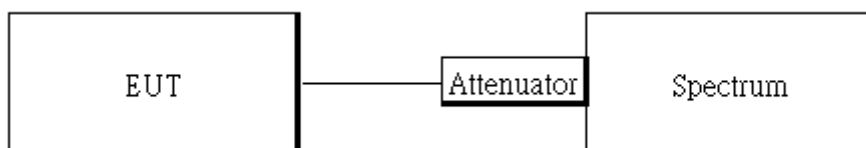


14 TIME OF OCCUPANCY (DWELL TIME)

14.1 Standard Applicable

Frequency hopping systems operating in the 2400MHz-2483.5MHz. The average time of occupancy on any frequency shall not greater than 0.4 s within period of 0.4 seconds multiplied by the number of hopping channel employed.

14.2 Test Setup



14.3 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows ANSI C63.10:2015.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set center frequency of spectrum analyzer = operating frequency.
5. Set the spectrum analyzer as RBW, VBW=1MHz, 3MHz, Span = 0Hz, Detector = Peak, Adjust Sweep = 2~8ms.
6. Repeat above procedures until all frequency of the interest measured were complete.

Formula Deduced: time occupancy of one time slot X Hopping rate / total slot in one channel / total channel that hops X period of working channels.

Where, standard hopping rate is 1600 hops/s, slot in one channel for DH1, DH3, and DH5 is 2, 4, and 6, respectively.

DH1 consists of single time slot of the uplink, and one slot of the downlink Total Slot: 2

DH3 consists of three time slot of the uplink, and one slot of the downlink. Total Slot: 4

DH5 consists of five time slot of the uplink, and one slot of the downlink. Total Slot: 6

Note: the result of the complete test default channel at 1Mbps is recorded on the test report, 2Mbps, and 3Mbps only records the measurement result at middle channel that reveals no much deviation.

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14.4 Measurement Result

1XL

GFSK (1Mbps)

Channel	PACKET TYPE	Measurement Result (ms)	Limit (ms)	VBW setting (kHz)
Mid	DH1	123.20	400ms	3.00
	DH3	264.00	400ms	1.00
	DH5	308.80	400ms	1.00

$\pi/4$ DQPSK (2Mbps)

Channel	PACKET TYPE	Measurement Result (ms)	Limit (ms)	VBW setting (kHz)
Mid	2DH1	123.20	400ms	3.00
	2DH3	262.40	400ms	1.00
	2DH5	307.20	400ms	1.00

8-DPSK (3Mbps)

Channel	PACKET TYPE	Measurement Result (ms)	Limit (ms)	VBW setting (kHz)
Mid	3DH1	123.20	400ms	3.00
	3DH3	260.80	400ms	1.00
	3DH5	308.80	400ms	1.00

GFSK (1Mbps):

CH Mid DH1 time slot = 0.385 * (1600/2/79) * 31.6 = 123.20 (ms)
 DH3 time slot = 1.650 * (1600/4/79) * 31.6 = 264.00 (ms)
 DH5 time slot = 2.895 * (1600/6/79) * 31.6 = 308.80 (ms)

$\pi/4$ -DQPSK (2Mbps):

CH Mid 2DH1 time slot = 0.385 * (1600/2/79) * 31.6 = 123.20 (ms)
 2DH3 time slot = 1.640 * (1600/4/79) * 31.6 = 262.40 (ms)
 2DH5 time slot = 2.880 * (1600/6/79) * 31.6 = 307.20 (ms)

8-DPSK (3Mbps):

CH Mid 3DH1 time slot = 0.385 * (1600/2/79) * 31.6 = 123.20 (ms)
 3DH3 time slot = 1.630 * (1600/4/79) * 31.6 = 260.80 (ms)
 3DH5 time slot = 2.895 * (1600/6/79) * 31.6 = 308.80 (ms)

A period time = 0.4 (s) * 79 = 31.6 (s)

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2XS

GFSK (1Mbps)

Channel	PACKET TYPE	Measurement Result (ms)	Limit (ms)	VBW setting (kHz)
Mid	DH1	123.20	400ms	3.00
	DH3	262.40	400ms	1.00
	DH5	308.80	400ms	1.00

$\pi/4$ DQPSK (2Mbps)

Channel	PACKET TYPE	Measurement Result (ms)	Limit (ms)	VBW setting (kHz)
Mid	2DH1	124.80	400ms	3.00
	2DH3	262.40	400ms	1.00
	2DH5	307.20	400ms	1.00

8-DPSK (3Mbps)

Channel	PACKET TYPE	Measurement Result (ms)	Limit (ms)	VBW setting (kHz)
Mid	3DH1	124.80	400ms	3.00
	3DH3	262.40	400ms	1.00
	3DH5	308.80	400ms	1.00

GFSK (1Mbps):

CH Mid	DH1 time slot =	0.385 * (1600/2/79) *	31.6 =	123.20 (ms)
	DH3 time slot =	1.640 * (1600/4/79) *	31.6 =	262.40 (ms)
	DH5 time slot =	2.895 * (1600/6/79) *	31.6 =	308.80 (ms)

$\pi/4$ -DQPSK (2Mbps):

CH Mid	2DH1 time slot =	0.390 * (1600/2/79) *	31.6 =	124.80 (ms)
	2DH3 time slot =	1.640 * (1600/4/79) *	31.6 =	262.40 (ms)
	2DH5 time slot =	2.880 * (1600/6/79) *	31.6 =	307.20 (ms)

8-DPSK (3Mbps):

CH Mid	3DH1 time slot =	0.390 * (1600/2/79) *	31.6 =	124.80 (ms)
	3DH3 time slot =	1.640 * (1600/4/79) *	31.6 =	262.40 (ms)
	3DH5 time slot =	2.895 * (1600/6/79) *	31.6 =	308.80 (ms)

A period time = 0.4 (s) * 79 = 31.6 (s)

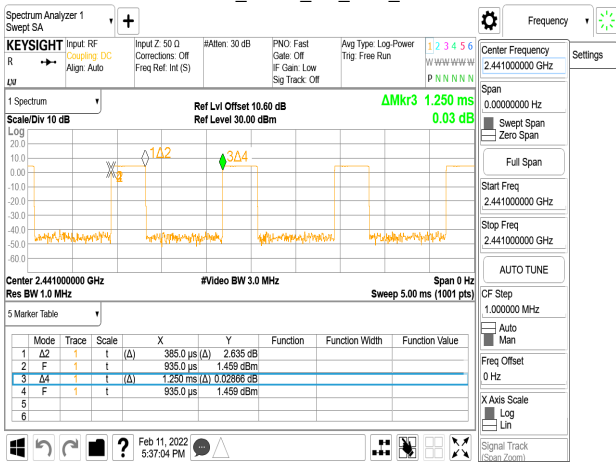
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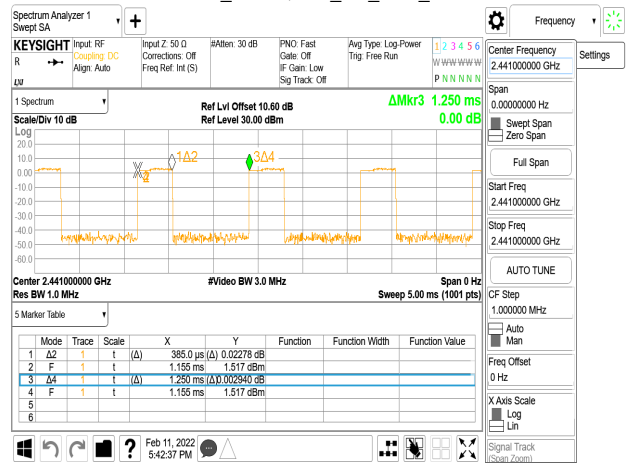
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1XL

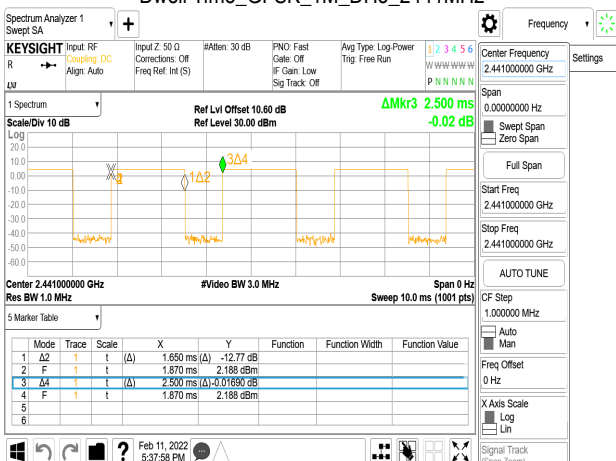
Dwell Time_GFSK_1M_DH1_2441MHz



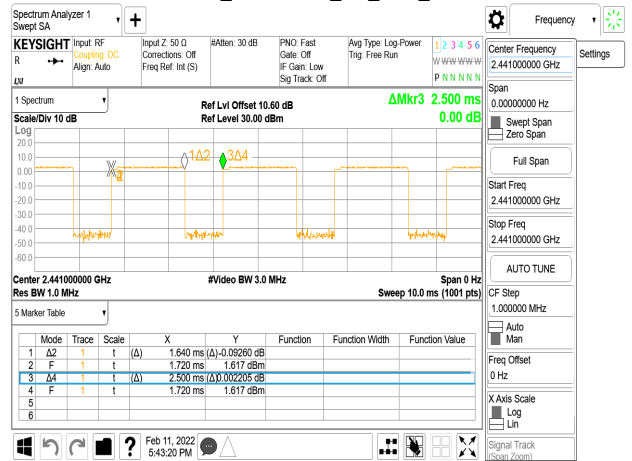
Dwell Time_π/4DQPSK_2M_DH1_2441MHz



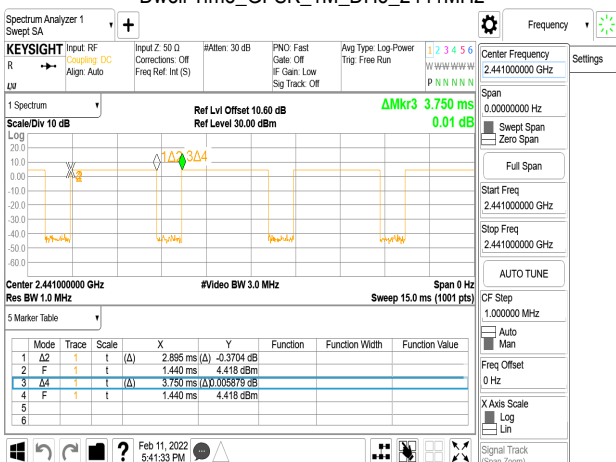
Dwell Time_GFSK_1M_DH3_2441MHz



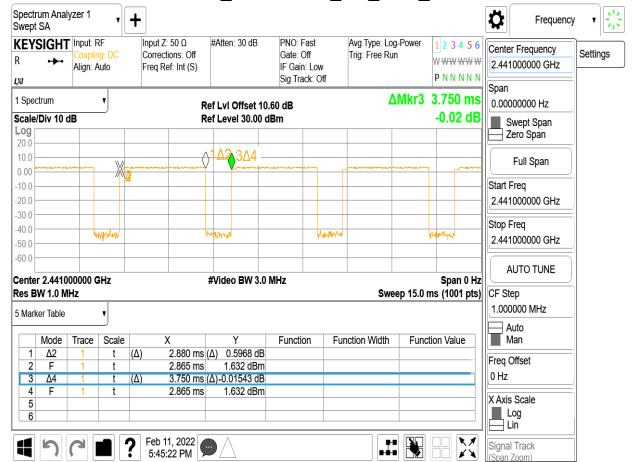
Dwell Time_π/4DQPSK_2M_DH3_2441MHz



Dwell Time_GFSK_1M_DH5_2441MHz



Dwell Time_π/4DQPSK_2M_DH5_2441MHz

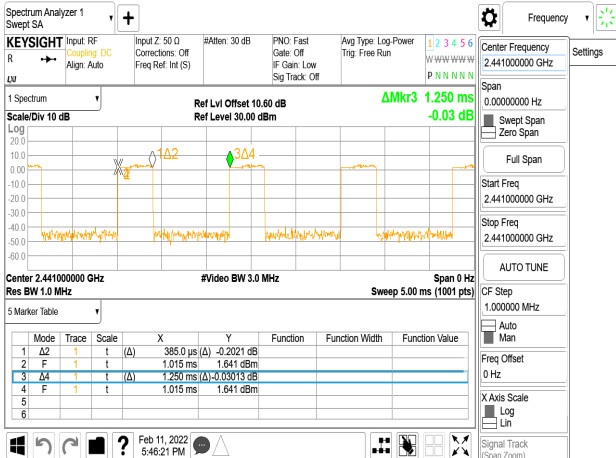


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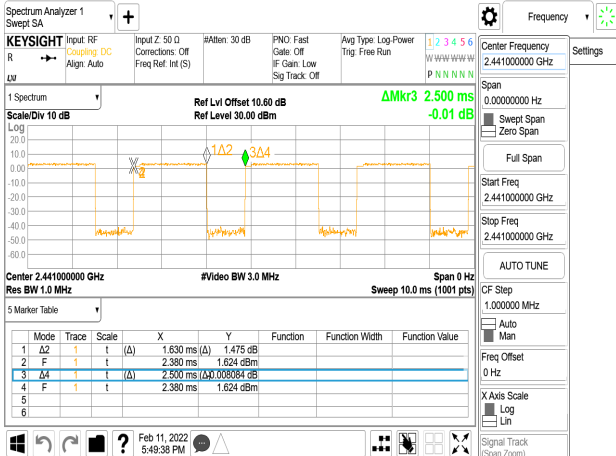
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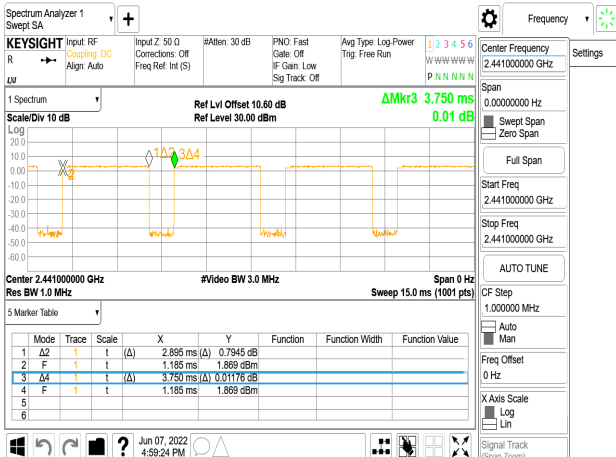
Dwell Time_8DPSK_3M_DH1_2441MHz



Dwell Time_8DPSK_3M_DH3_2441MHz



Dwell Time_8DPSK_3M_DH5_2441MHz



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15 ANTENNA REQUIREMENT

15.1 Standard Applicable

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§ 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

15.2 Antenna Connected Construction

The antenna is designed with unique RF connector and no consideration of replacement. Please see EUT photo for details.

~ End of Report ~

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