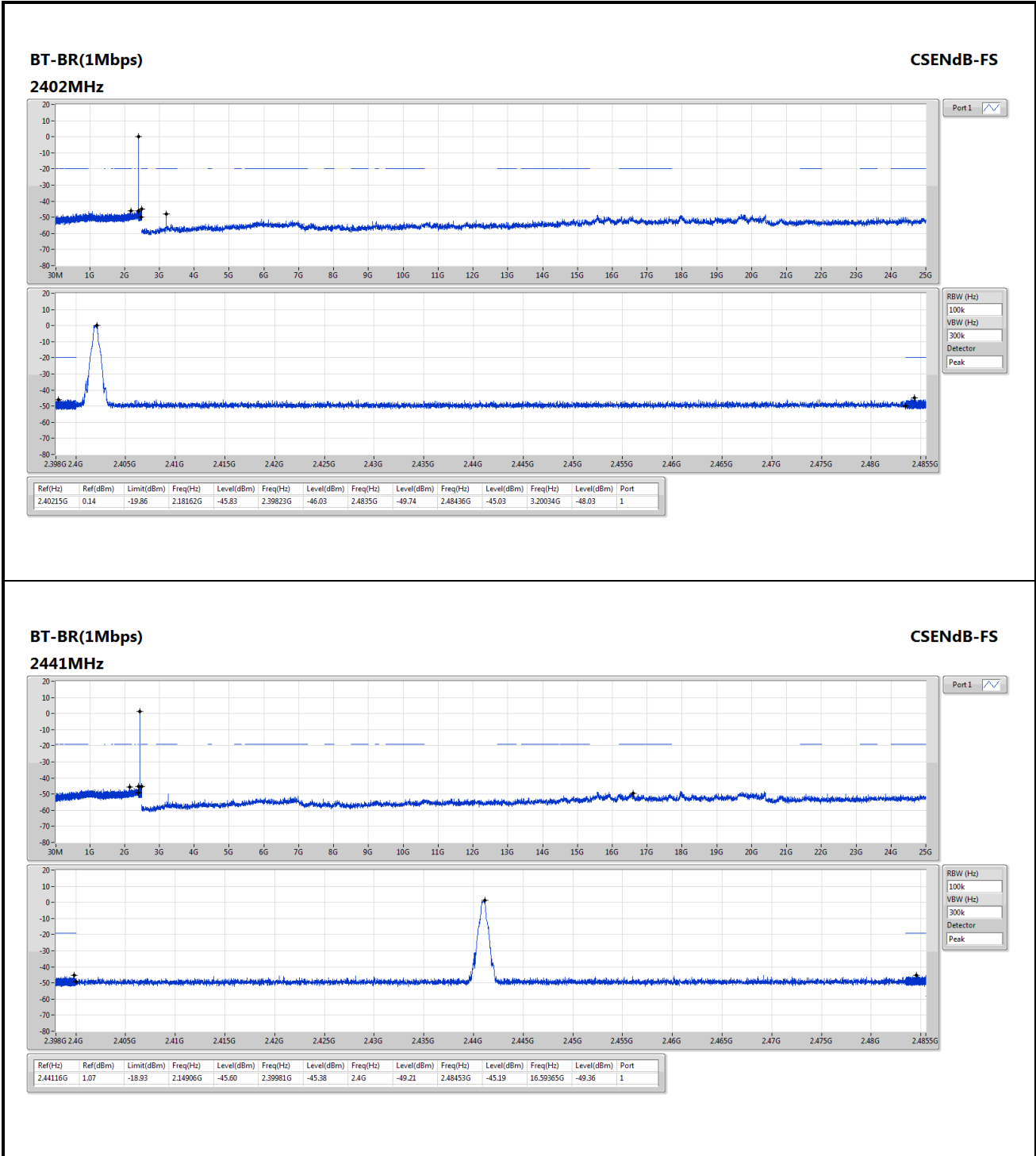
1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Scan Frequency range is up to 25GHz
4. Use the peak marker function to determine the maximum amplitude level

3.3.3 Test Setup



3.3.4 Unwanted Emissions into Non-Restricted Frequency Bands

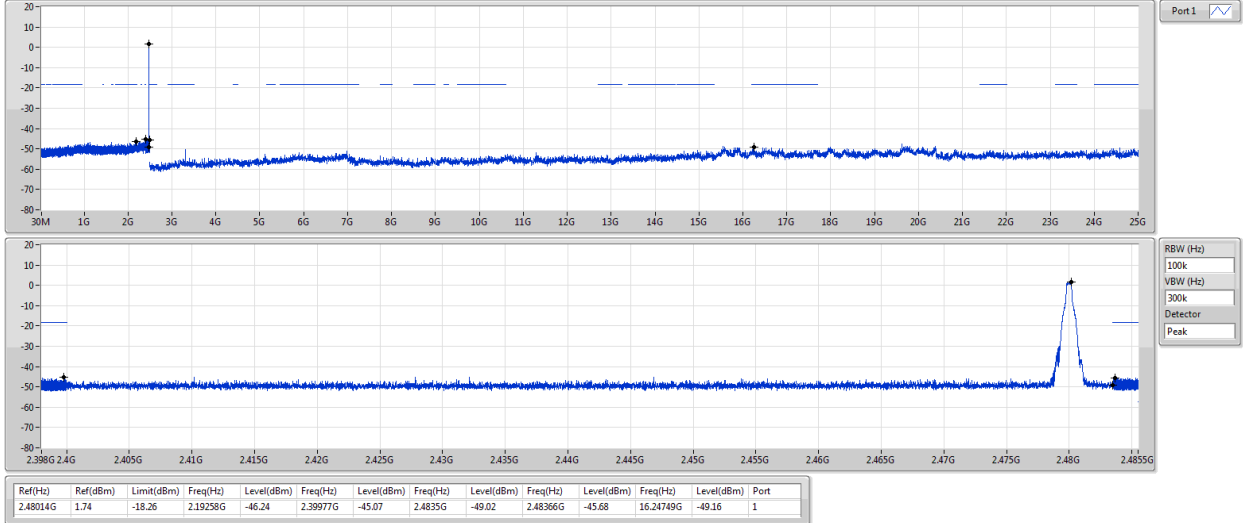
Ambient Condition	24°C / 66%	Tested By	Aska Huang
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BT-BR(1Mbps)

CSENdB-FS

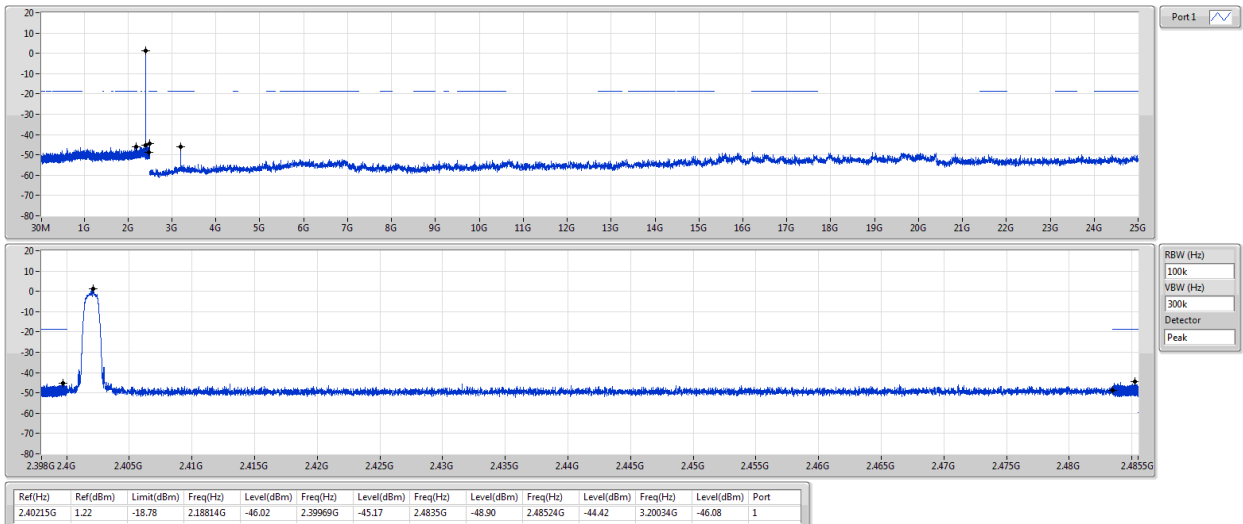
2480MHz



BT-EDR(2Mbps)

CSENdB-FS

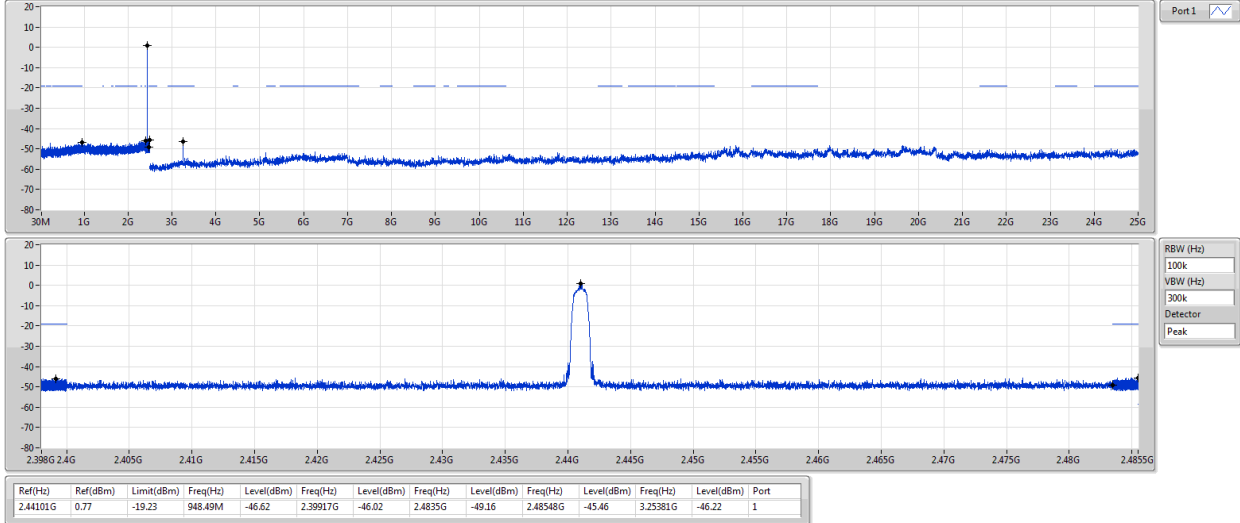
2402MHz



BT-EDR(2Mbps)

CSENdB-FS

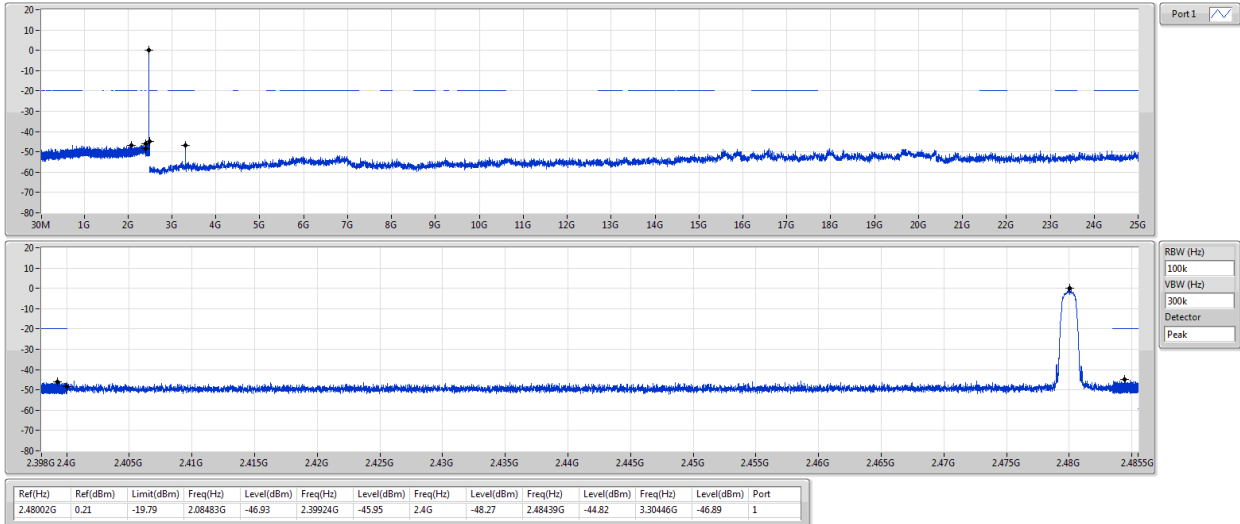
2441MHz



BT-EDR(2Mbps)

CSENdB-FS

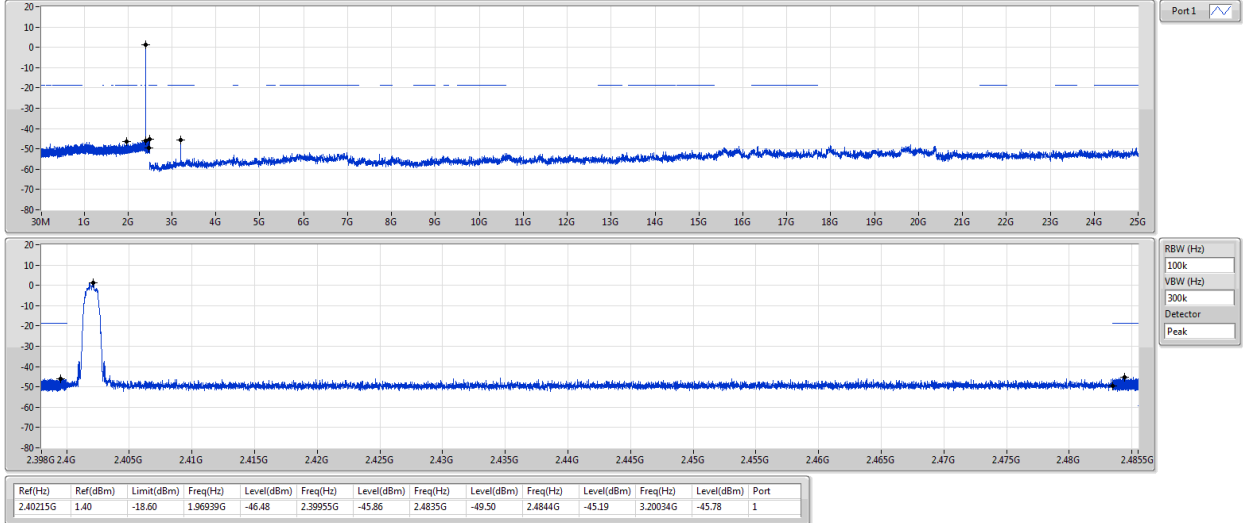
2480MHz



BT-EDR(3Mbps)

CSENdB-FS

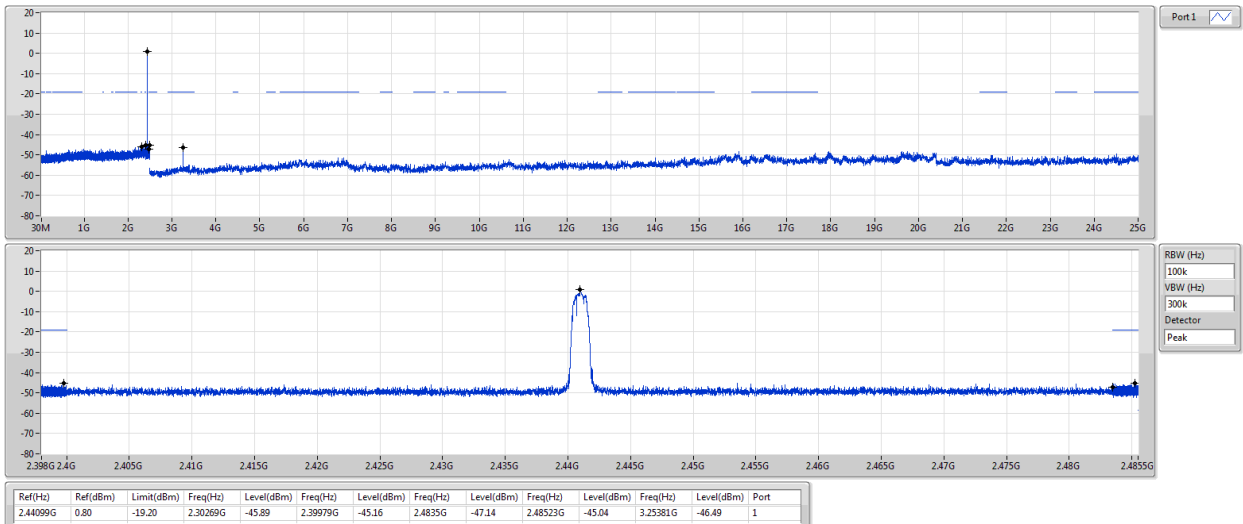
2402MHz

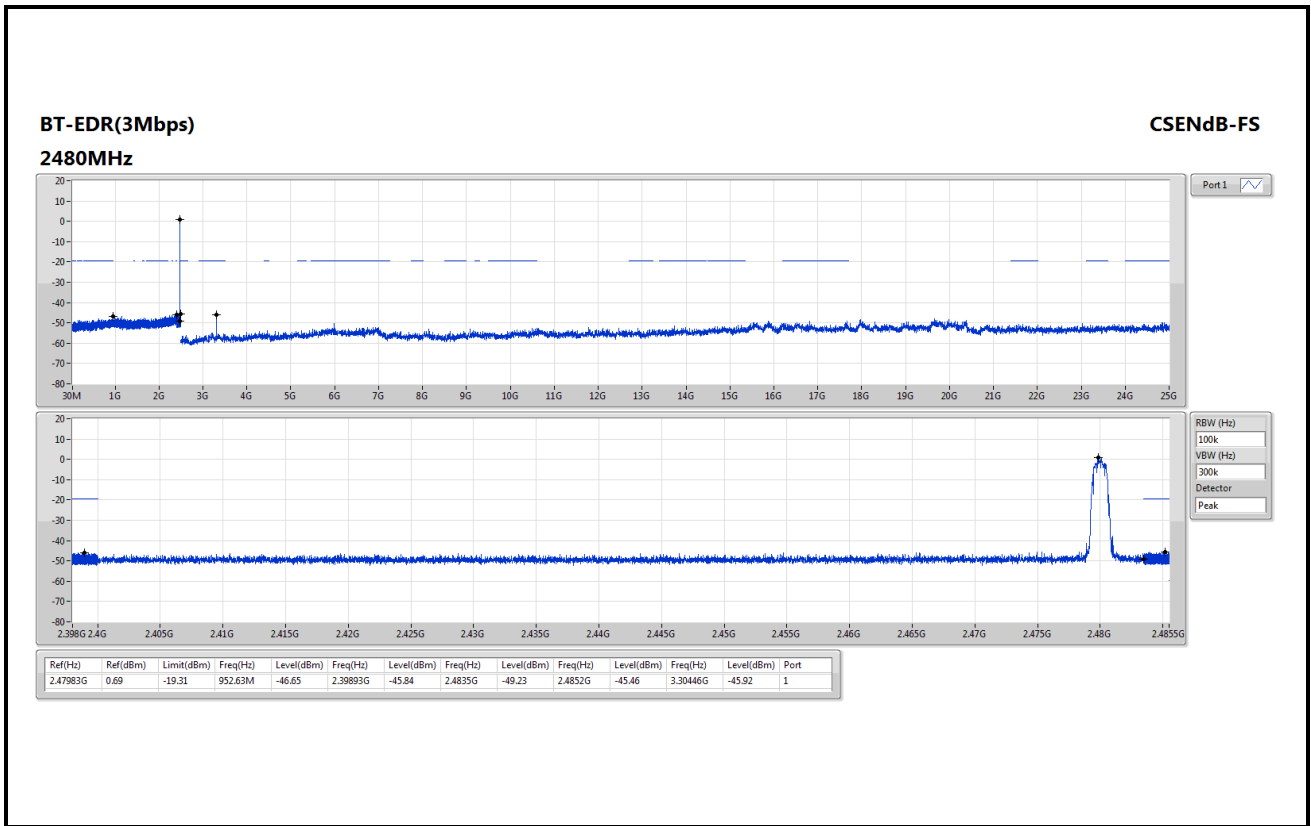


BT-EDR(3Mbps)

CSENdB-FS

2441MHz

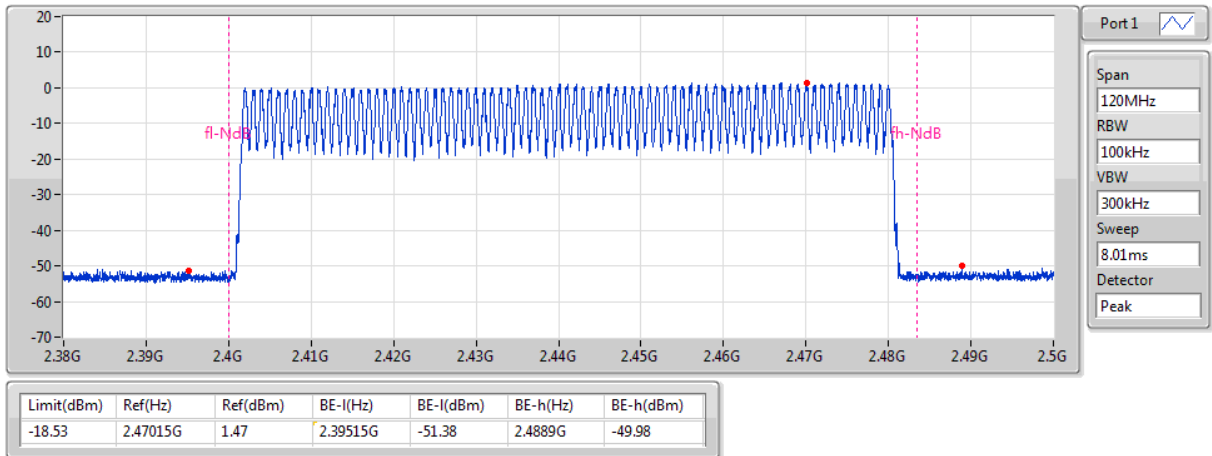




BT-BR(1Mbps)

2402MHz

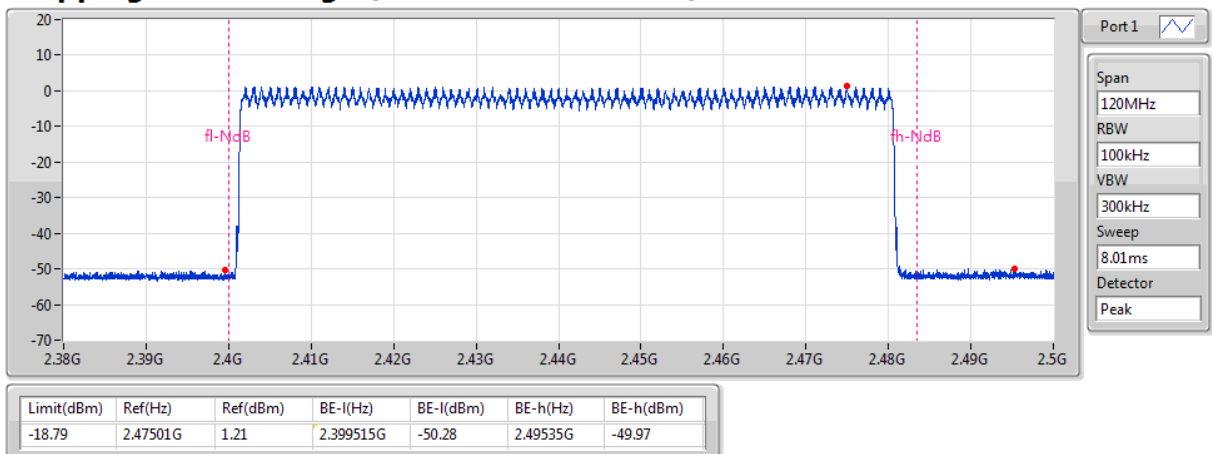
Hopping Ch Bandedge (Non-restricted Band)



BT-EDR(2Mbps)

2402MHz

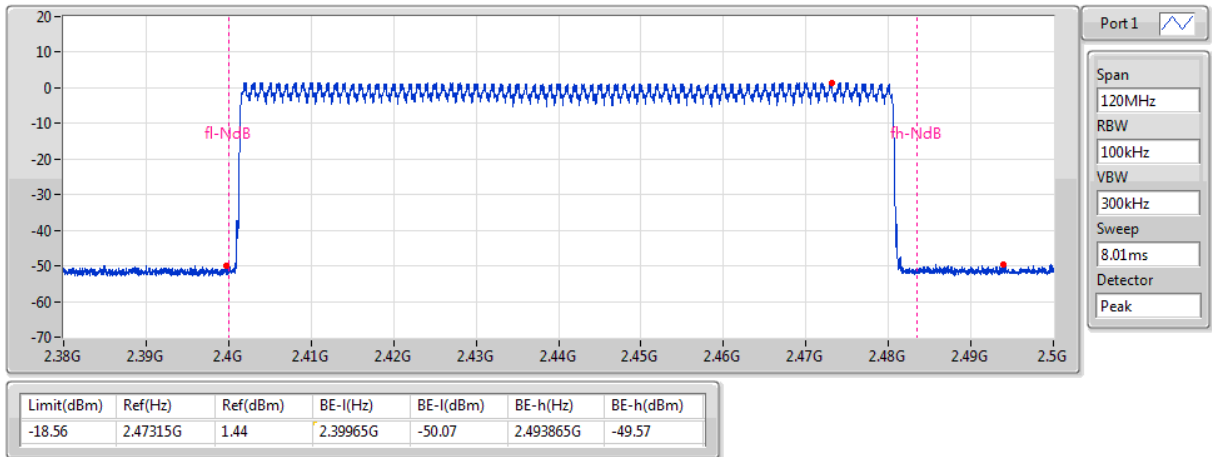
Hopping Ch Bandedge (Non-restricted Band)



BT-EDR(3Mbps)

2402MHz

Hopping Ch Bandedge (Non-restricted Band)



3.4 Conducted Output Power

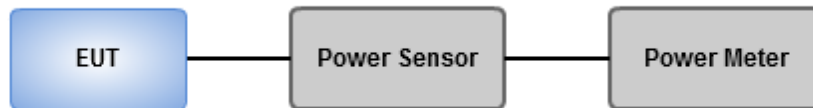
3.4.1 Limit of Conducted Output Power

- 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.

3.4.2 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

3.4.3 Test Setup



3.4.4 Test Result of Conducted Output Power

Ambient Condition	24°C / 66%	Tested By	Aska Huang
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Summary of Peak Conducted Output Power

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-BR(1Mbps)	1.84	0.00153
BT-EDR(2Mbps)	4.79	0.00301
BT-EDR(3Mbps)	5.10	0.00324

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-BR(1Mbps)	-	-	-	-
2402MHz	Pass	2.70	0.62	21.00
2441MHz	Pass	2.70	1.47	21.00
2480MHz	Pass	2.70	1.84	21.00
BT-EDR(2Mbps)	-	-	-	-
2402MHz	Pass	2.70	4.73	21.00
2441MHz	Pass	2.70	4.68	21.00
2480MHz	Pass	2.70	4.79	21.00
BT-EDR(3Mbps)	-	-	-	-
2402MHz	Pass	2.70	5.08	21.00
2441MHz	Pass	2.70	4.95	21.00
2480MHz	Pass	2.70	5.10	21.00

DG = Directional Gain; Port X = Port X output power

Summary of Conducted (Average) Output Power

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-BR(1Mbps)	1.55	0.00143
BT-EDR(2Mbps)	2.26	0.00168
BT-EDR(3Mbps)	2.24	0.00167

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-BR(1Mbps)	-	-	-	-
2402MHz	Pass	2.70	0.28	-
2441MHz	Pass	2.70	1.11	-
2480MHz	Pass	2.70	1.55	-
BT-EDR(2Mbps)	-	-	-	-
2402MHz	Pass	2.70	2.20	-
2441MHz	Pass	2.70	2.16	-
2480MHz	Pass	2.70	2.26	-
BT-EDR(3Mbps)	-	-	-	-
2402MHz	Pass	2.70	2.22	-
2441MHz	Pass	2.70	2.14	-
2480MHz	Pass	2.70	2.24	-

Note: Average power is for reference only.

3.5 Number of Hopping Frequency

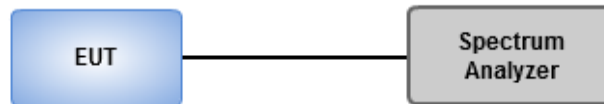
3.5.1 Limit of Number of Hopping Frequency

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

3.5.2 Test Procedures

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

3.5.3 Test Setup



3.5.4 Test Result of Number of Hopping Frequency

Ambient Condition	24°C / 66%	Tested By	Aska Huang
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Summary

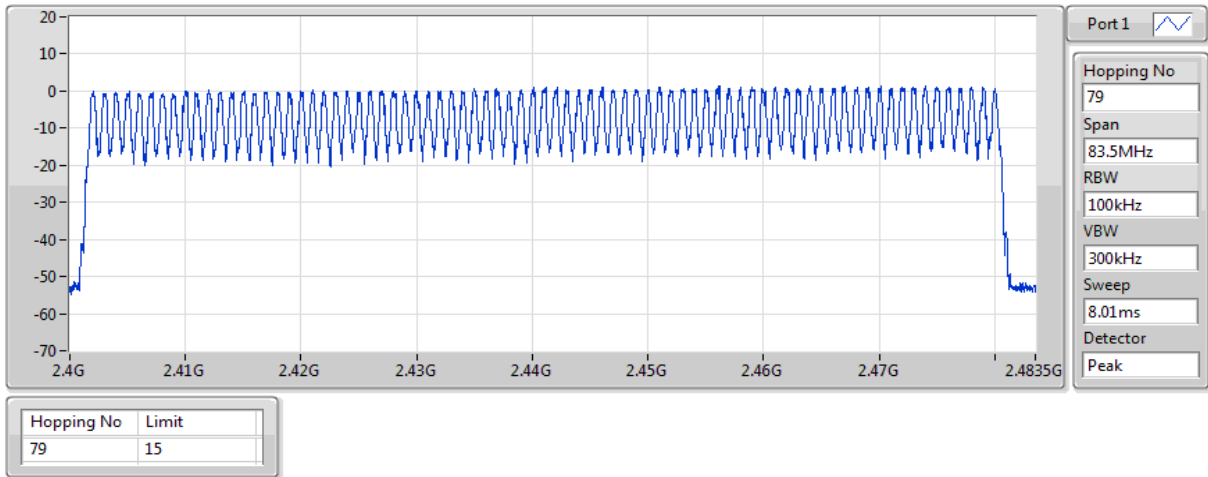
Mode	Max-Hop No
2.4-2.4835GHz	-
BT-BR(1Mbps)	79
BT-EDR(2Mbps)	79
BT-EDR(3Mbps)	79

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

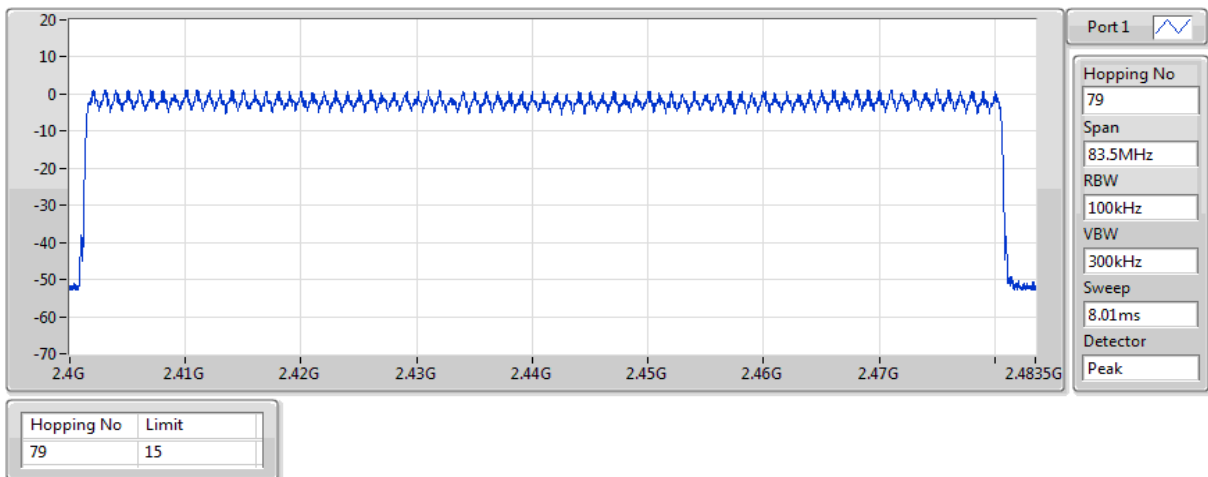
BT-BR(1Mbps)
2402MHz

Hopping-FS



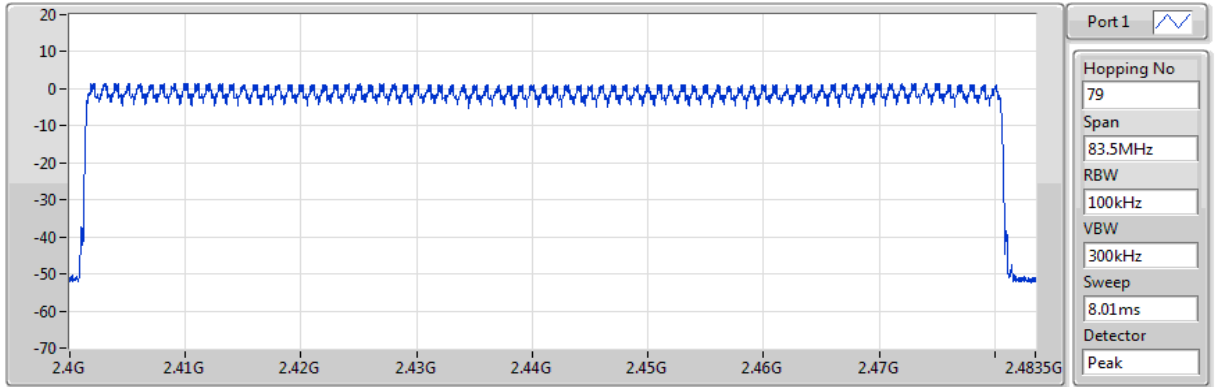
BT-EDR(2Mbps)
2402MHz

Hopping-FS



BT-EDR(3Mbps)
2402MHz

Hopping-FS



Hopping No	Limit
79	15

3.6 20dB and Occupied Bandwidth

3.6.1 Test Procedures

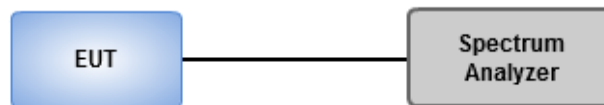
20dB Bandwidth

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 for other modes, 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

3.6.2 Test Setup



3.6.3 Test result of 20dB and Occupied Bandwidth

Ambient Condition	24°C / 66%	Tested By	Aska Huang
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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)	1.011M	915.34k	915KF1D	985.507k	882.779k
BT-EDR(2Mbps)	1.33M	1.208M	1M21G1D	1.322M	1.194M
BT-EDR(3Mbps)	1.293M	1.205M	1M21G1D	1.254M	1.198M

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

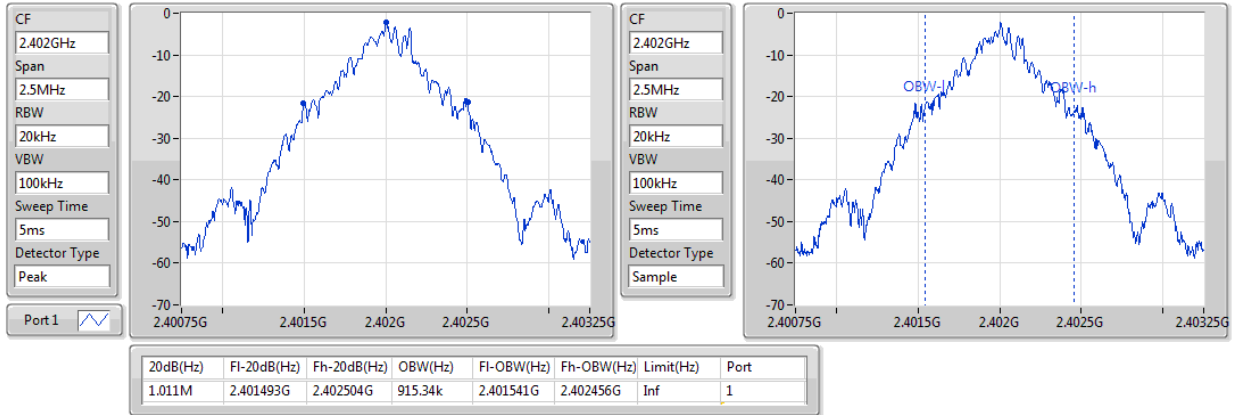
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-BR(1Mbps)	-	-	-	-
2402MHz	Pass	Inf	1.011M	915.34k
2441MHz	Pass	Inf	985.507k	882.779k
2480MHz	Pass	Inf	985.507k	911.722k
BT-EDR(2Mbps)	-	-	-	-
2402MHz	Pass	Inf	1.33M	1.201M
2441MHz	Pass	Inf	1.322M	1.194M
2480MHz	Pass	Inf	1.322M	1.208M
BT-EDR(3Mbps)	-	-	-	-
2402MHz	Pass	Inf	1.254M	1.201M
2441MHz	Pass	Inf	1.293M	1.198M
2480MHz	Pass	Inf	1.29M	1.205M

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

BT-BR(1Mbps)

EBW-FS

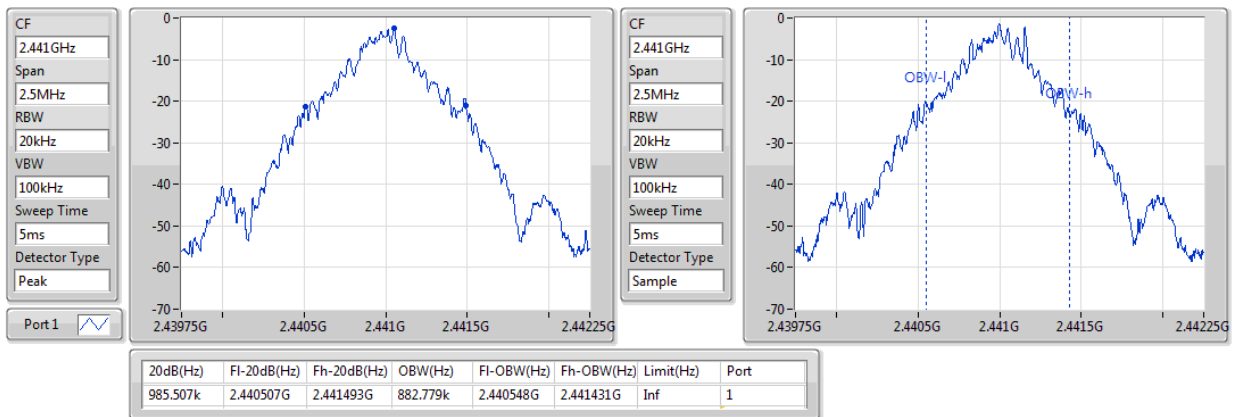
2402MHz



BT-BR(1Mbps)

EBW-FS

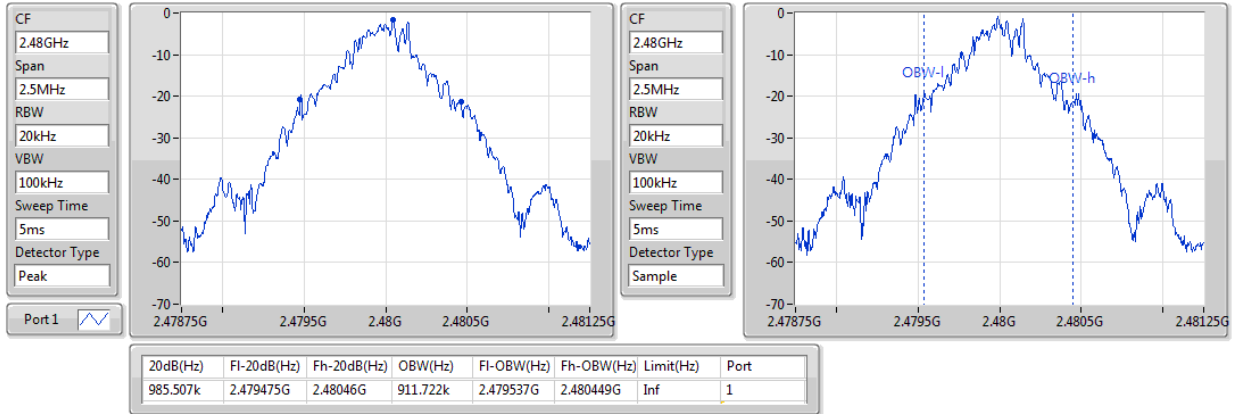
2441MHz



BT-BR(1Mbps)

EBW-FS

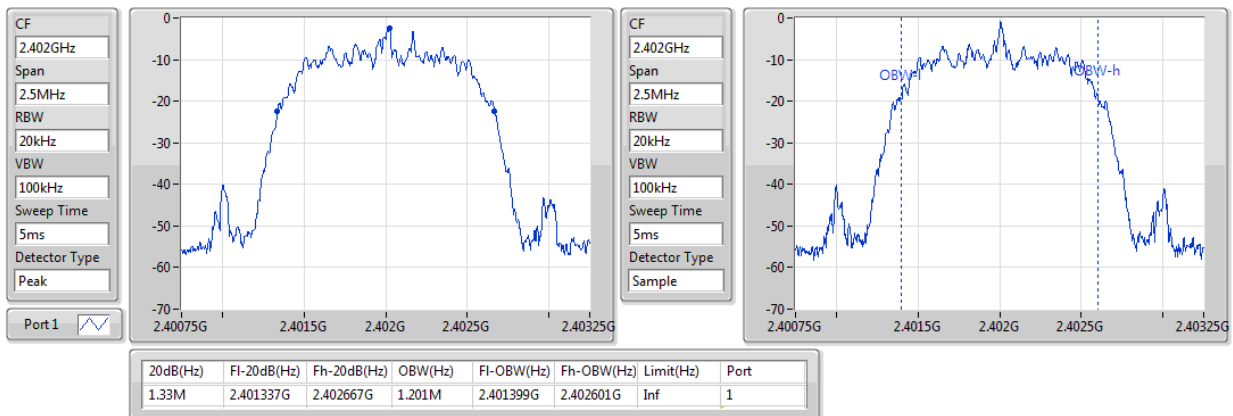
2480MHz



BT-EDR(2Mbps)

EBW-FS

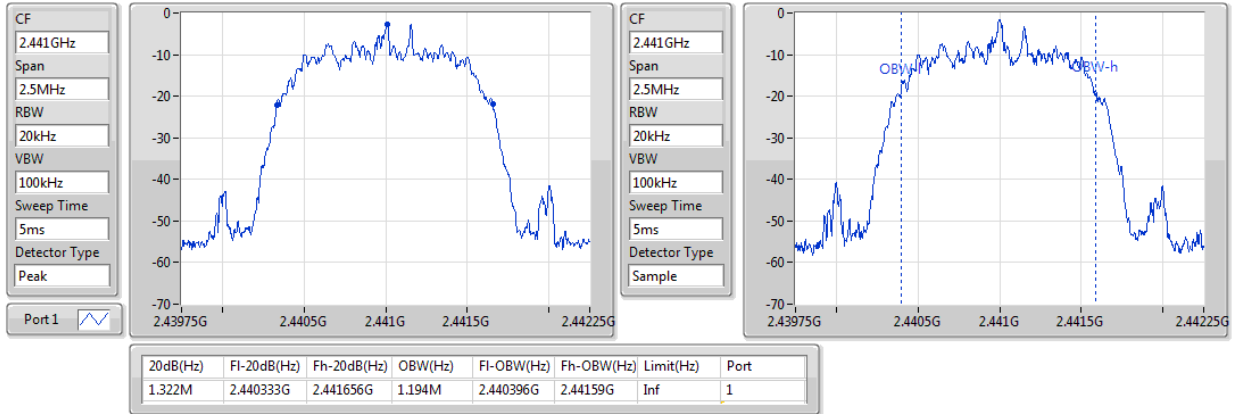
2402MHz



BT-EDR(2Mbps)

EBW-FS

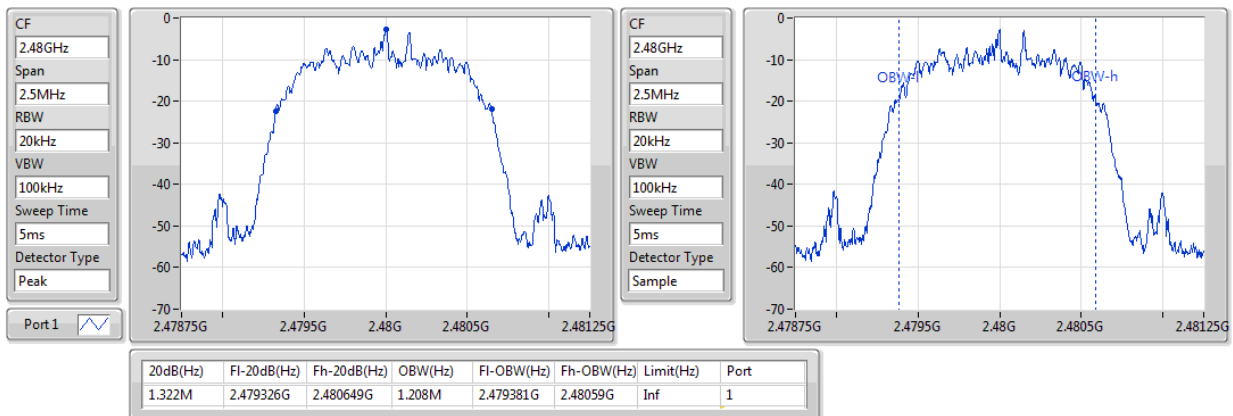
2441MHz



BT-EDR(2Mbps)

EBW-FS

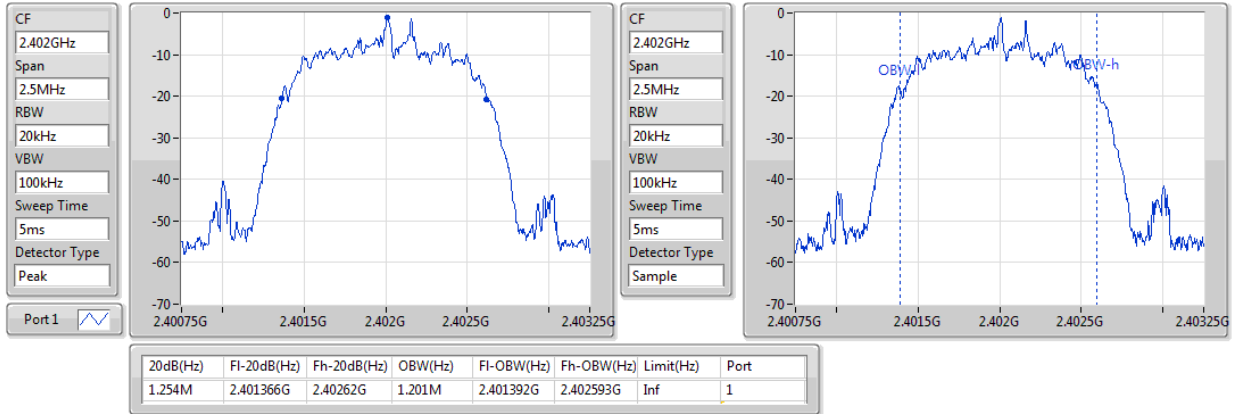
2480MHz



BT-EDR(3Mbps)

EBW-FS

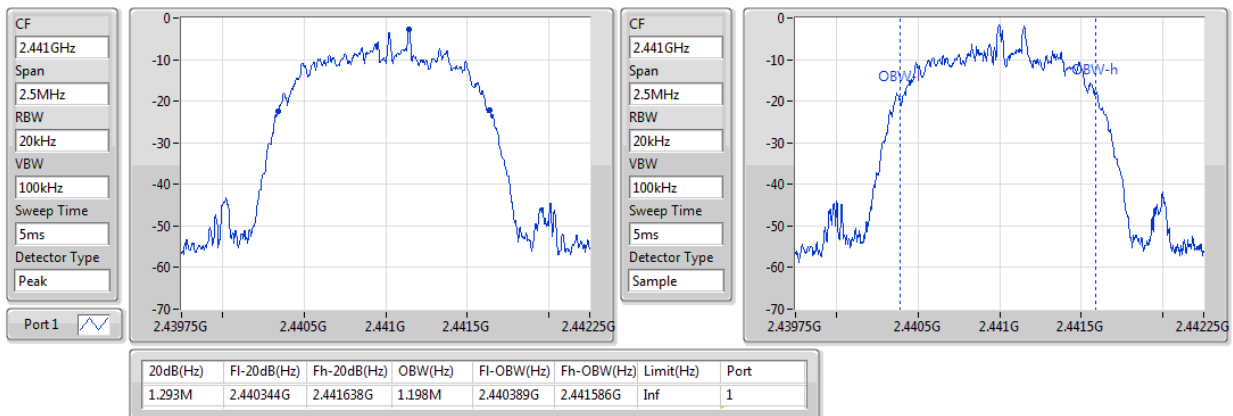
2402MHz



BT-EDR(3Mbps)

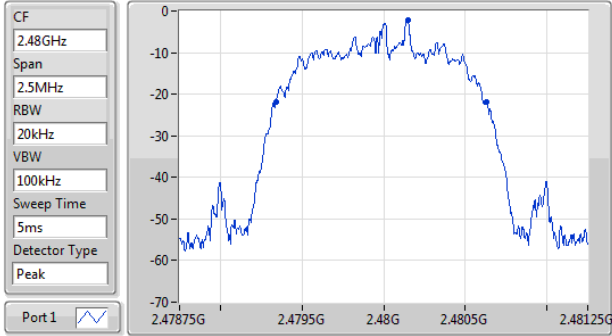
EBW-FS

2441MHz

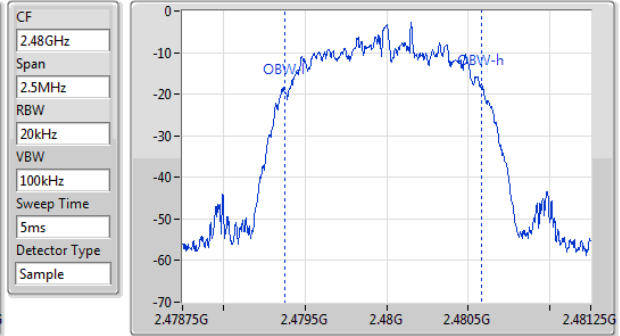


BT-EDR(3Mbps)

2480MHz



EBW-FS



20dB(Hz)	Fl-20dB(Hz)	Fh-20dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.29M	2.479341G	2.48063G	1.205M	2.479378G	2.480582G	Inf	1

3.7 Channel Separation

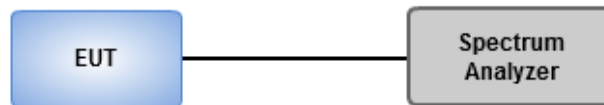
3.7.1 Limit of Channel Separation

- 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.

3.7.2 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

3.7.3 Test Setup



3.7.4 Test result of Channel Separation

Ambient Condition	24°C / 66%	Tested By	Aska Huang
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Summary

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

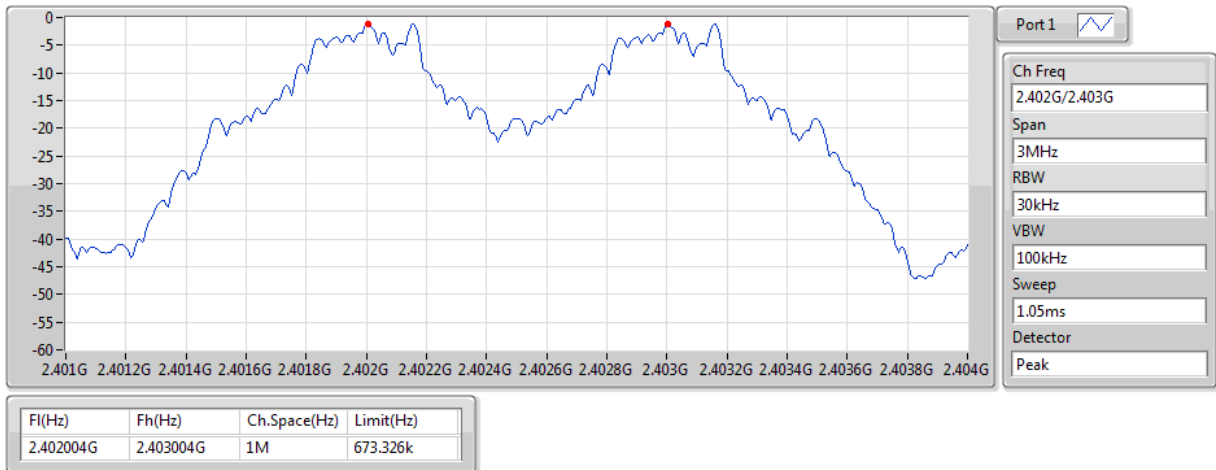
Result

Mode	Result	Fl (Hz)	Fh (Hz)	Ch.Space (Hz)	Limit (Hz)
BT-BR(1Mbps)	-	-	-	-	-
2402MHz	Pass	2.402004G	2.403004G	1M	673.326k
2441MHz	Pass	2.441148G	2.442152G	1.004348M	656.347662k
2480MHz	Pass	2.478991G	2.479991G	1M	656.347662k
BT-EDR(2Mbps)	-	-	-	-	-
2402MHz	Pass	2.402004G	2.403004G	1M	885.78k
2441MHz	Pass	2.441G	2.442G	1M	880.452k
2480MHz	Pass	2.478991G	2.479991G	1M	880.452k
BT-EDR(3Mbps)	-	-	-	-	-
2402MHz	Pass	2.402004G	2.403004G	1M	835.164k
2441MHz	Pass	2.441152G	2.442152G	1M	861.138k
2480MHz	Pass	2.478991G	2.479991G	1M	859.14k

BT-BR(1Mbps)

Channel Separation-FS

2.402G/2.403GHz

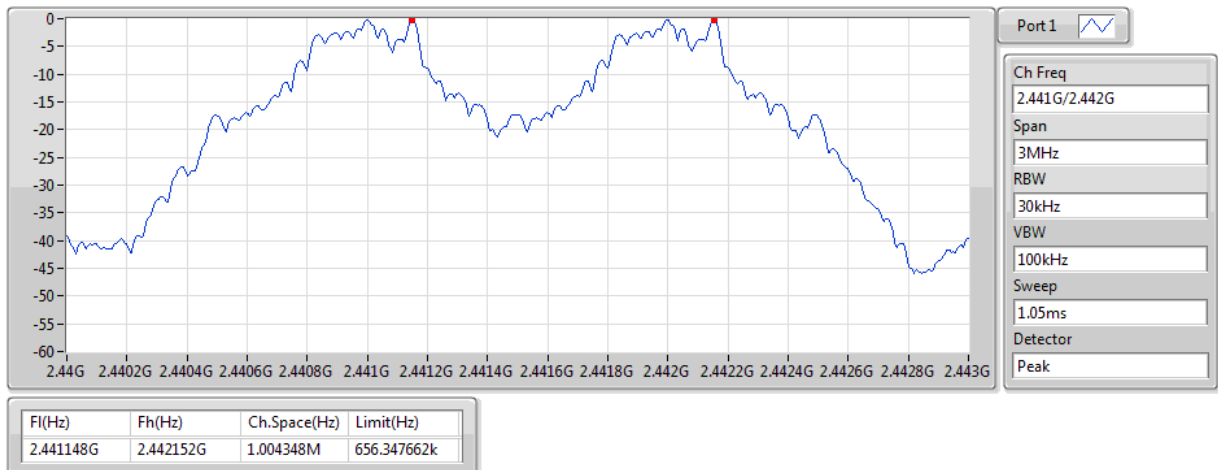


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BT-BR(1Mbps)

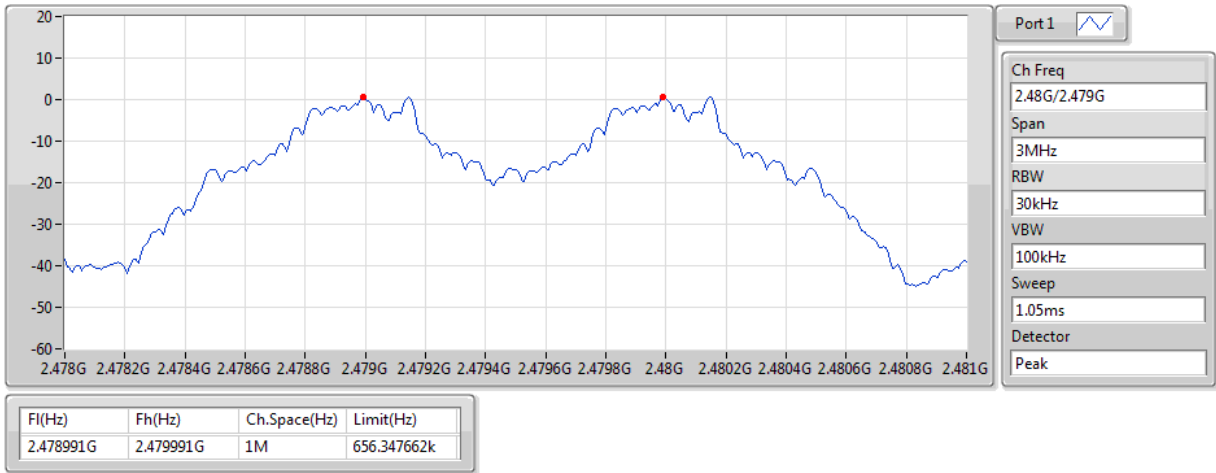
Channel Separation-FS

2.441G/2.442GHz



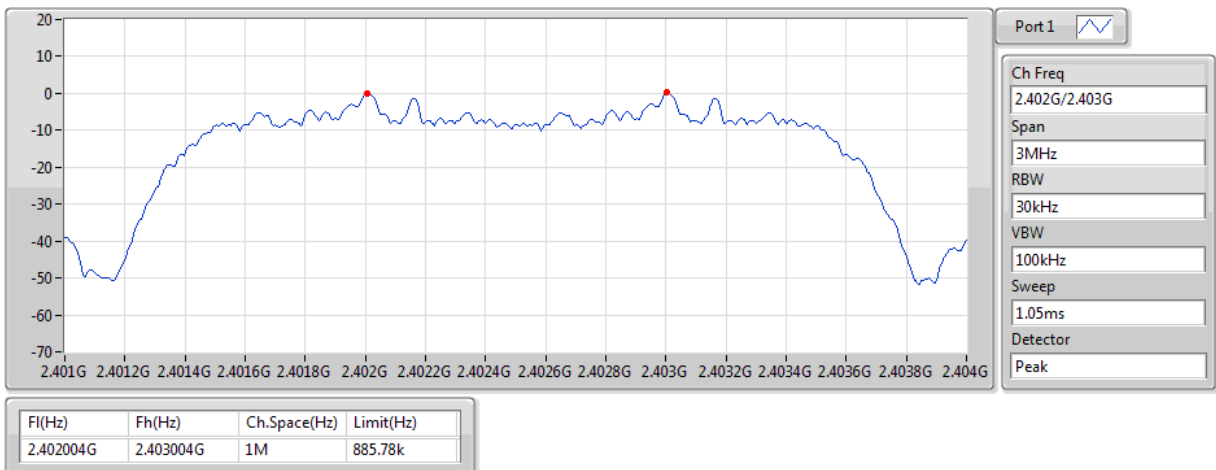
BT-BR(1Mbps)
2.48G/2.479GHz

Channel Separation-FS



BT-EDR(2Mbps)
2.402G/2.403GHz

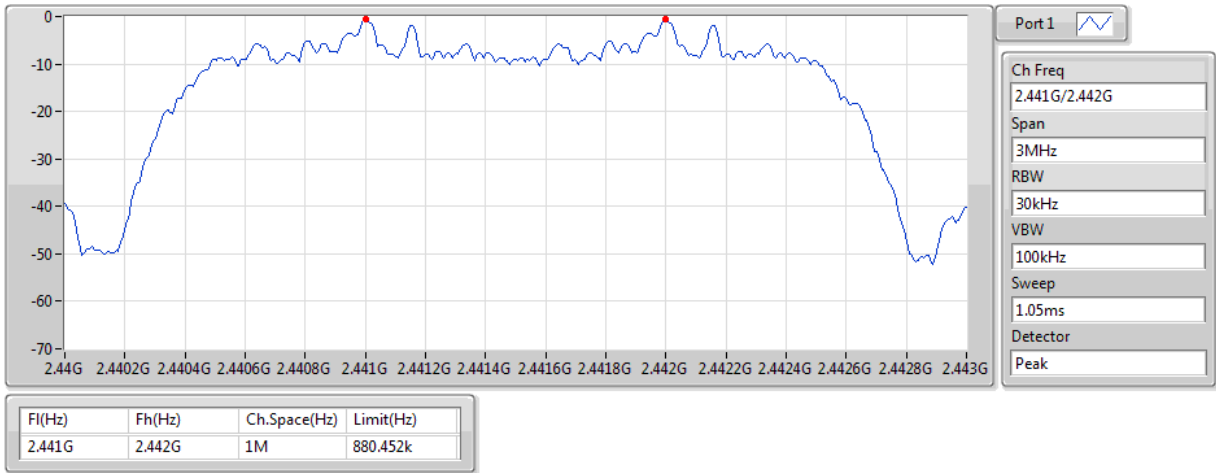
Channel Separation-FS



BT-EDR(2Mbps)

Channel Separation-FS

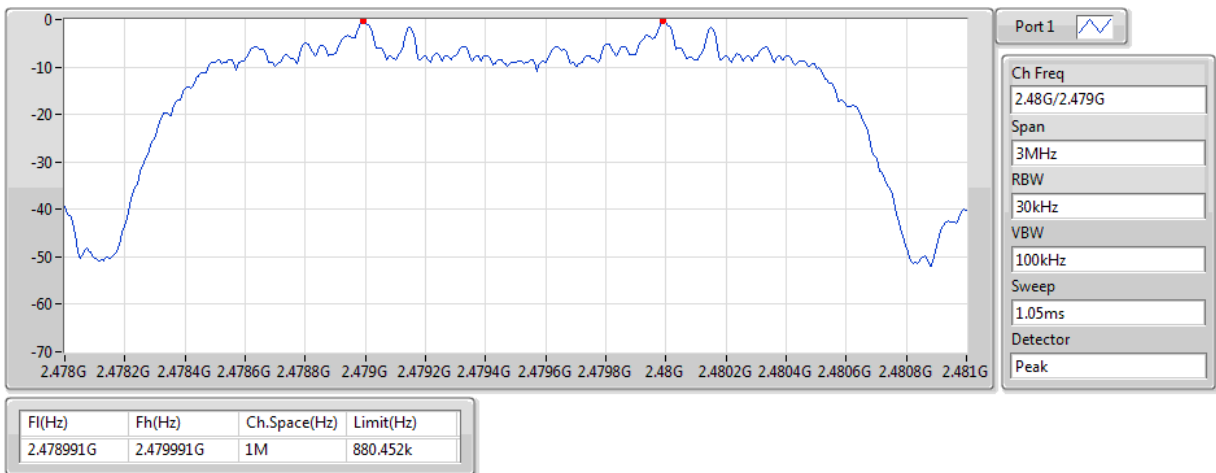
2.441G/2.442GHz



BT-EDR(2Mbps)

Channel Separation-FS

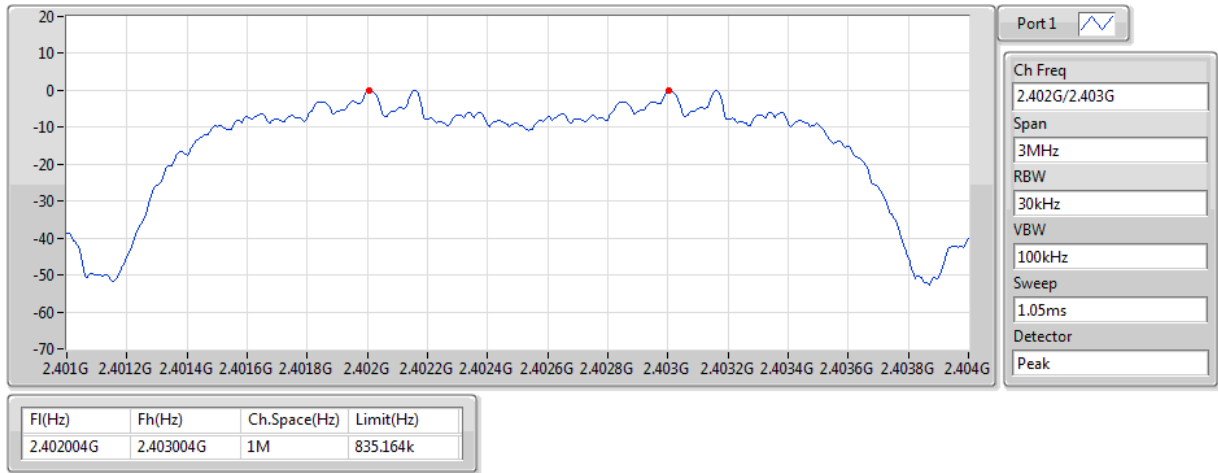
2.48G/2.479GHz



BT-EDR(3Mbps)

Channel Separation-FS

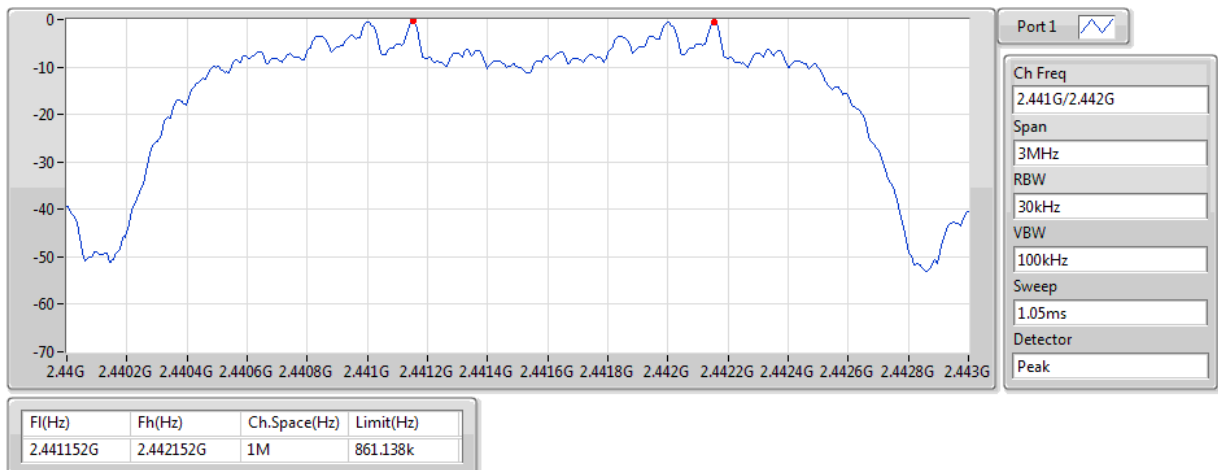
2.402G/2.403GHz



BT-EDR(3Mbps)

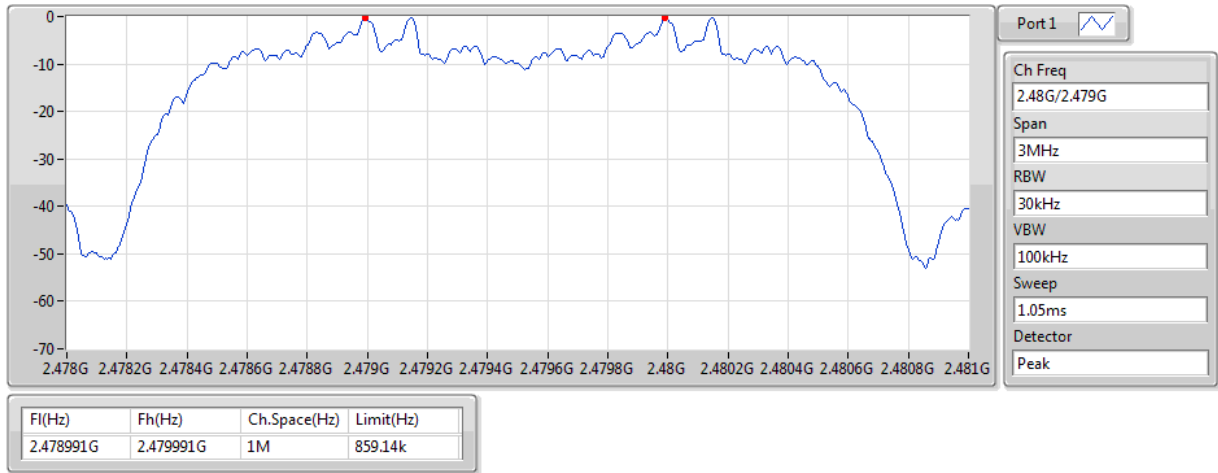
Channel Separation-FS

2.441G/2.442GHz



BT-EDR(3Mbps)
2.48G/2.479GHz

Channel Separation-FS



3.8 Number of Dwell Time

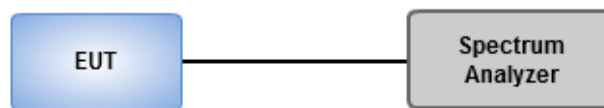
3.8.1 Limit of Dwell time

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.

3.8.2 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.

3.8.3 Test Setup



3.8.4 Test Result of Dwell Time

Ambient Condition	24°C / 66%	Tested By	Aska Huang
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Summary

Mode	Max-Dwell (s)
2.4-2.4835GHz	-
BT-BR(1Mbps)	347.06122m_DH5
BT-EDR(2Mbps)	310.7702m_DH5
BT-EDR(3Mbps)	329.24988m_DH5
BT-BR-AFH(1Mbps)	312.147m_DH5-AFH
BT-EDR-AFH(2Mbps)	300.794m_DH5-AFH
BT-EDR-AFH(3Mbps)	289.45m_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	0.34706	0.4	2.89025	19
BT-EDR(2Mbps)	-	-	-	-	-	-
2402MHz_DH5	PASS	31.6	0.31077	0.4	2.89250	17
BT-EDR(3Mbps)	-	-	-	-	-	-
2402MHz_DH5	PASS	31.6	0.32925	0.4	2.89425	18

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	0.31215	0.4	2.89025	27
BT-EDR-AFH(2Mbps)	-	-	-	-	-	-
2402MHz_DH5	PASS	8	0.30079	0.4	2.89225	26
BT-EDR-AFH(3Mbps)	-	-	-	-	-	-
2402MHz_DH5	PASS	8	0.28945	0.4	2.89450	25

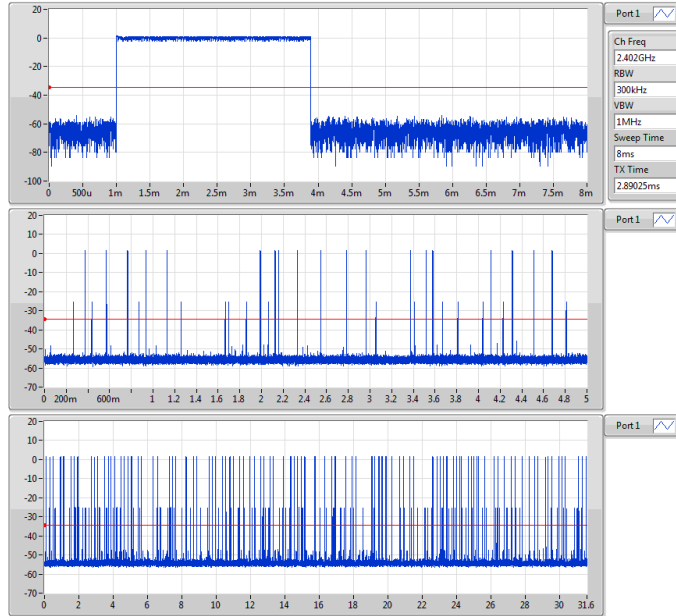
Note 1: Dwell time =Number of transmission in a 2 second x Tx On Time x 4

Note 2: DH5 was the worst mode.

BT-BR(1Mbps)

Dwell-FS

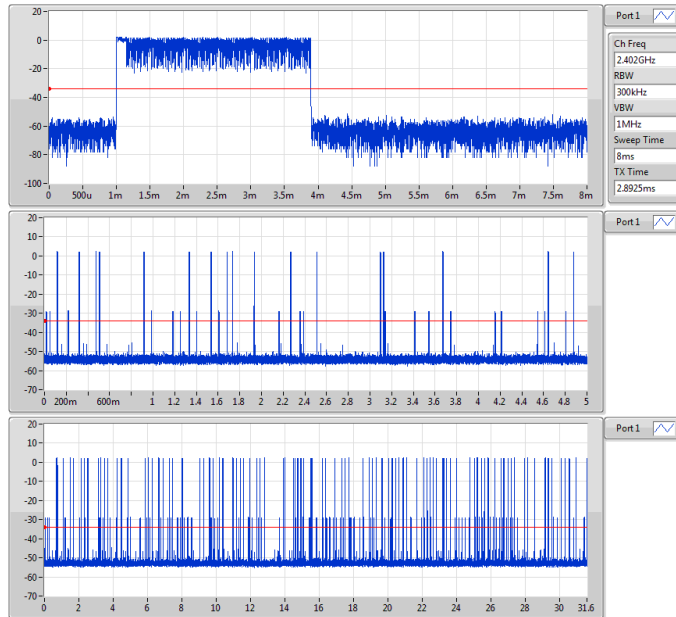
2402MHz



BT-EDR(2Mbps)

Dwell-FS

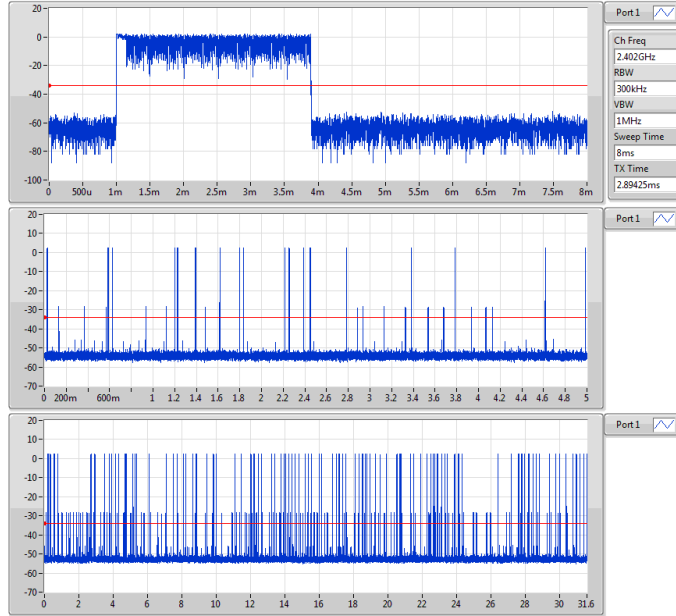
2402MHz



BT-EDR(3Mbps)

Dwell-FS

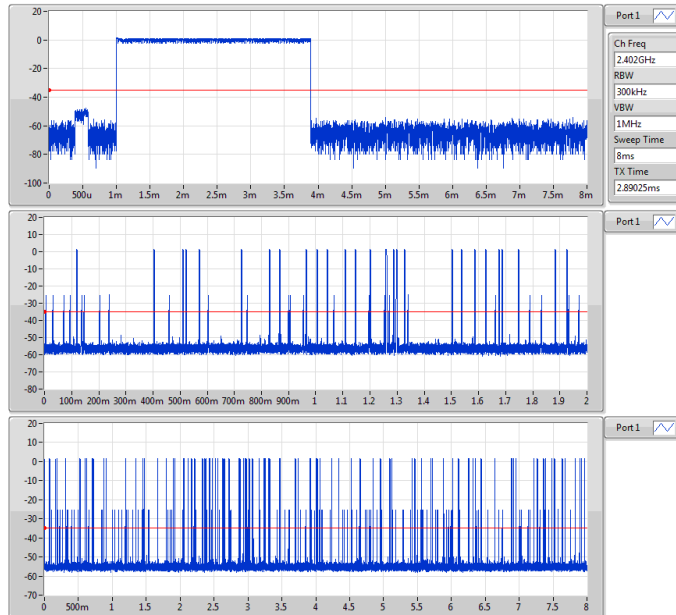
2402MHz



BT-BR-AFH(1Mbps)

Dwell-FS

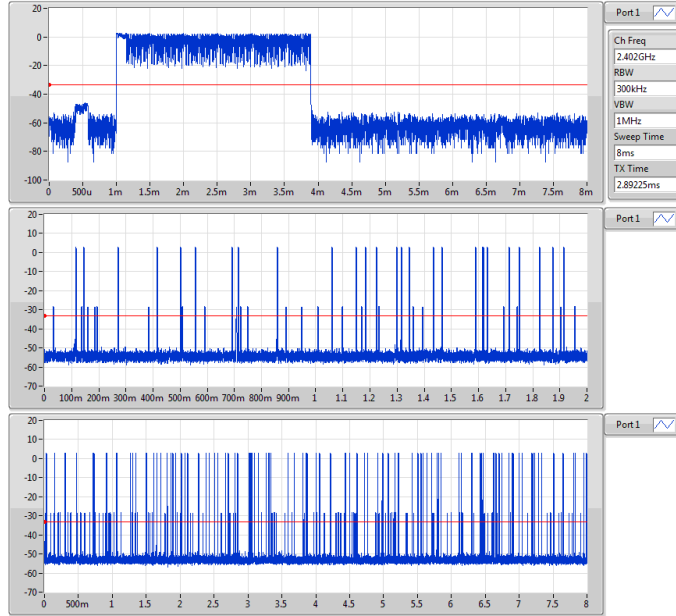
2402MHz



BT-EDR-AFH(2Mbps)

Dwell-FS

2402MHz



BT-EDR-AFH(3Mbps)

Dwell-FS

2402MHz



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

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