ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No.	**: OT-197-RWD-052**
AGR No.	**: A195A-120**
Applicant	**: LG Electronics USA**
Address	**: 1000 Sylvan Avenue, Englewood Cliffs, New Jersey, 07632, United States**
Manufacturer	**: LG Electronics Inc.**
Address	**: 222 LG-ro, Jinwi-Myeon, Pyeongtaek -Si, Gyeonggi-Do, 451-713, Korea**
Type of Equipment	**: Wireless module**
FCC ID.	**: BEJRBHP-B213B**
Model Name	**: RBHP-B213B**
Multiple Model Name	**: N/A**
Serial number	**: N/A**
Total page of Report	**: 97 pages (including this page)**
Date of Incoming	**: June 20, 2019**
Date of issue	**: July 22, 2019**

SUMMARY

The equipment complies with the regulation; ***FCC PART 15 SUBPART C Section 15.247***

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

Reviewed by: Tae-Ho, Kim / Senior Manager, ONETECH Corp.

Approved by: Ki-Hong, Nam / Chief Engineer, ONETECH Corp.

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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-197-RWD-052	July 22, 2019	Initial Release	All

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1. VERIFICATION OF COMPLIANCE

Applicant	: LG Electronics USA
Address	: 1000 Sylvan Avenue, Englewood Cliffs, New Jersey, 07632, United States
Contact Person	: Kyung-Su, Han / Director, Standards & Compliance
Telephone No.	: +201-472-2623
FCC ID	: BEJRBHP-B213B
Model Name	: RBHP-B213B
Brand Name	: N/A
Serial Number	: N/A
Date	: July 22, 2019

EQUIPMENT CLASS	DSS – PART 15 SPREAD SPECTRUM TRANSMITTER
E.U.T. DESCRIPTION	Wireless module
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.247 558074 D01 15.247 Meas Guidance v05r02
Modifications on the Equipment to Achieve Compliance	None
Final Test was Conducted On	3 m, Semi Anechoic Chamber

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

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2. TEST SUMMARY

2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
15.247 (a) (1)	Carrier Frequency Separation	Met the Limit / PASS
15.247 (a) (1) (iii)	Minimum Number of Hopping Channels	Met the Limit / PASS
15.247 (a) (1) (iii)	Average Time of Occupancy	Met the Limit / PASS
15.247 (b) (1)	Maximum Peak Conducted Output Power	Met the Limit / PASS
15.247 (d)	100 kHz Bandwidth Outside the Frequency Band	Met the Limit / PASS
15.247 (d)	Radiated Emission which fall in the Restricted Band	Met the Limit / PASS
15.209	Radiated Emission Limits, General Requirement	Met the Limit / PASS
15.207	Conducted Limits	Met the Limit / PASS
15.203	Antenna Requirement	Met requirement / PASS

2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

2.3 Related Submittal(s) / Grant(s)

Original submittal only

2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in FCC PART 15 SUBPART C Section 15.247.

2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2013. Radiated testing was performed at a distance of 3 m from EUT to the antenna.

2.6 Test Facility

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-4112/ C-14617/ G-10666 / T-1842

IC (Industry Canada) – Registration No. Site# 3736A-3

-. Site Accreditation:

KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation NO. KT085

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

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3. GENERAL INFORMATION

3.1 Product Description

The LG Electronics USA, Model RBHP-B213B (referred to as the EUT in this report) is a Wireless module. The product specification described herein was obtained from product data sheet or user's manual.

<table>
<tr><td>DEVICE TYPE</td><td colspan="3">Wireless module</td></tr>
<tr><td>Temperature Range</td><td colspan="3">-20 ℃ ~ 55 ℃</td></tr>
<tr><td rowspan="5">OPERATING FREQUENCY</td><td>Bluetooth</td><td colspan="2">2 402 MHz ~ 2 480 MHz</td></tr>
<tr><td>WLAN 2.4 GHz</td><td colspan="2">2 412 MHz ~ 2 462 MHz (802.11b/g/n(HT20))</td></tr>
<tr><td rowspan="3">5 725 MHz ~ 5 850 MHz Band</td><td colspan="2">5 745 MHz ~ 5 825 MHz (802.11a/n(HT20)/ac(VHT20))</td></tr>
<tr><td colspan="2">5 755 MHz ~ 5 795 MHz (802.11n(HT40)/ac(VHT40))</td></tr>
<tr><td colspan="2">5 775 MHz (802.11ac(VHT80))</td></tr>
<tr><td rowspan="3">MODULATION TYPE</td><td>Bluetooth</td><td colspan="2">GFSK for 1Mbps, π/4-DQPSK for 2Mbps, 8-DPSK for 3Mbps</td></tr>
<tr><td>WLAN 2.4 GHz</td><td colspan="2">DSSS Modulation(DBPSK/DQPSK/CCK)
OFDM Modulation(BPSK/QPSK/16QAM/64QAM)</td></tr>
<tr><td>WLAN 5 GHz</td><td colspan="2">OFDM Modulation(BPSK/QPSK/16QAM/64QAM)</td></tr>
<tr><td rowspan="7">RF OUTPUT POWER'</td><td rowspan="3">Bluetooth</td><td>1 Mbps</td><td>1.03 dBm</td></tr>
<tr><td>2 Mbps</td><td>-2.27 dBm</td></tr>
<tr><td>3 Mbps</td><td>-1.91 dBm</td></tr>
<tr><td>WLAN 2.4 GHz</td><td colspan="2">14.56 dBm(802.11b)
9.90 dBm(802.11g)
9.30 dBm(802.11n_HT20)</td></tr>
<tr><td rowspan="3">5 725 MHz ~ 5 850 MHz Band</td><td>Antenna 0</td><td>6.28 dBm(802.11a)
6.22 dBm(802.11n_HT20)
6.07 dBm(802.11n_HT40)
5.74 dBm(802.11ac_VHT80)</td></tr>
<tr><td>Antenna 1</td><td>10.07 dBm(802.11a)
9.99 dBm(802.11n_HT20)
10.29 dBm(802.11n_HT40)
9.62 dBm(802.11ac_VHT80)</td></tr>
<tr><td>Multiple Antenna</td><td>11.51 dBm(802.11n_HT20)
11.68 dBm(802.11n_HT40)
11.11 dBm(802.11ac_VHT80)</td></tr>
</table>

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MODULATION TYPE	Bluetooth	GFSK for 1Mbps, π/4-DQPSK for 2Mbps, 8-DPSK for 3Mbps		
	WLAN 2.4 G	DSSS Modulation(DBPSK/DQPSK/CCK) OFDM Modulation(BPSK/QPSK/16QAM/64QAM)		
	WLAN 5 G	OFDM Modulation(BPSK/QPSK/16QAM/64QAM)		
Antenna Type	PCB Antenna			
ANTENNA GAIN	2.4 GHz Band	Antenna 0 (Bluetooth + 5 GHz WiFi)		5.28 dBi
		Antenna 1 (2.4 GHz WiFi + 5 GHz WiFi)		2.29 dBi
	5 GHz Band	5 725 MHz ~ 5 850 MHz	Antenna 0 (Bluetooth + 5 GHz WiFi)	2.47 dBi
			Antenna 1 (2.4 GHz WiFi + 5 GHz WiFi)	2.28 dBi
			Antenna 0 + 1	5.39 dBi
	Intermodulation Mode		Bluetooth + 2.4 GHz WiFi (Antenna 0 + Antenna 1)	7.05 dBi
			Bluetooth + 5 GHz WiFi (Antenna 0 + Antenna 1)	7.04 dBi
List of each Osc. or crystal Freq. (Freq. >= 1 MHz)	37.4 MHz			

3.2 Alternative type(s)/model(s); also covered by this test report.

-. None

4. EUT MODIFICATIONS

-. None

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5. SYSTEM TEST CONFIGURATION

5.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
MAIN BOARD	LG Electronics Inc.	GWANG_SMD	-

5.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested:

Model	Manufacturer	Description	Connected to
RBHP-B213B	LG Electronics Inc.	Wireless module (EUT)	-
N/A	N/A	Jig Board	EUT
HP Pavilion g series	HP	Notebook PC	-
PPP009C	LIE-ON TECHNOLOGY (CHANGZHOU)CO.,LTD.	AC Adapter	-

5.3 Mode of operation during the test

For the testing, software used to control the EUT for staying in continuous transmitting is programmed.

For final testing, the EUT was set at 2 402 MHz, 2 441MHz, and 2 480 MHz to get a maximum emission levels from the EUT. The EUT was moved throughout the XY, XZ, and YZ planes and the worst case is “XZ” axis, but the worst data was recorded in this report.

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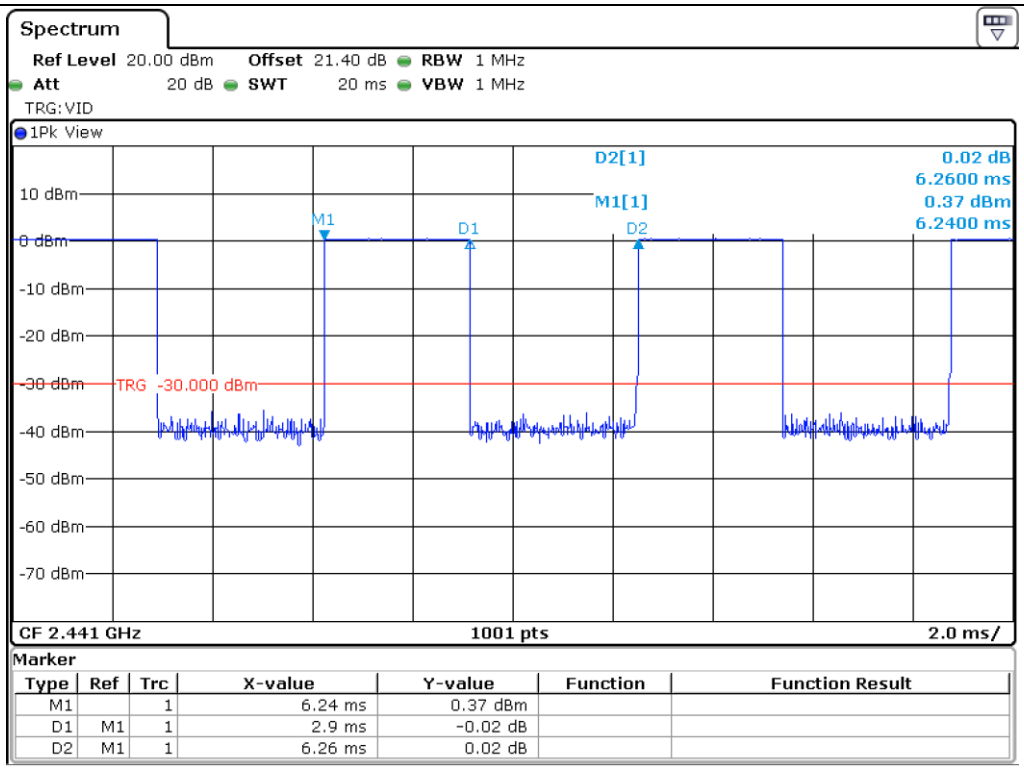
-. Duty Cycle

Mode	Tx On Time [ms]	Tx Off Time [ms]	Duty Cycle [%]	Correction Factor [dB]
1 Mbps (DH5)	2.90	3.36	46.33	3.34
2 Mbps (DH5)	2.88	3.38	46.01	3.37
3 Mbps (DH5)	2.90	3.36	46.33	3.34

Note – Duty Cycle : (Tx On Time / (Tx On Time + Tx Off Time)) * 100

Correction Factor : 10 * Log(1 / (Duty Cycle / 100))

-. Test Plot



1 Mbps (DH5)

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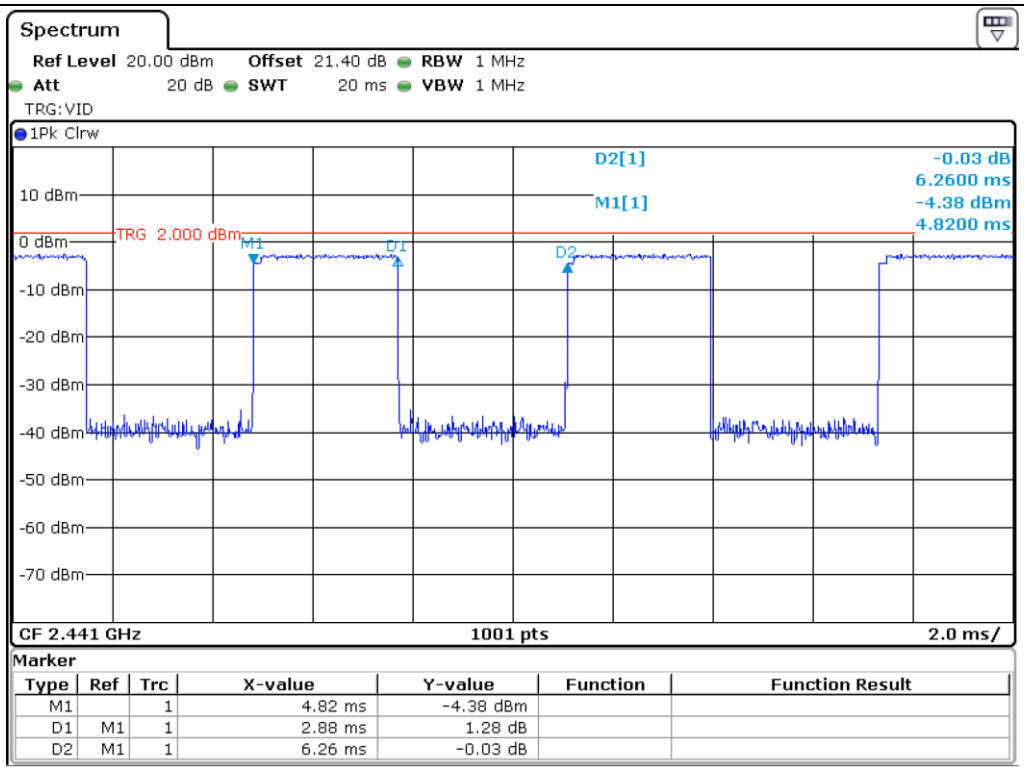
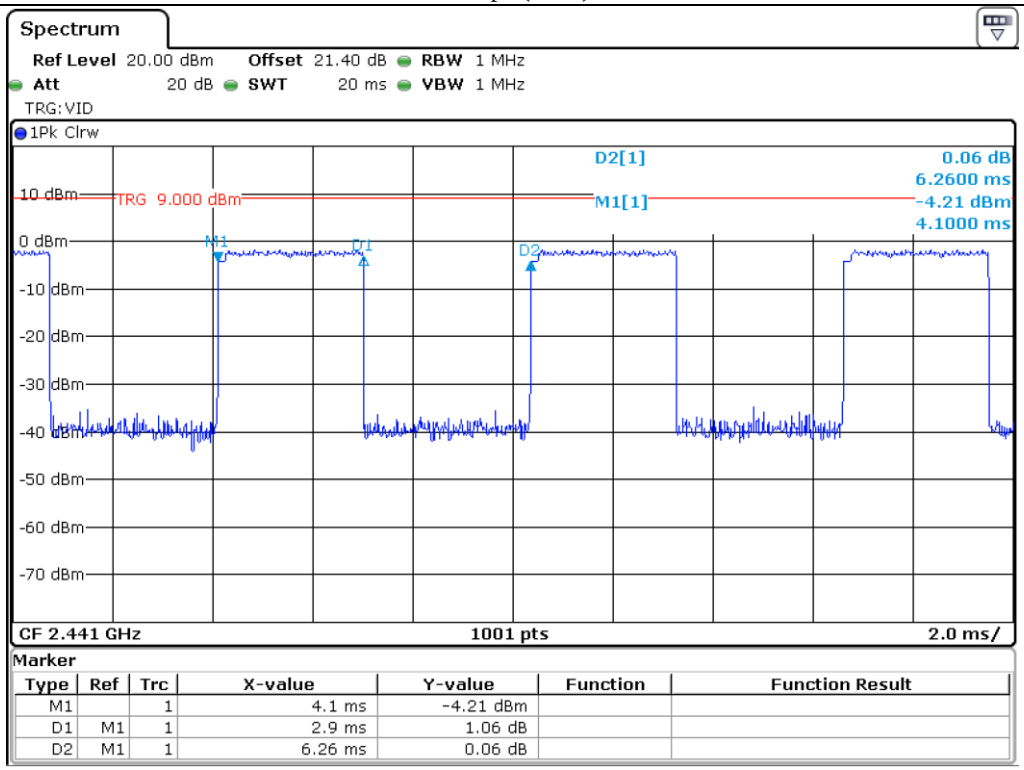


2 Mbps (DH5)



3 Mbps (DH5)

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5.4 Configuration of Test System

Line Conducted Test: The EUT was connected to Jig Board and the power was connected to DC Power Supply. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions.

Radiated Emission Test: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 meter Semi Anechoic Chamber.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

5.5 Antenna Requirement

For intentional device, according to section 15.203, 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.

Antenna Construction:

The antenna of the EUT is a PCB Antenna on the main board in the EUT, so no consideration of replacement by the user.

6. PRELIMINARY TEST

6.1 AC Power line Conducted Emissions Tests

During Preliminary Test, the following operating mode was investigated.

Operation Mode	The Worse operating condition (Please check one only)
Transmitting Mode	X

6.2 General Radiated Emissions Tests

During Preliminary Test, the following operating mode was investigated.

Operation Mode	The Worse operating condition (Please check one only)
Transmitting Mode	X

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7. MINIMUM 20 dB BANDWIDTH

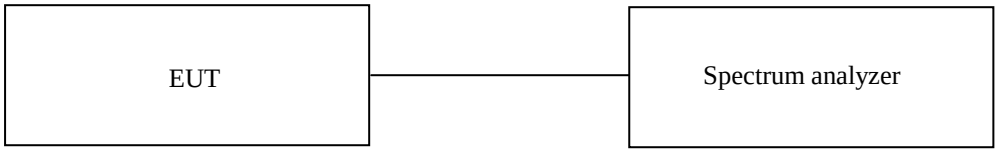
7.1 Operating environment

Temperature : 25 ℃

Relative humidity : 46 % R.H.

7.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 10 kHz, and peak detection was used. The 20 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 20 dB.



7.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Mar. 11, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

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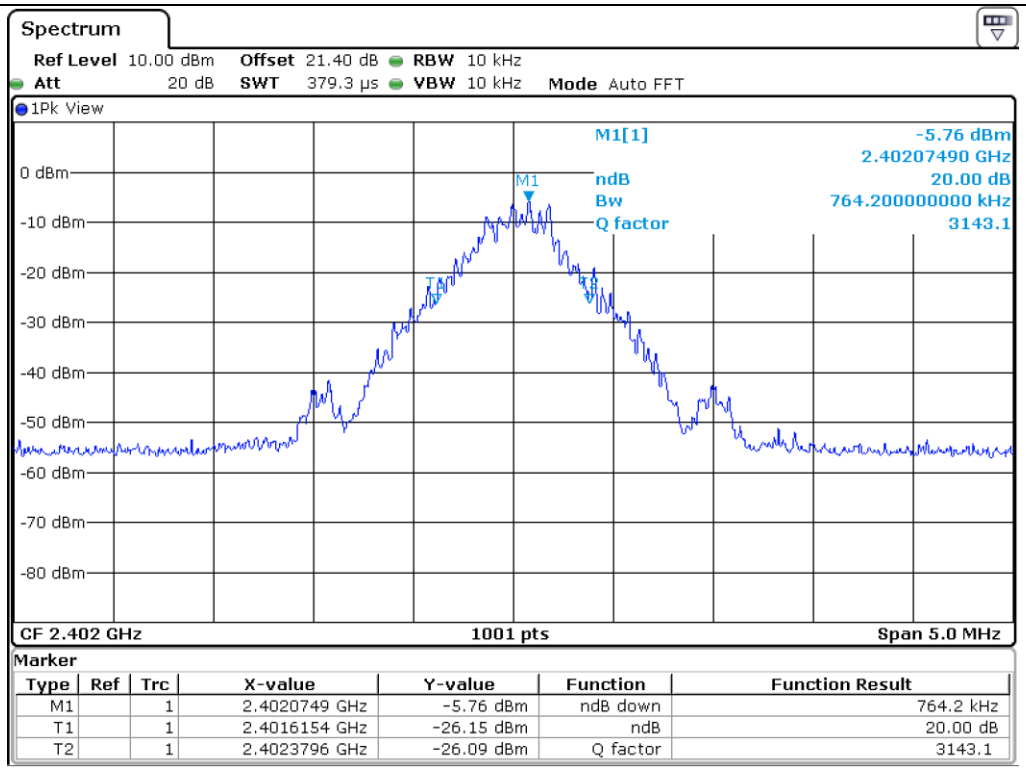
7.4 Test data for 1 Mbps

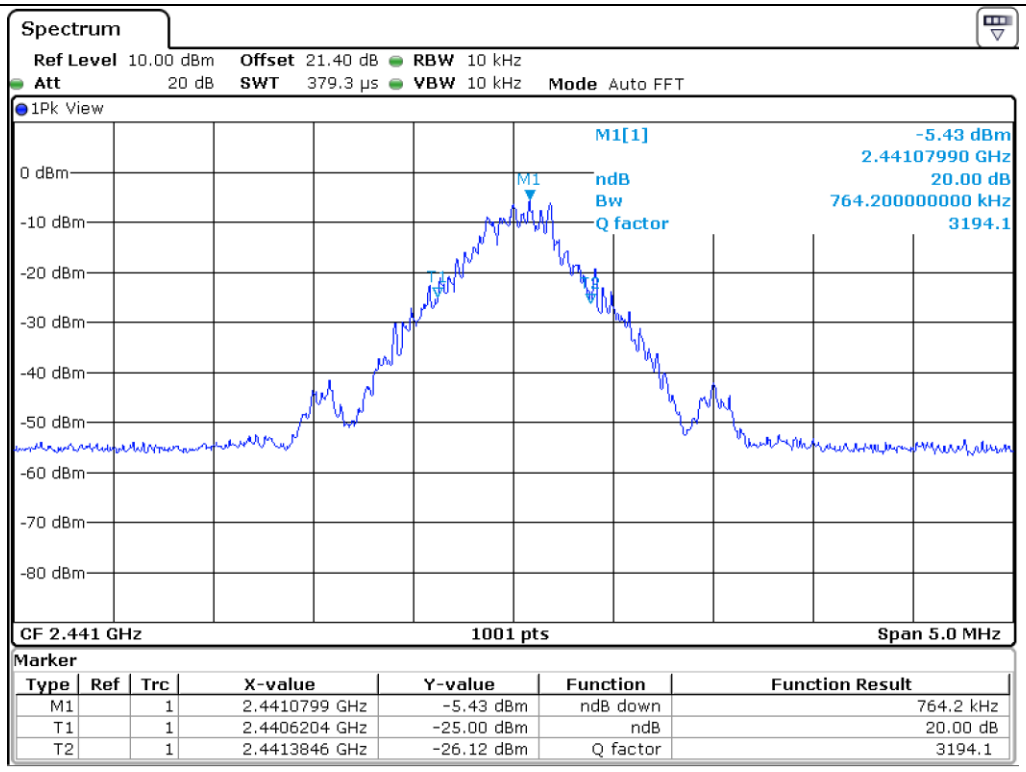
-. Test Date : June 20, 2019 ~ June 26, 2019

CHANNEL	FREQUENCY (MHz)	20 dB Bandwidth (kHz)
Low	2 402.00	764.20
Middle	2 441.00	764.20
High	2 480.00	764.20

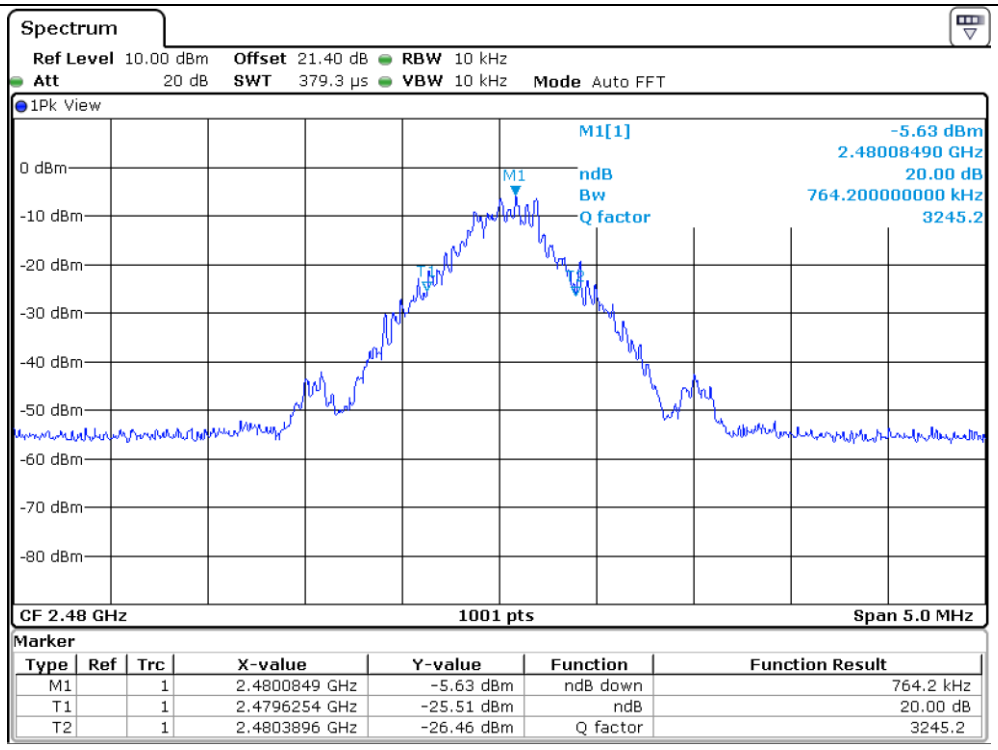
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

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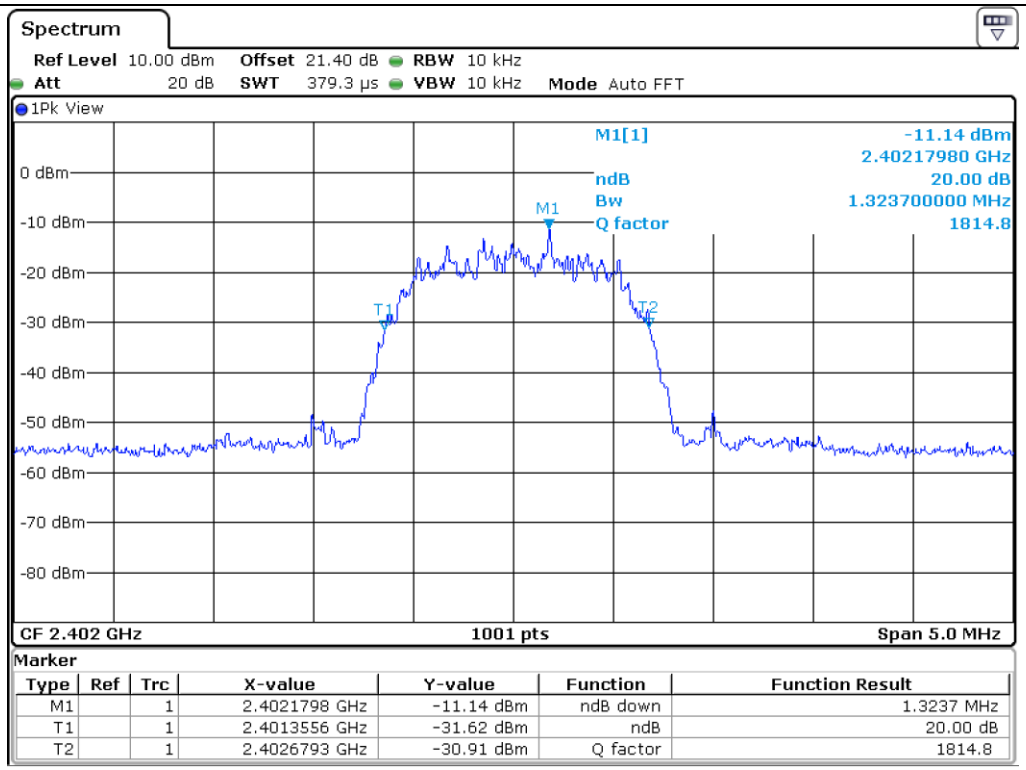
7.5 Test data for 2 Mbps

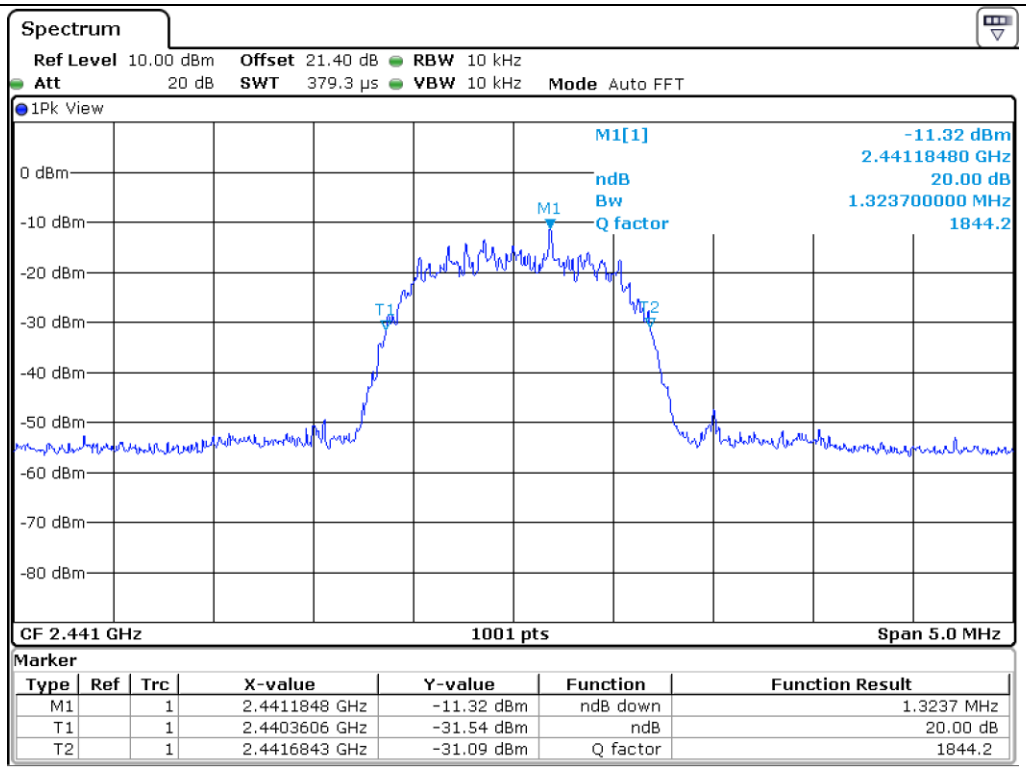
-. Test Date : June 20, 2019 ~ June 26, 2019

CHANNEL	FREQUENCY (MHz)	20 dB Bandwidth (kHz)
Low	2 402.00	1 323.70
Middle	2 441.00	1 323.70
High	2 480.00	1 323.70

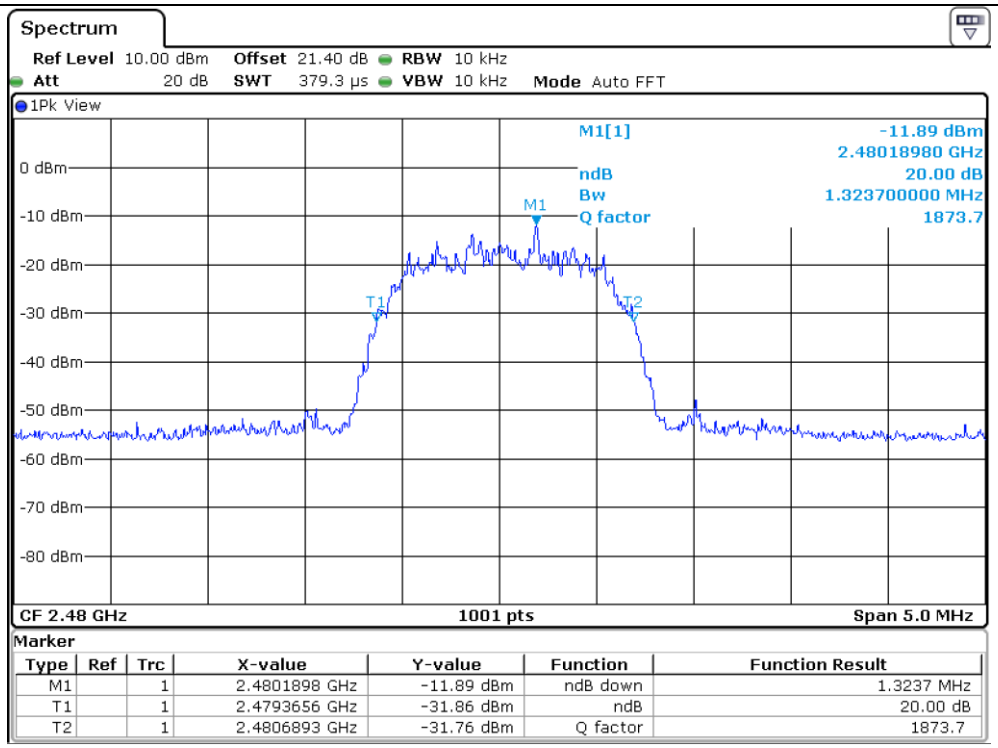
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

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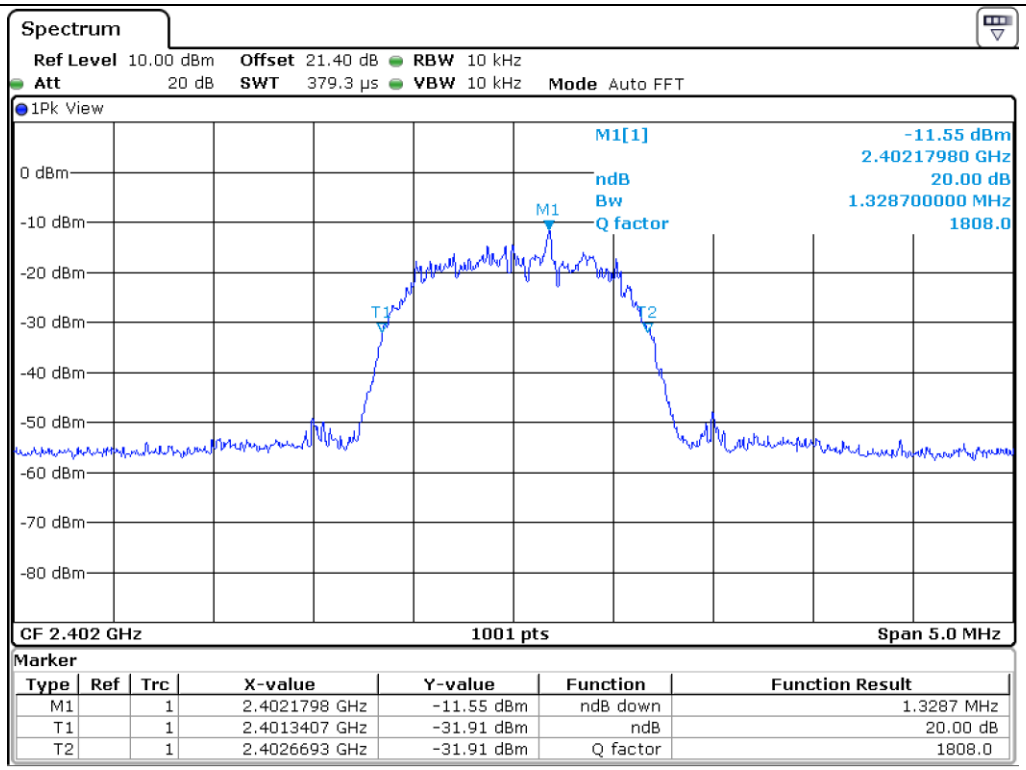
7.6 Test data for 3 Mbps

-. Test Date : June 20, 2019 ~ June 26, 2019

CHANNEL	FREQUENCY (MHz)	20 dB Bandwidth (kHz)
Low	2 402.00	1 328.70
Middle	2 441.00	1 323.70
High	2 480.00	1 328.70

Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel

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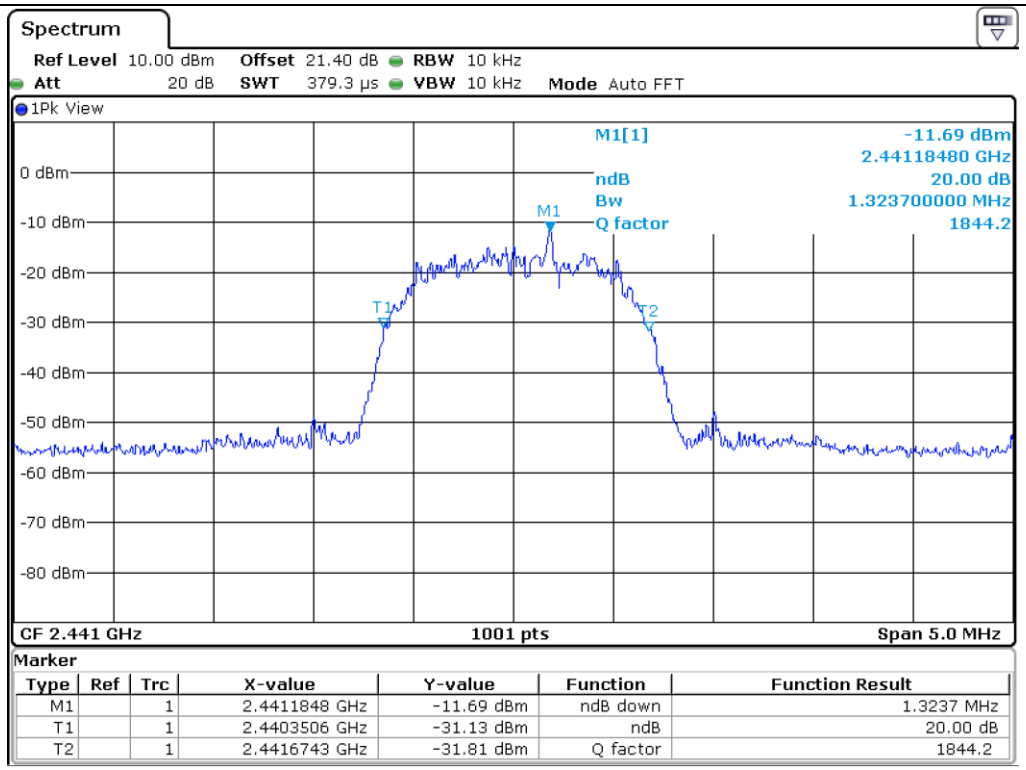
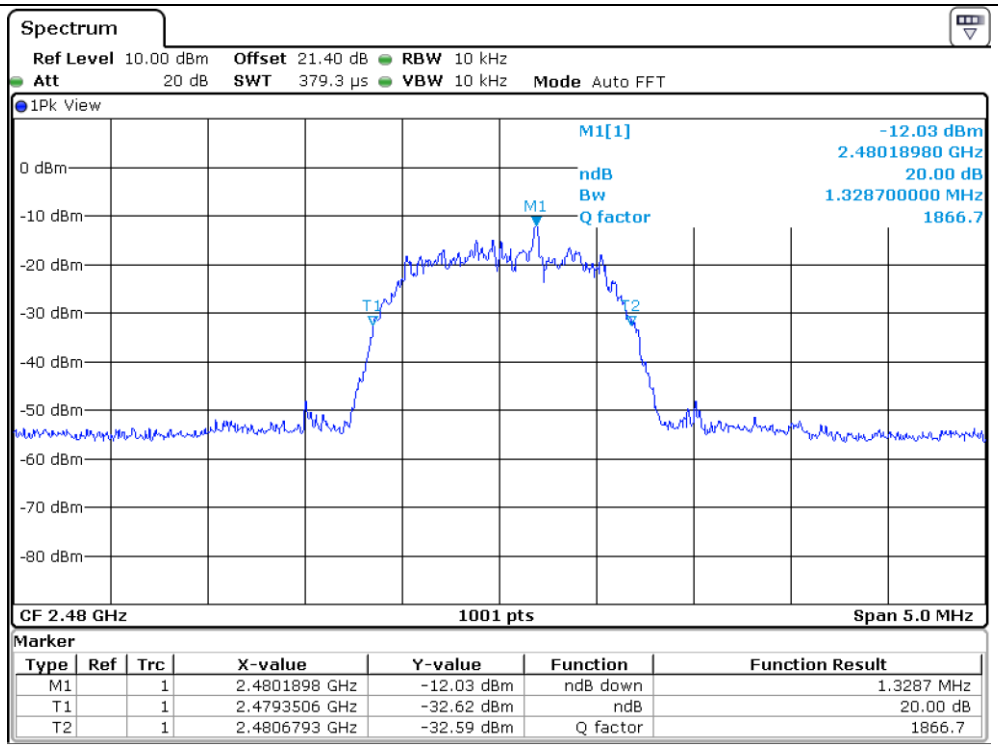


Middle Channel



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8. HOPPING FREQUENCY SEPARATION

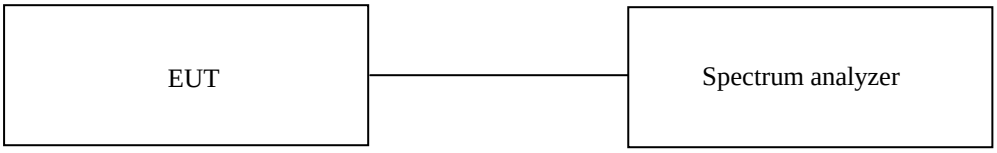
8.1 Operating environment

Temperature : 25 ℃

Relative humidity : 46 % R.H.

8.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The frequency span is set to 5 MHz. The analyzer is set to peak hold then a pseudo-random hopping sequence of the transmitter is captured. The mark delta function was used to measure the frequency separation between two adjacent hopping channels.



8.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Mar. 11, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

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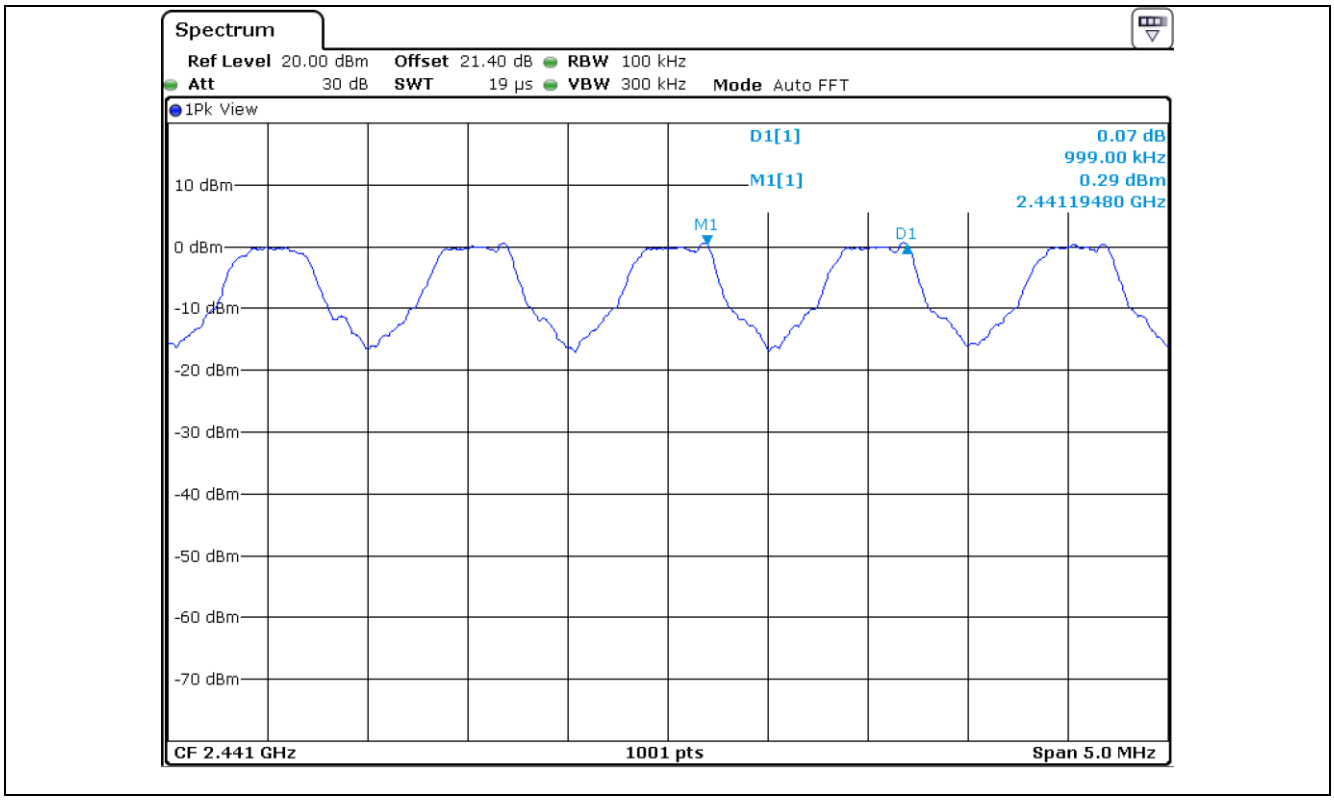
8.4 Test data for 1 Mbps

-. Test Date : June 20, 2019 ~ June 26, 2019

-. Test Result : Pass

MEASURED VLAUE (kHz)	Two-third of 20 dB Bandwidth (kHz)	LIMIT
999.00	509.47	Separated by a minimum of 25 kHz

Tested by: Hyung-Kwon, Oh / Assistant Manager



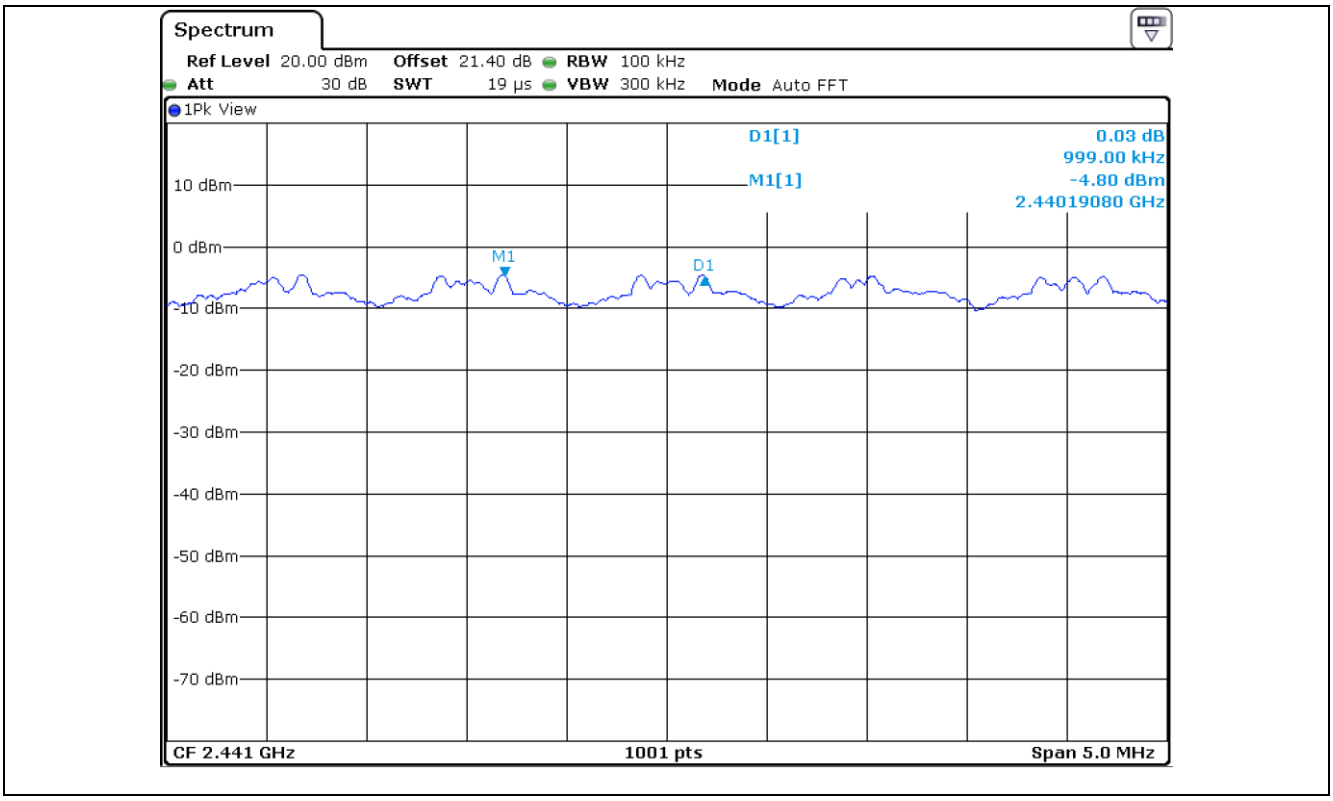
8.5 Test data for 2 Mbps

-. Test Date : June 20, 2019 ~ June 26, 2019

-. Test Result : Pass

MEASURED VLAUE (kHz)	Two-third of 20 dB Bandwidth (kHz)	LIMIT
999.00	882.47	Separated by a minimum of 25 kHz

Tested by: Hyung-Kwon, Oh / Assistant Manager



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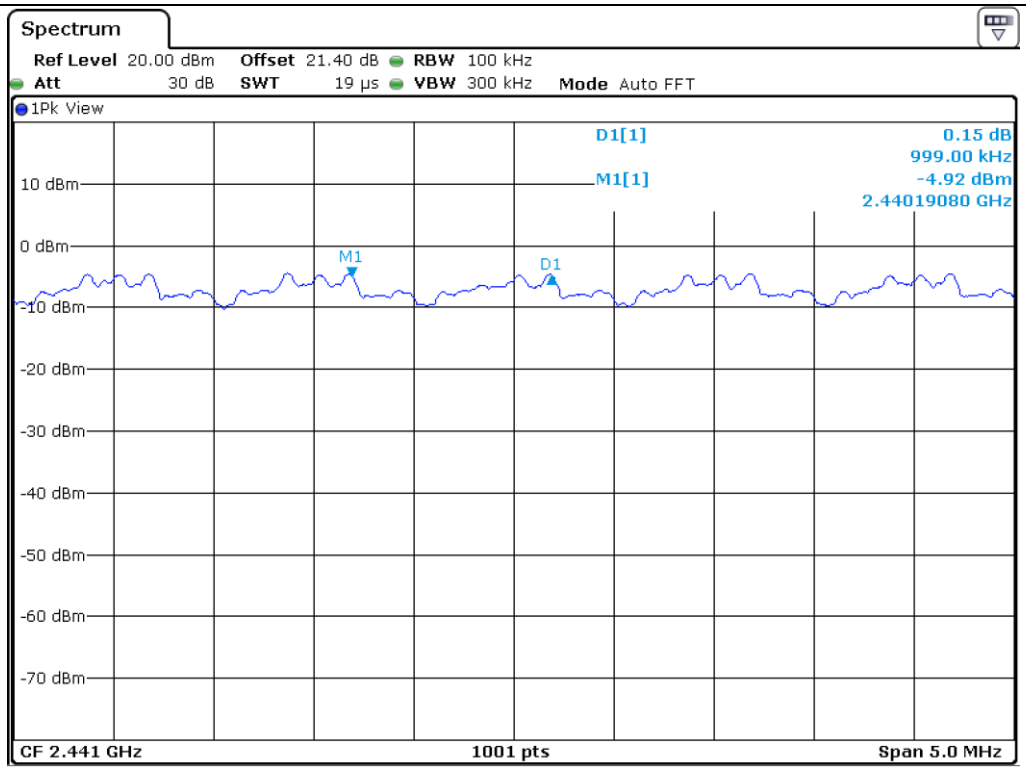
8.6 Test data for 3 Mbps

-. Test Date : June 20, 2019 ~ June 26, 2019

-. Test Result : Pass

MEASURED VLAUE (kHz)	Two-third of 20 dB Bandwidth (kHz)	LIMIT
999.00	882.47	Separated by a minimum of 25 kHz

Tested by: Hyung-Kwon, Oh / Assistant Manager



ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

9. NUMBER OF HOPPING CHANNELS

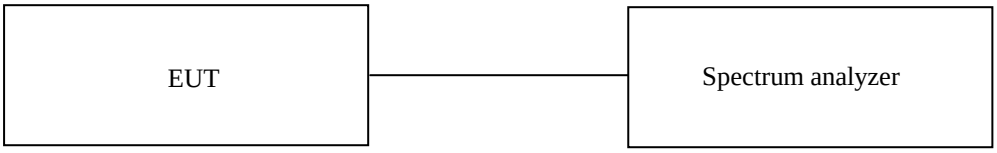
9.1 Operating environment

Temperature : 25 ℃

Relative humidity : 46 % R.H.

9.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The frequency span is set to 100 MHz and the resolution bandwidth is set to 100 kHz. The analyzer is set to peak hold and then complete pseudo-random hopping sequence of the transmitter is captured.



9.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Mar. 11, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

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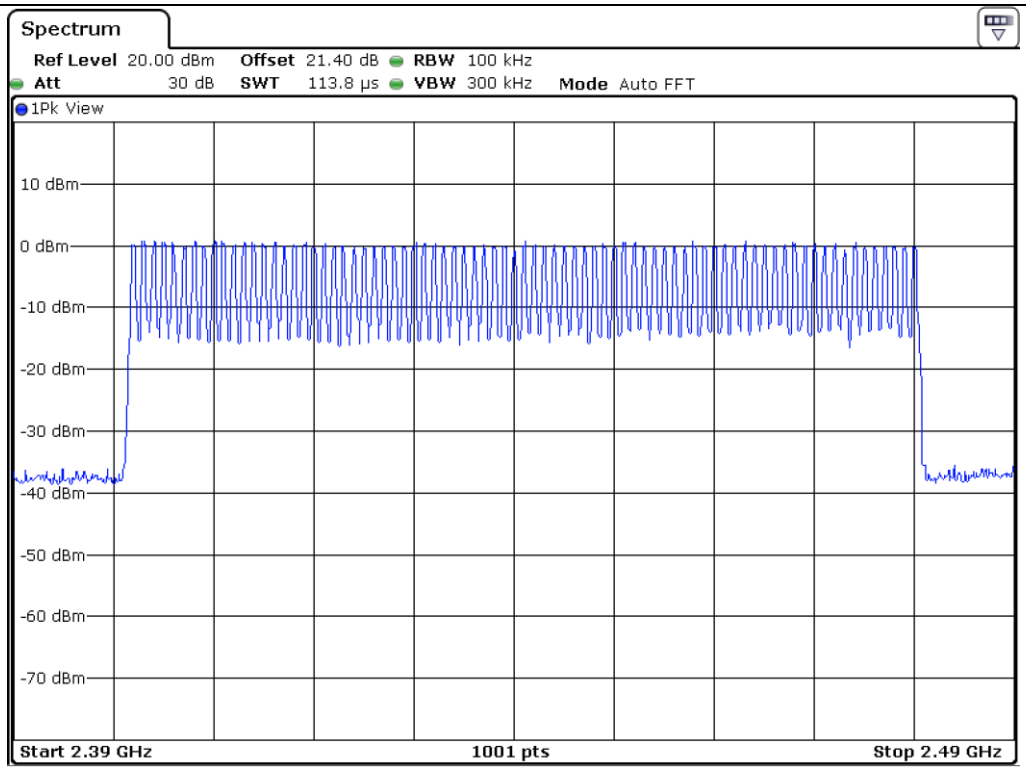
9.4 Test data for 1 Mbps

-. Test Date : June 20, 2019 ~ June 26, 2019

-. Test Result : Pass

Data Transfer Rate	Measured value (Number)	Limit (Number)	Margin (Number)
1 Mbps	79	Minimum of 15	64

Tested by: Hyung-Kwon, Oh / Assistant Manager



Total number of hopping channel: 28+30+21 = 79

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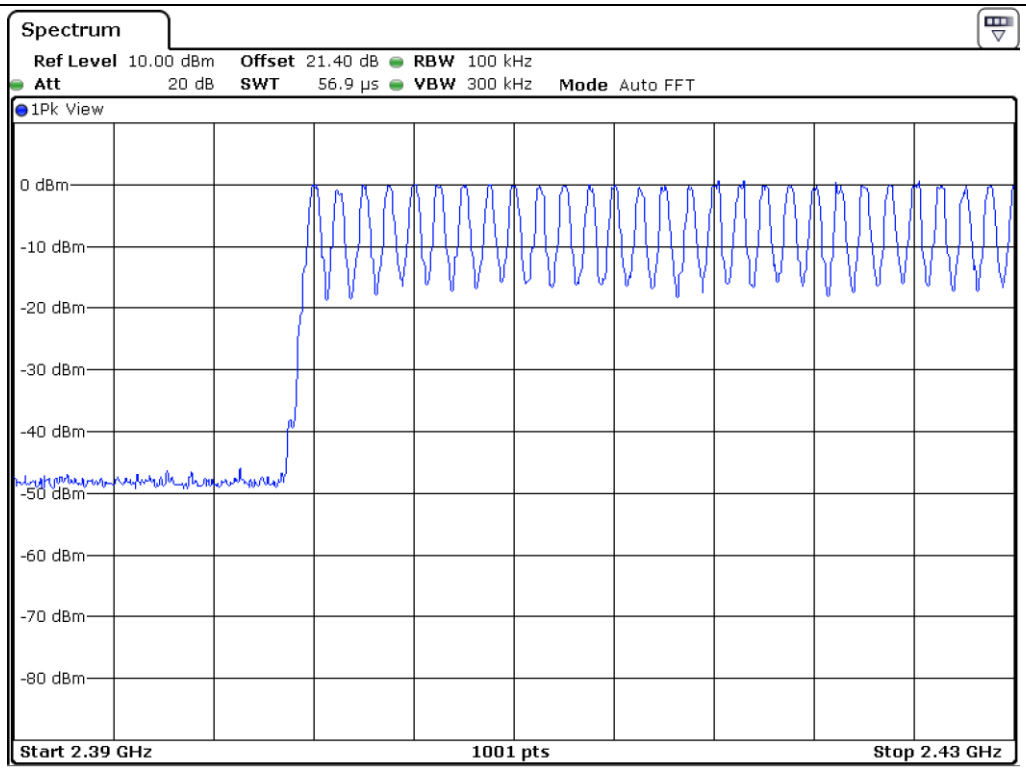
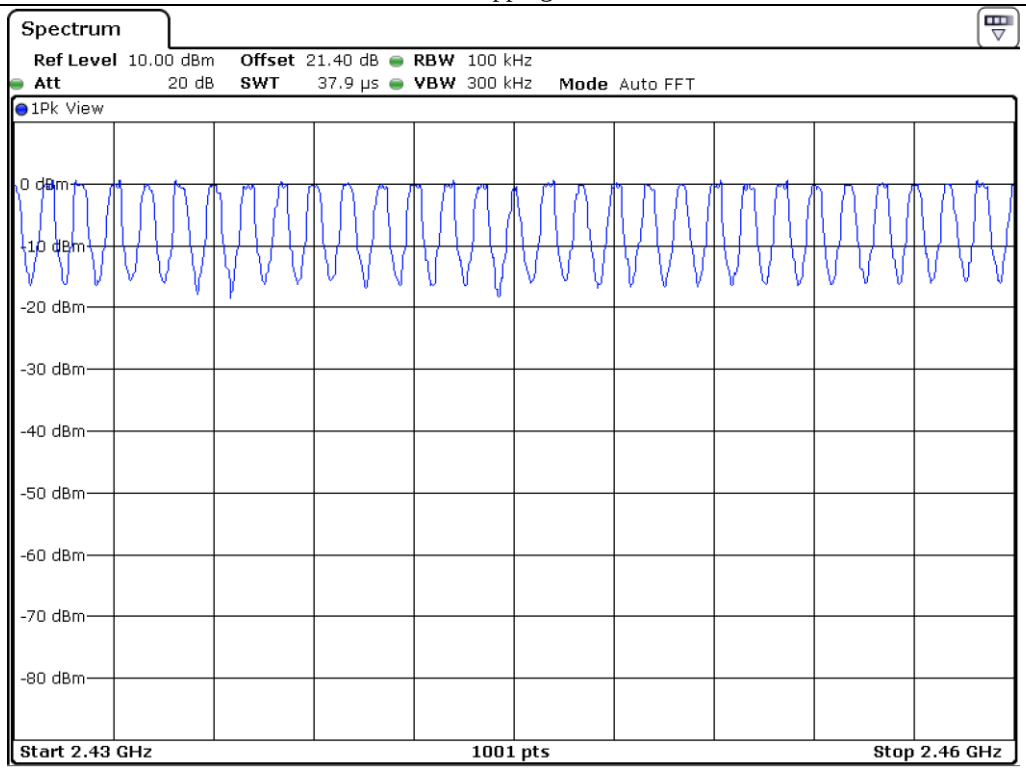
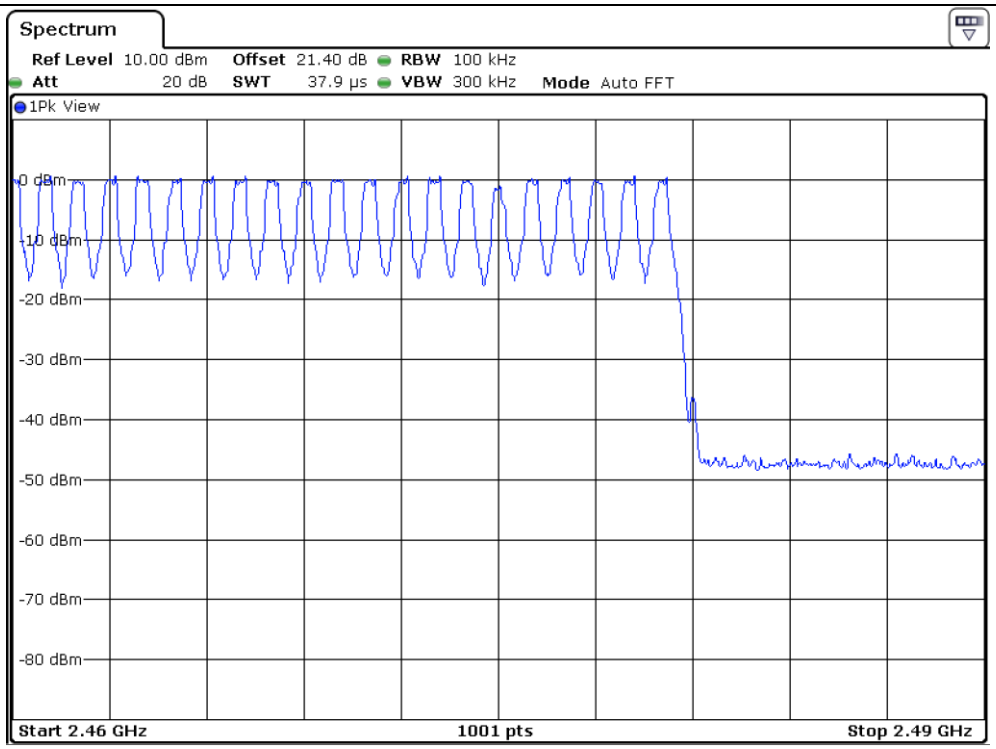


Number of hopping channel: 28



Number of hopping channel: 30



Number of hopping channel: 21

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

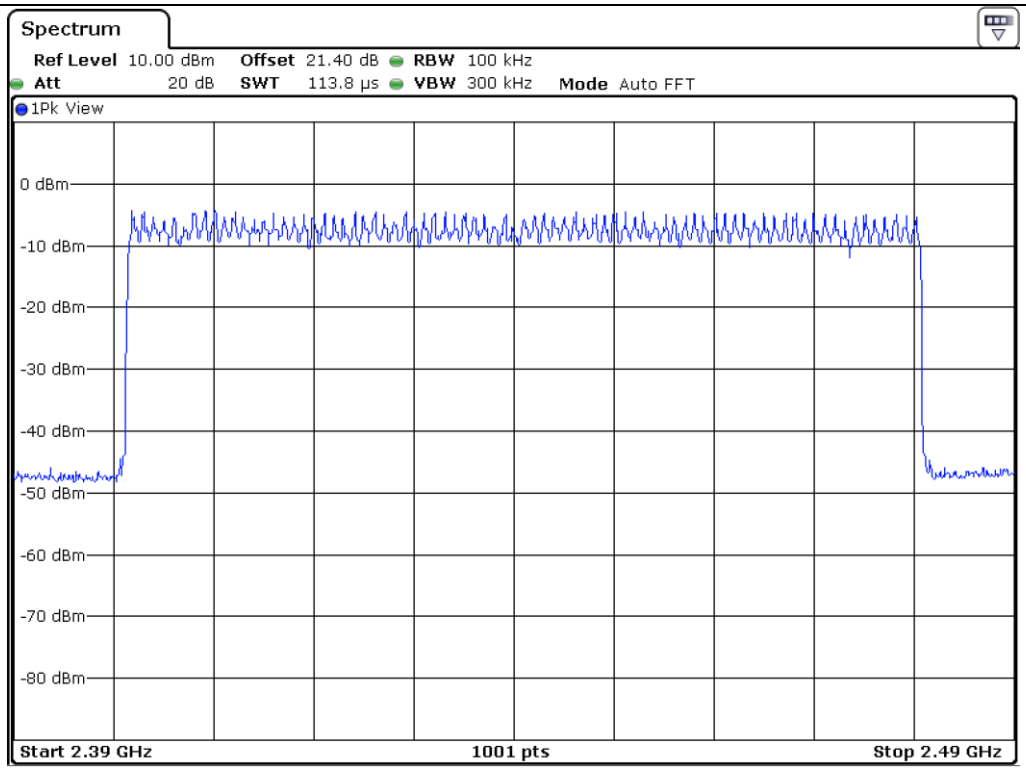
9.5 Test data for 2 Mbps

-. Test Date : June 20, 2019 ~ June 26, 2019

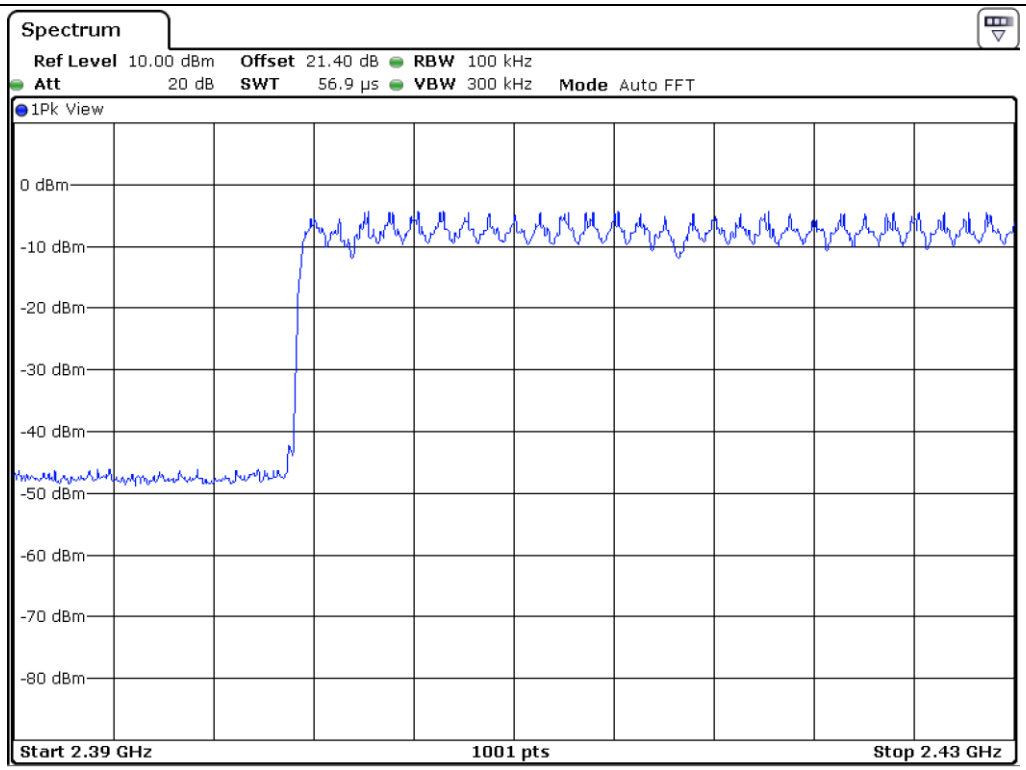
-. Test Result : Pass

Data Transfer Rate	Measured value (Number)	Limit (Number)	Margin (Number)
2 Mbps	79	Minimum of 15	64

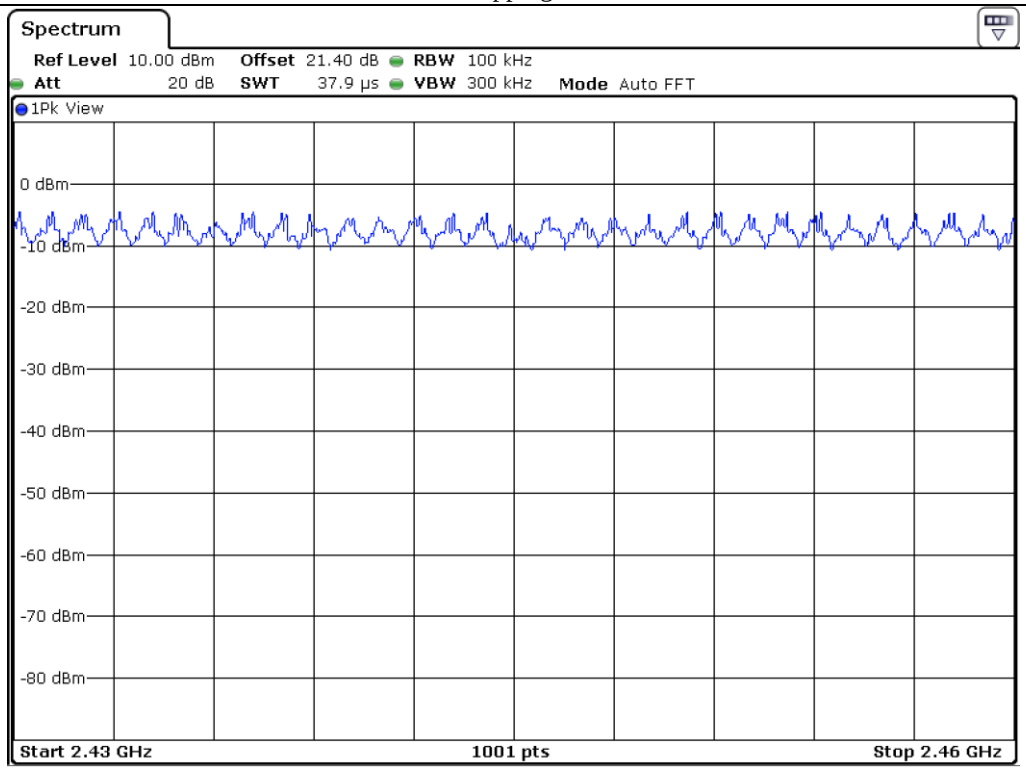
Tested by: Hyung-Kwon, Oh / Assistant Manager



Total number of hopping channel: 28+30+21 = 79

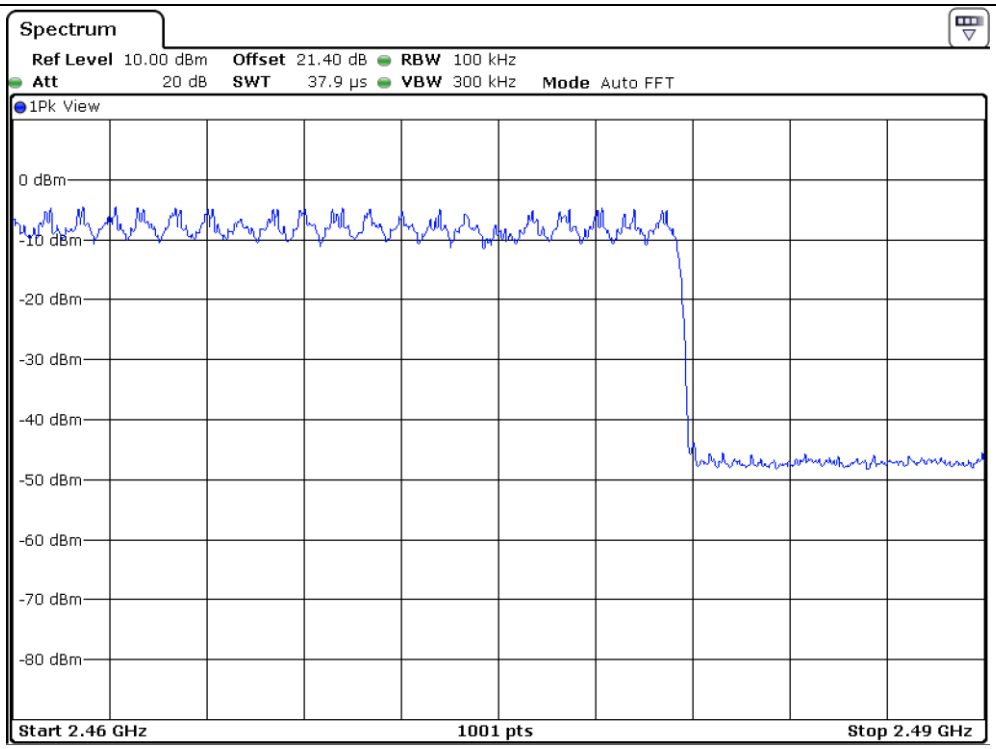


Number of hopping channel: 28



Number of hopping channel: 30

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)



Number of hopping channel: 21

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

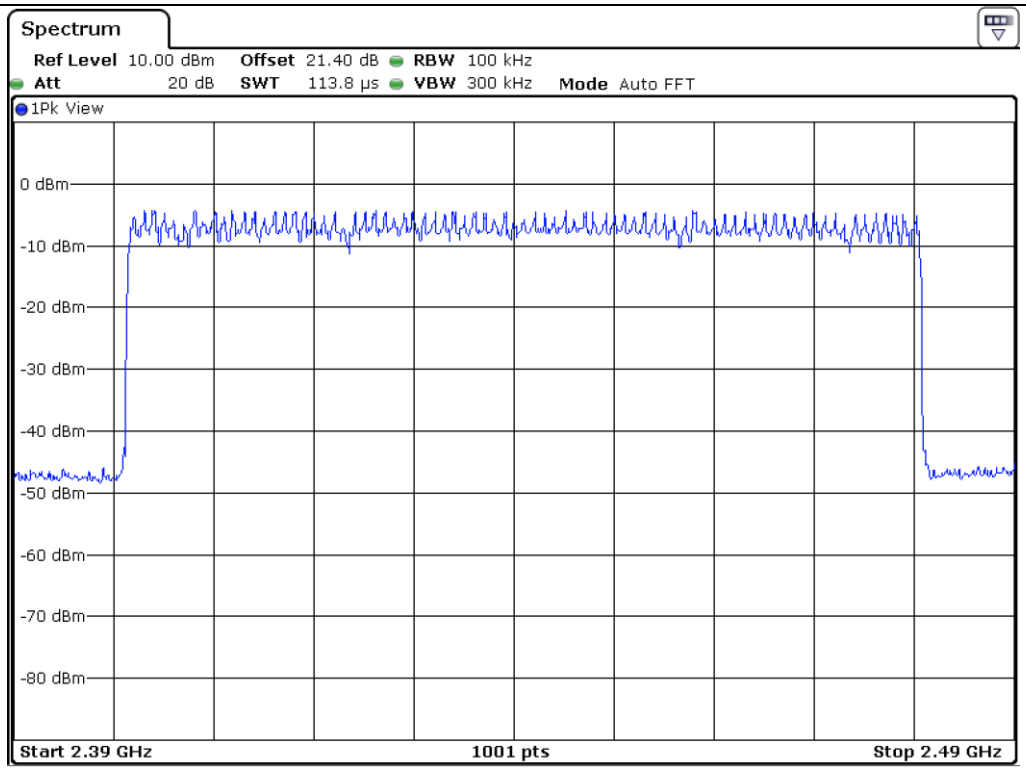
9.6 Test data for 3 Mbps

-. Test Date : June 20, 2019 ~ June 26, 2019

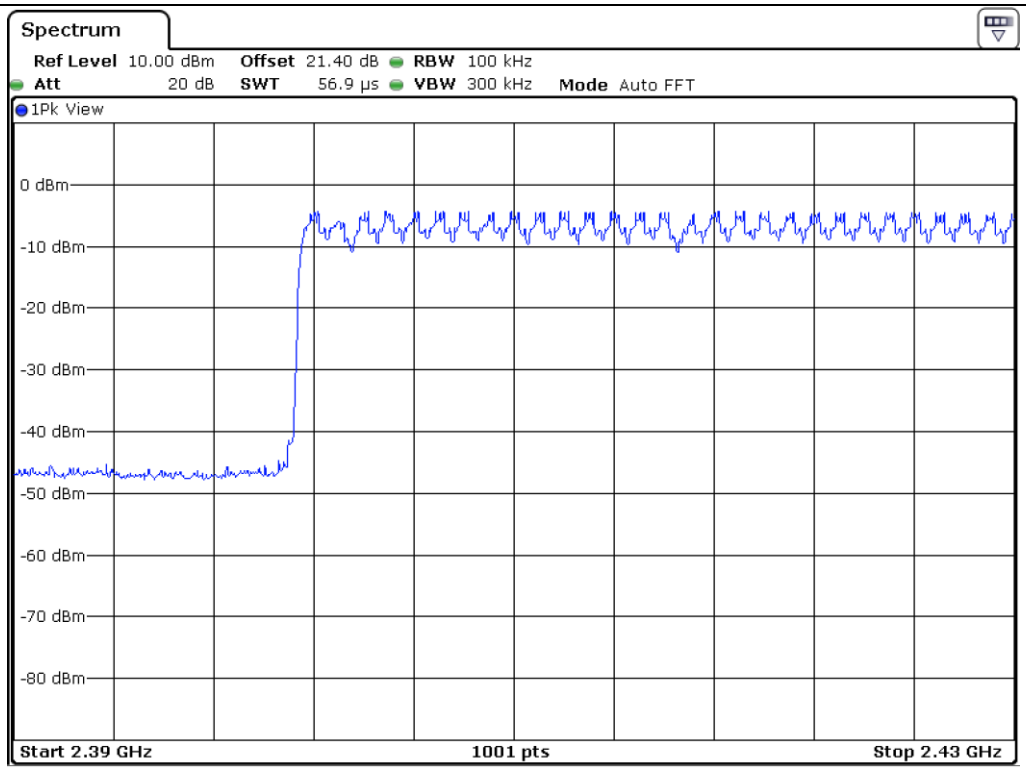
-. Test Result : Pass

Data Transfer Rate	Measured value (Number)	Limit (Number)	Margin (Number)
3 Mbps	79	Minimum of 15	64

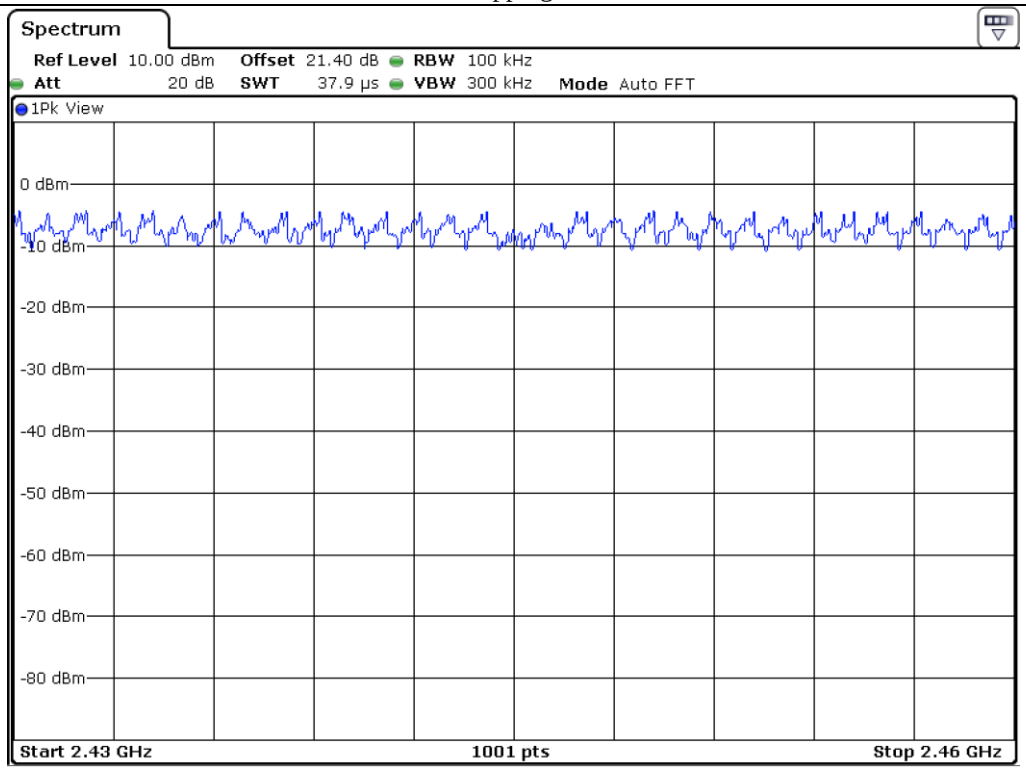
Tested by: Hyung-Kwon, Oh / Assistant Manager



Total number of hopping channel: 28+30+21 = 79

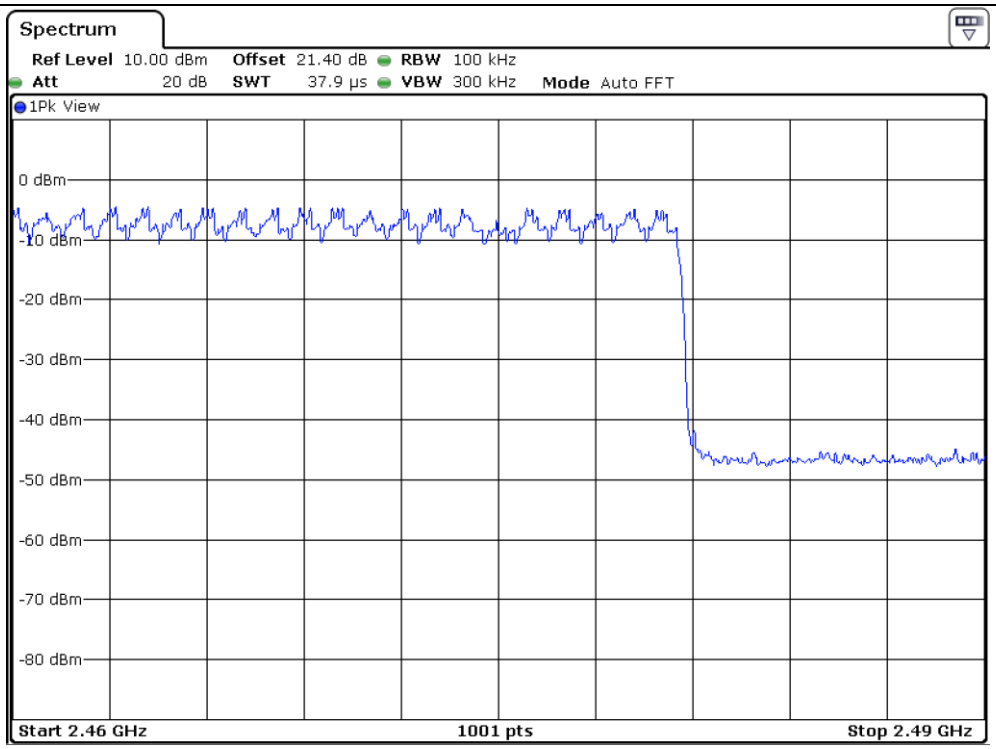


Number of hopping channel: 28



Number of hopping channel: 30

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)



Number of hopping channel: 21

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

10. TIME OF OCCUPANCY

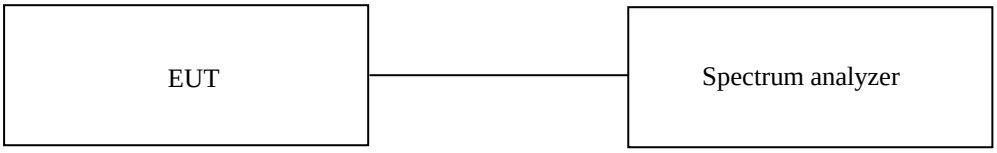
10.1 Operating environment

Temperature : 25 ℃

Relative humidity : 46 % R.H.

10.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The transmitter is set to operate in its normal frequency hopping mode. The center frequency of the spectrum analyzer is set to one of hopping channels near the center of the operating band and span is set to zero Hz. The sweep time is set to display one complete pulse. The mark delta function is used to measure the duration of the pulses.



10.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Mar. 11, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

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10.4 Test data for 1 Mbps

-. Test Date : June 20, 2019 ~ June 26, 2019

The system makes worst case 1 600 hops per second or 1 time slot has a length of 625 μs with 79 channels.

For DH1 packet type, the EUT needs 1 time slot for transmitting and 1 time slot for receiving and for DH3 packet type, the EUT needs 3 times slots for transmitting and 1 time slot for receiving, and DH5 packet needs 5 times slots for transmitting and 1 time slot for receiving. So The EUT has each channel for 10.13 times per second (= 1 600/2/79) for DH1, and 5.06 times (= 1 600/4/79) for DH3, and 3.38 times (= 1 600/6/79) for DH5.

Packet Type	Pulse Time (ms)	Hops per second with channels	Period Time (ms)	Total Dwell Time (ms)	Limit (ms)	Test Result
DH1	0.380	10.13	31.60	121.64	400.00	PASS
DH3	1.640	5.06	31.60	262.23	400.00	
DH5	2.880	3.38	31.60	307.61	400.00	

Total dwell time is calculated as following.

Total Dwell Time = Pulse time * Hops per second with channels * period time

Remark: See next page for an overview sweep performed with peak detector.

Tested by: Hyung-Kwon, Oh / Assistant Manager

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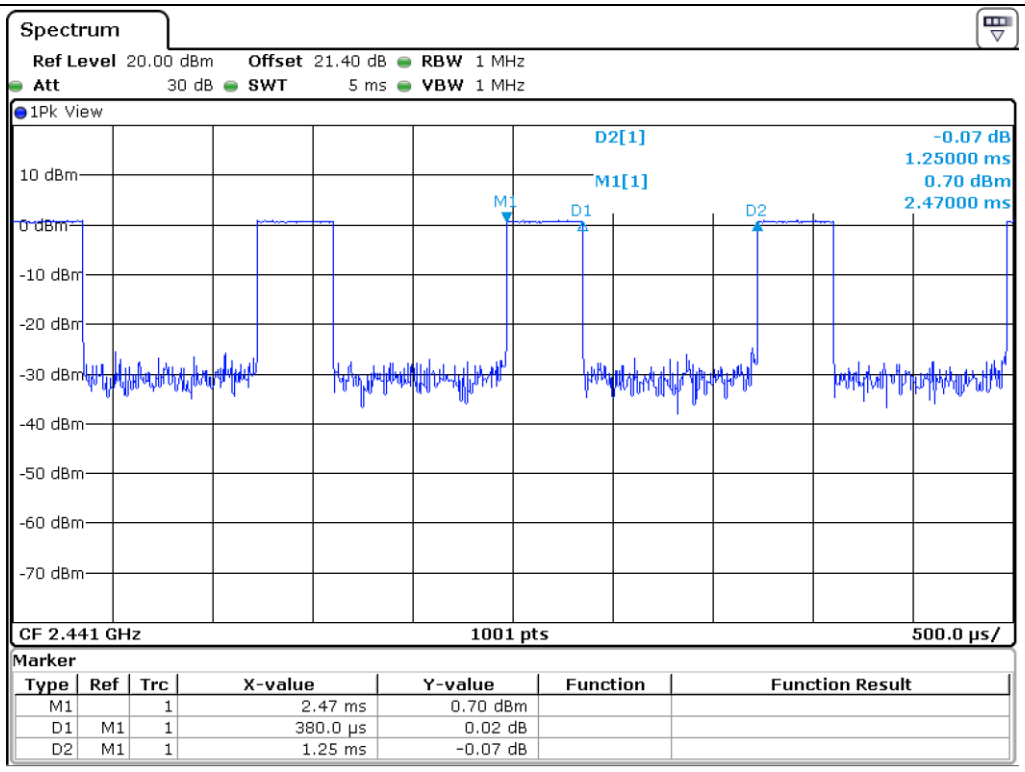
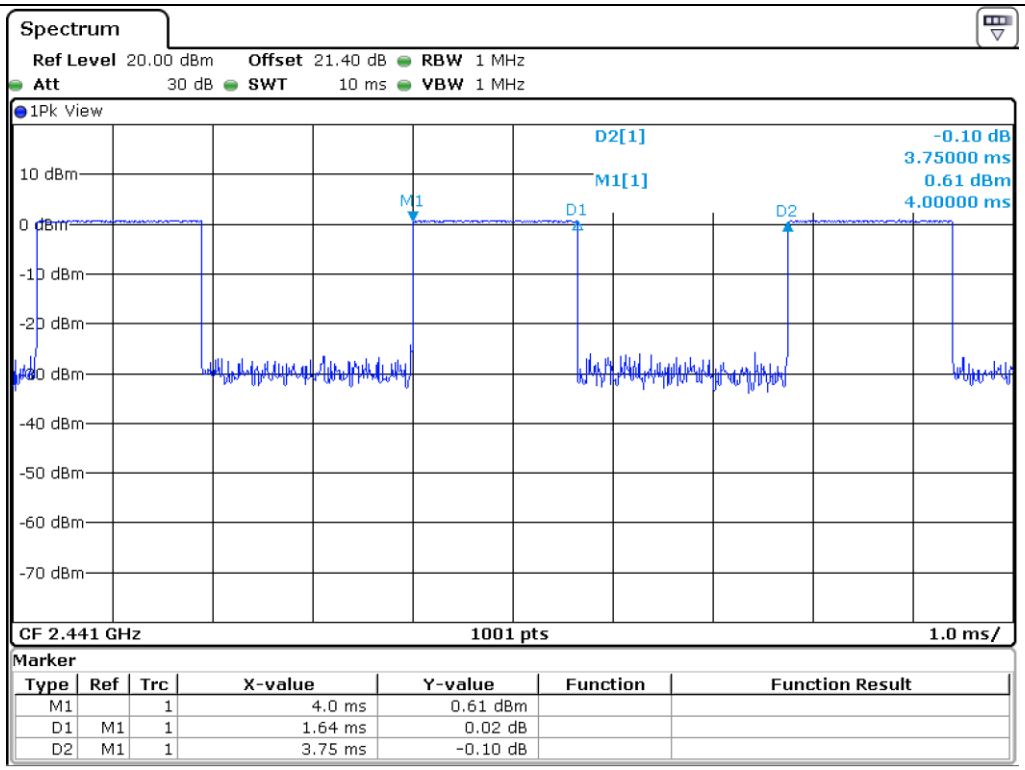
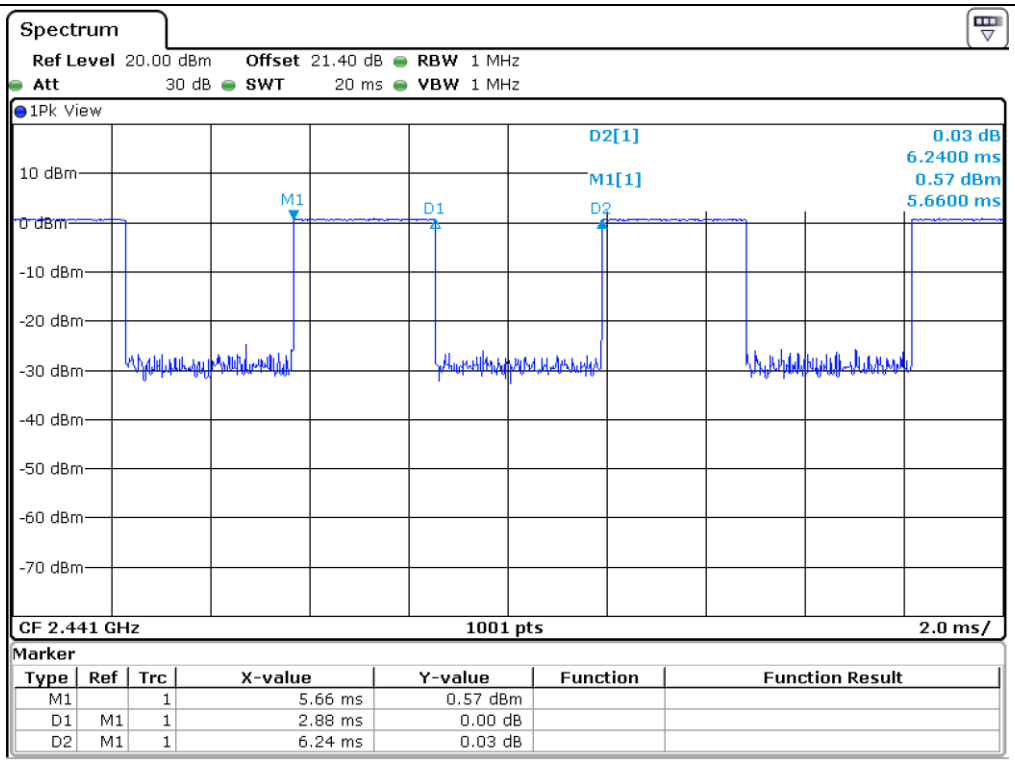


DH1



DH3

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)



DH5

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

10.5 Test data for 2 Mbps

-. Test Date : June 20, 2019 ~ June 26, 2019

The system makes worst case 1 600 hops per second or 1 time slot has a length of 625 μs with 79 channels.

For DH1 packet type, the EUT needs 1 time slot for transmitting and 1 time slot for receiving and for DH3 packet type, the EUT needs 3 times slots for transmitting and 1 time slot for receiving, and DH5 packet needs 5 times slots for transmitting and 1 time slot for receiving. So The EUT has each channel for 10.13 times per second (= 1 600/2/79) for DH1, and 5.06 times (= 1 600/4/79) for DH3, and 3.38 times (= 1 600/6/79) for DH5.

Packet Type	Pulse Time (ms)	Hops per second with channels	Period Time (ms)	Total Dwell Time (ms)	Limit (ms)	Test Result
DH1	0.390	10.13	31.60	124.84	400.00	PASS
DH3	1.640	5.06	31.60	262.23	400.00	
DH5	2.880	3.38	31.60	307.61	400.00	

Total dwell time is calculated as following.

Total Dwell Time = Pulse time * Hops per second with channels * period time

Remark: See next page for an overview sweep performed with peak detector.

Tested by: Hyung-Kwon, Oh / Assistant Manager

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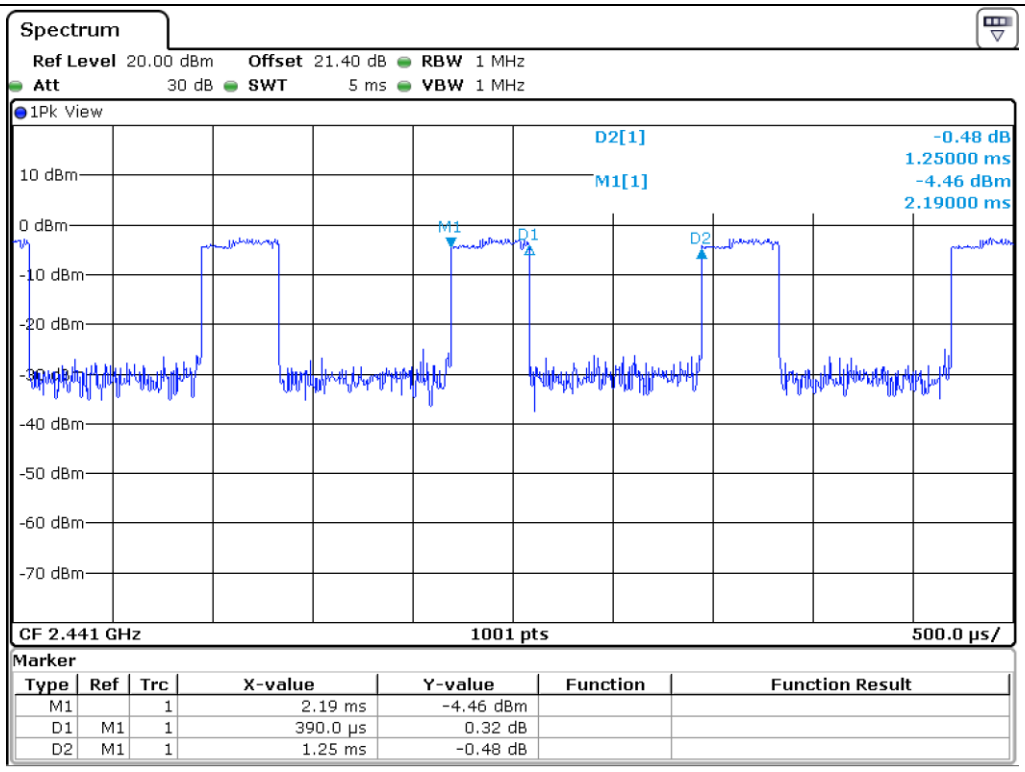
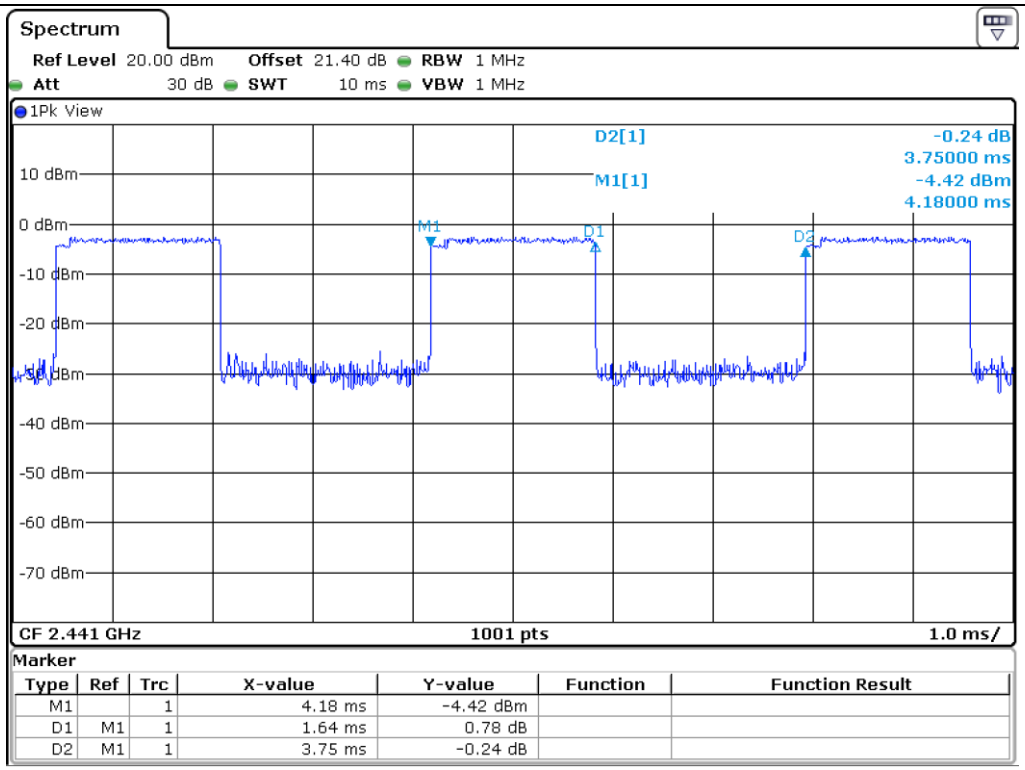
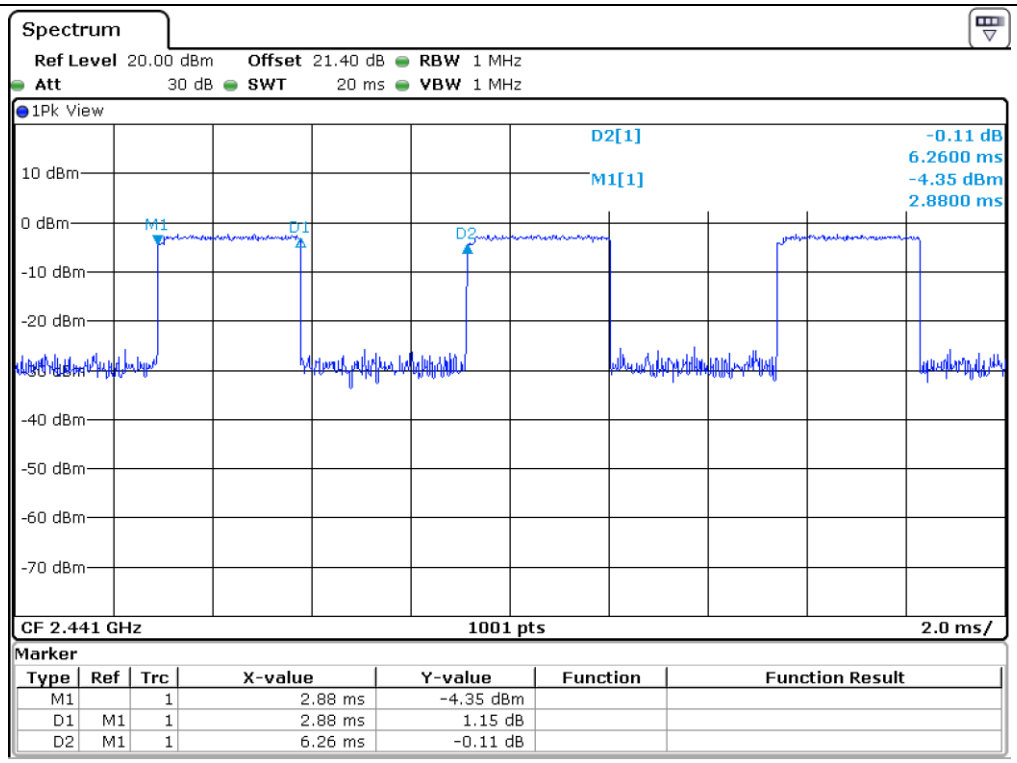


DH1



DH3

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)



DH5

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

10.6 Test data for 3 Mbps

-. Test Date : June 20, 2019 ~ June 26, 2019

The system makes worst case 1 600 hops per second or 1 time slot has a length of 625 μs with 79 channels.

For DH1 packet type, the EUT needs 1 time slot for transmitting and 1 time slot for receiving and for DH3 packet type, the EUT needs 3 times slots for transmitting and 1 time slot for receiving, and DH5 packet needs 5 times slots for transmitting and 1 time slot for receiving. So The EUT has each channel for 10.13 times per second (= 1 600/2/79) for DH1, and 5.06 times (= 1 600/4/79) for DH3, and 3.38 times (= 1 600/6/79) for DH5.

Packet Type	Pulse Time (ms)	Hops per second with channels	Period Time (ms)	Total Dwell Time (ms)	Limit (ms)	Test Result
DH1	0.390	10.13	31.60	124.84	400.00	PASS
DH3	1.640	5.06	31.60	262.23	400.00	
DH5	2.880	3.38	31.60	307.61	400.00	

Total dwell time is calculated as following.

Total Dwell Time = Pulse time * Hops per second with channels * period time

Remark: See next page for an overview sweep performed with peak detector.

Tested by: Hyung-Kwon, Oh / Assistant Manager

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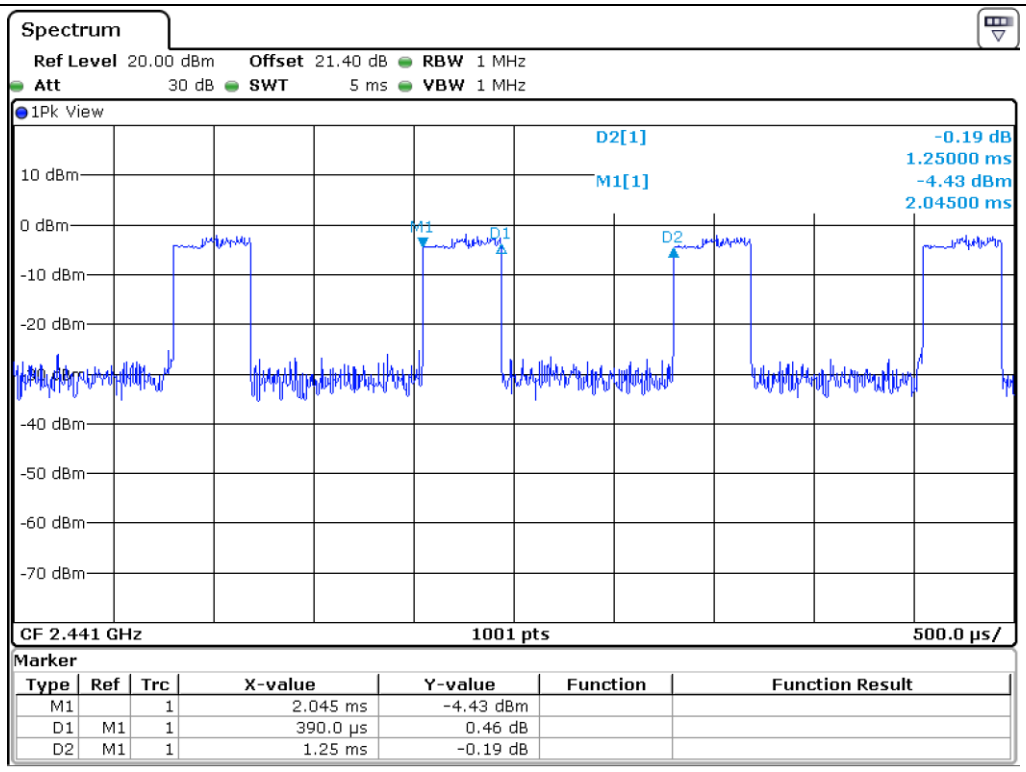
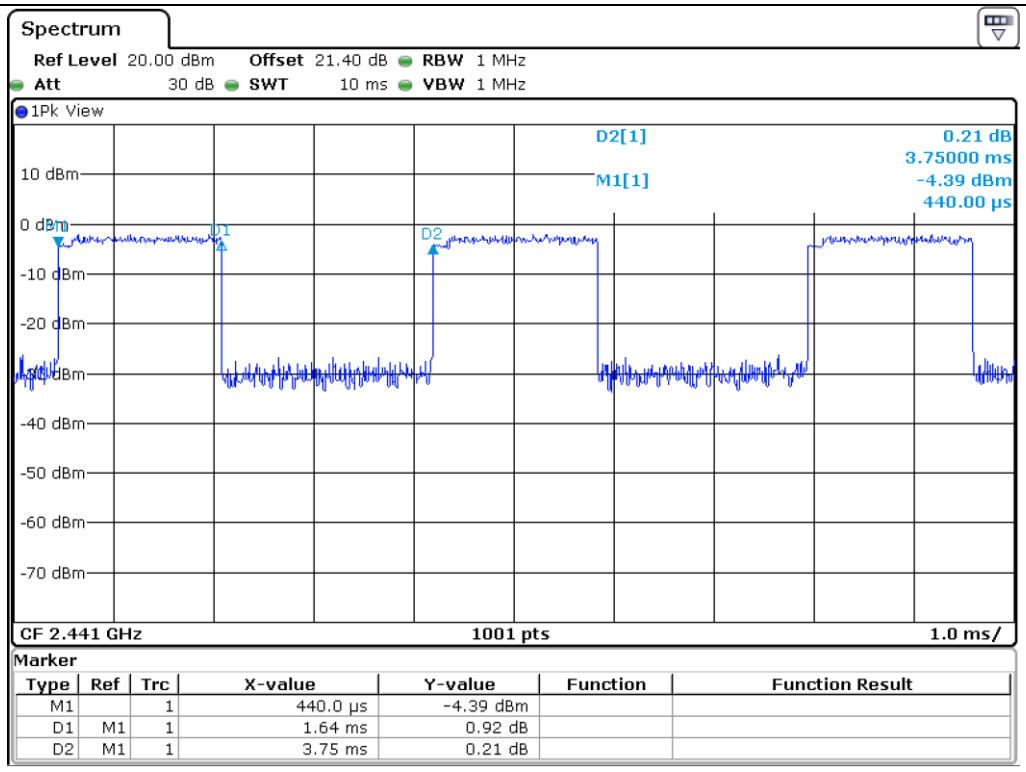
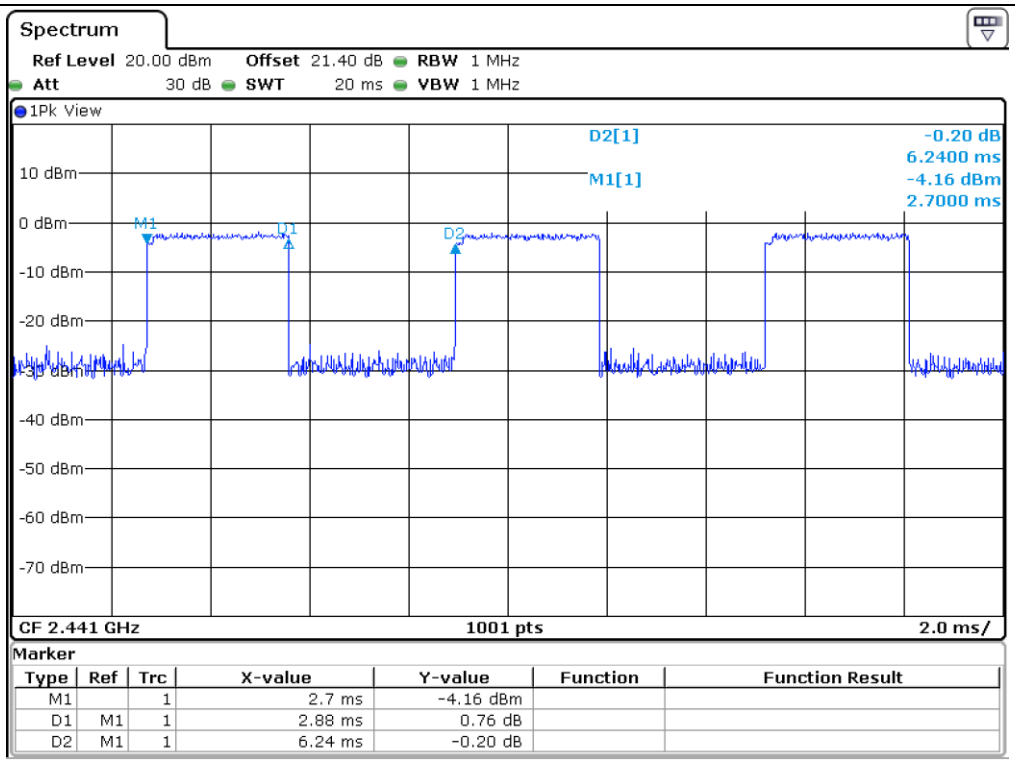


DH1



DH3

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)



DH5

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

11. MAXIMUM PEAK OUTPUT POWER

11.1 Operating environment

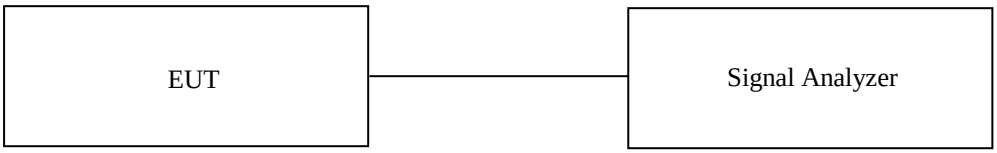
Temperature : 25 ℃

Relative humidity : 46 % R.H.

11.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer.

The resolution bandwidth is set to ≥ DTS Bandwidth, the video bandwidth is set to 3 times the resolution bandwidth.



11.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Mar. 11, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

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11.4 Test data for 1 Mbps

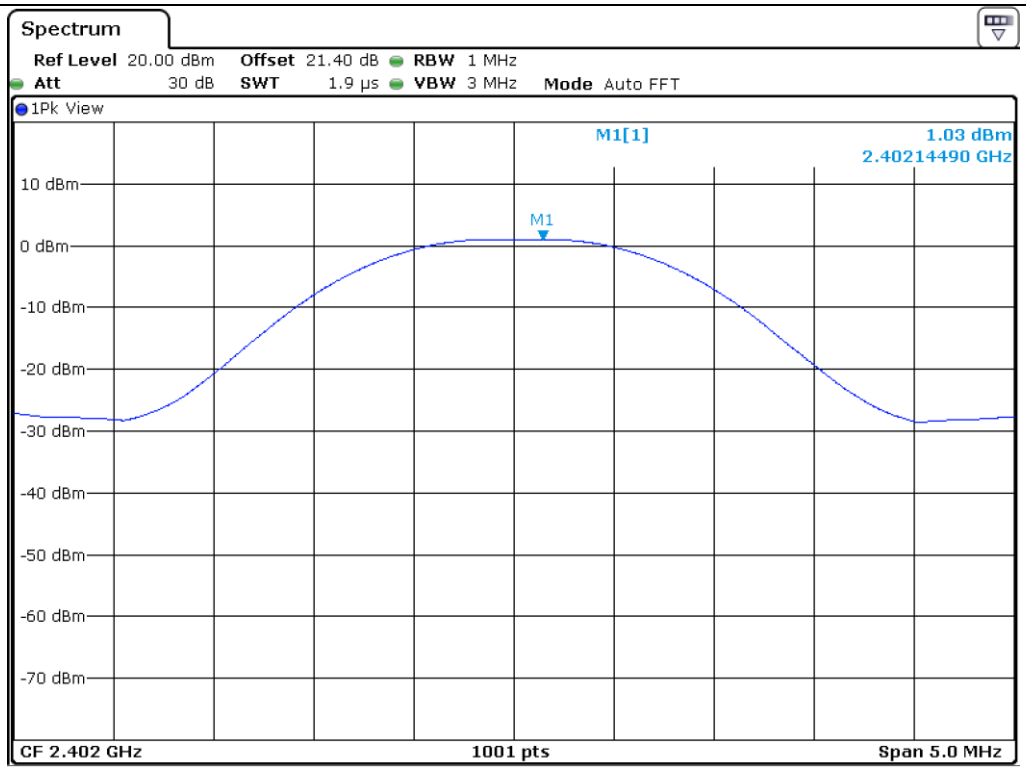
-. Test Date : June 20, 2019 ~ June 26, 2019

. Test Result : Pass

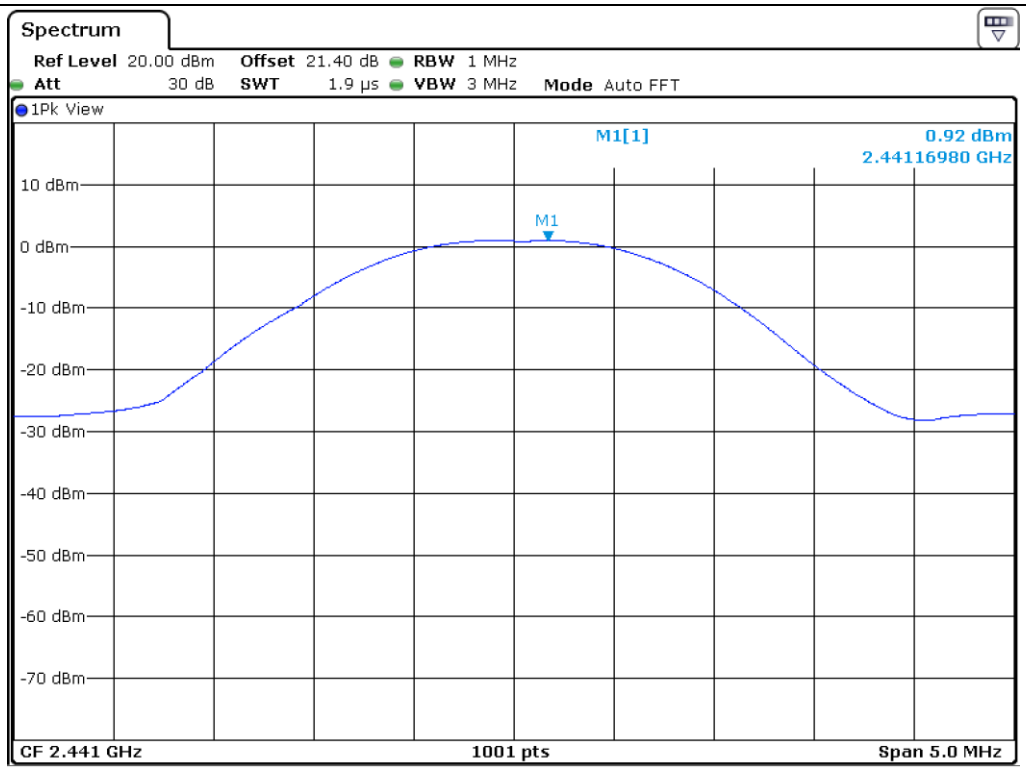
CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 402.00	1.03	21.00	19.97
MIDDLE	2 441.00	0.92	21.00	20.08
HIGH	2 480.00	0.79	21.00	20.21

Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

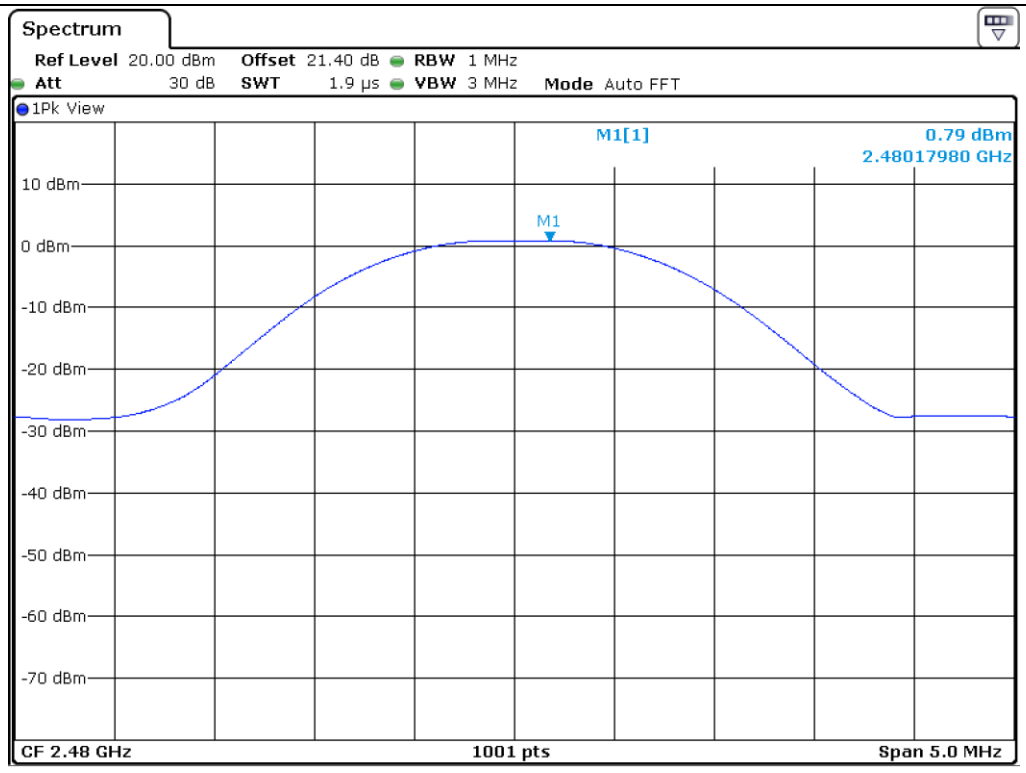
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

11.5 Test data for 2 Mbps

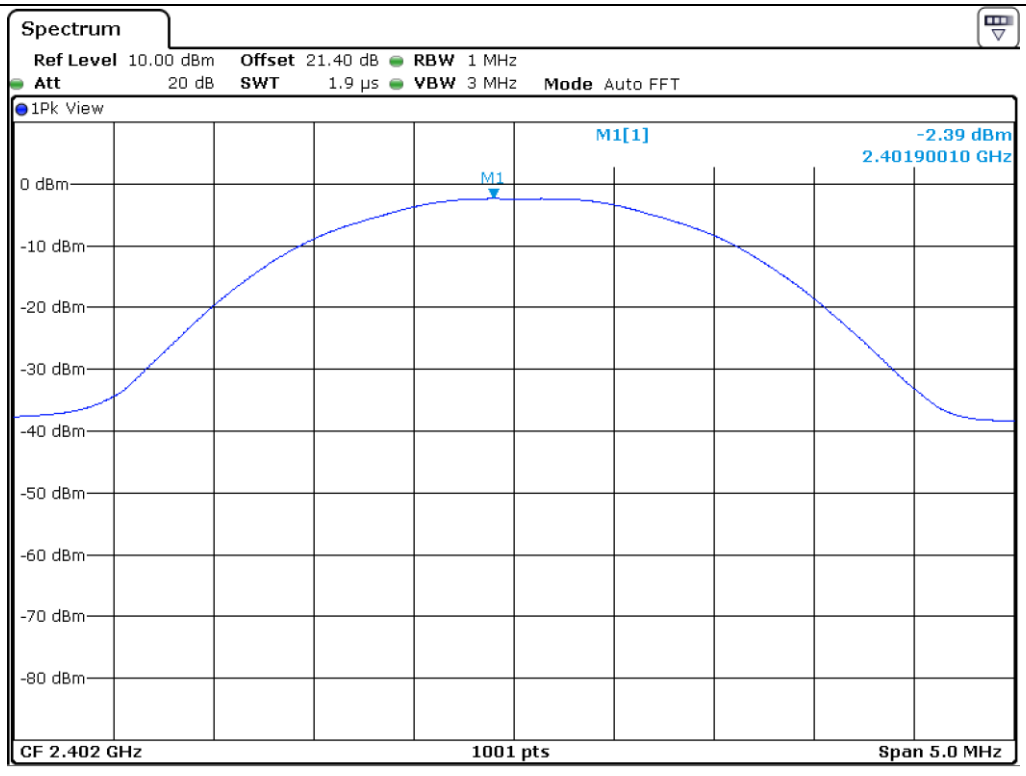
-. Test Date : June 20, 2019 ~ June 26, 2019

-. Test Result : Pass

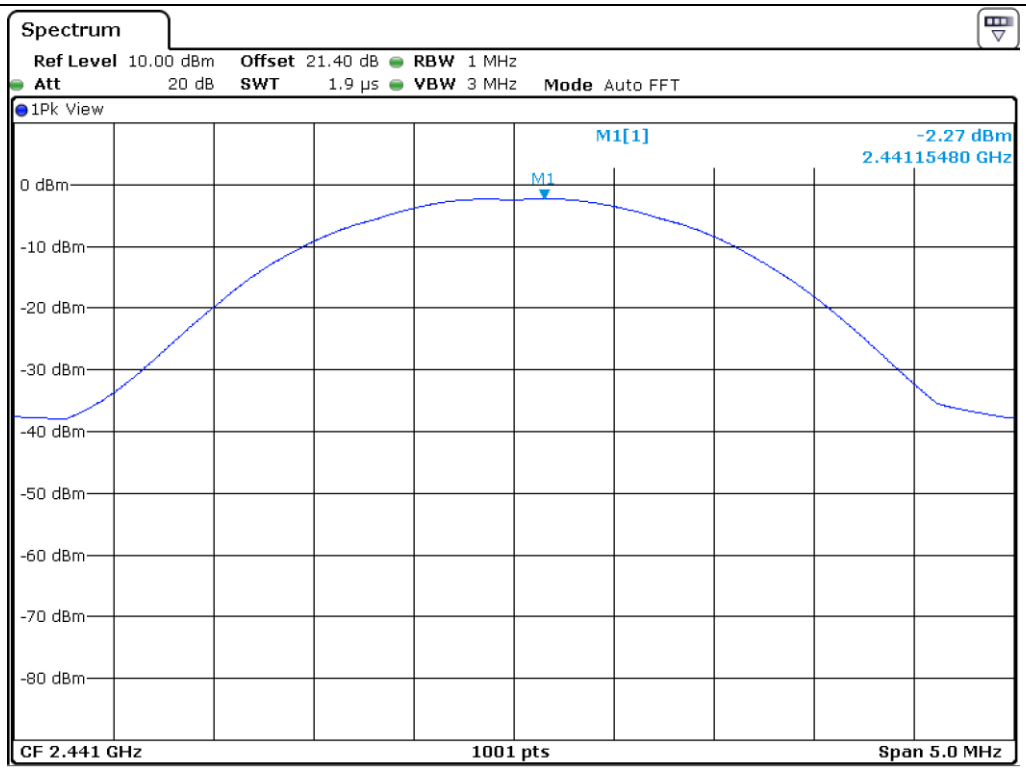
CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 402.00	-2.39	21.00	23.39
MIDDLE	2 441.00	-2.27	21.00	23.27
HIGH	2 480.00	-2.74	21.00	23.74

Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

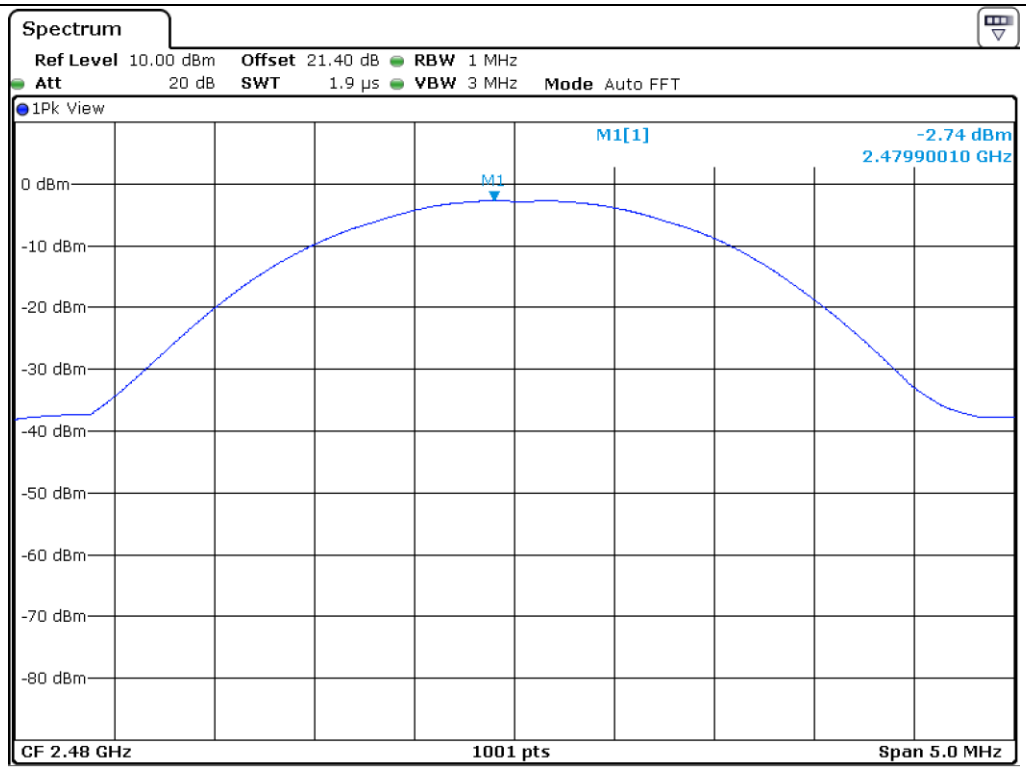
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

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11.6 Test data for 3 Mbps

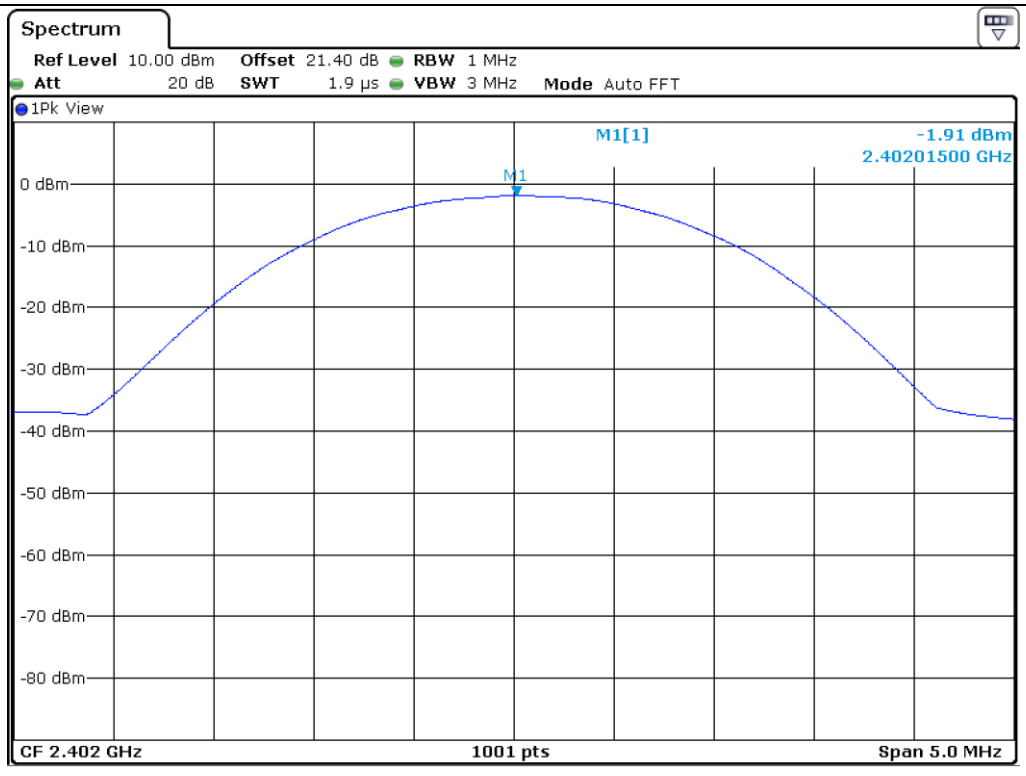
-. Test Date : June 20, 2019 ~ June 26, 2019

-. Test Result : Pass

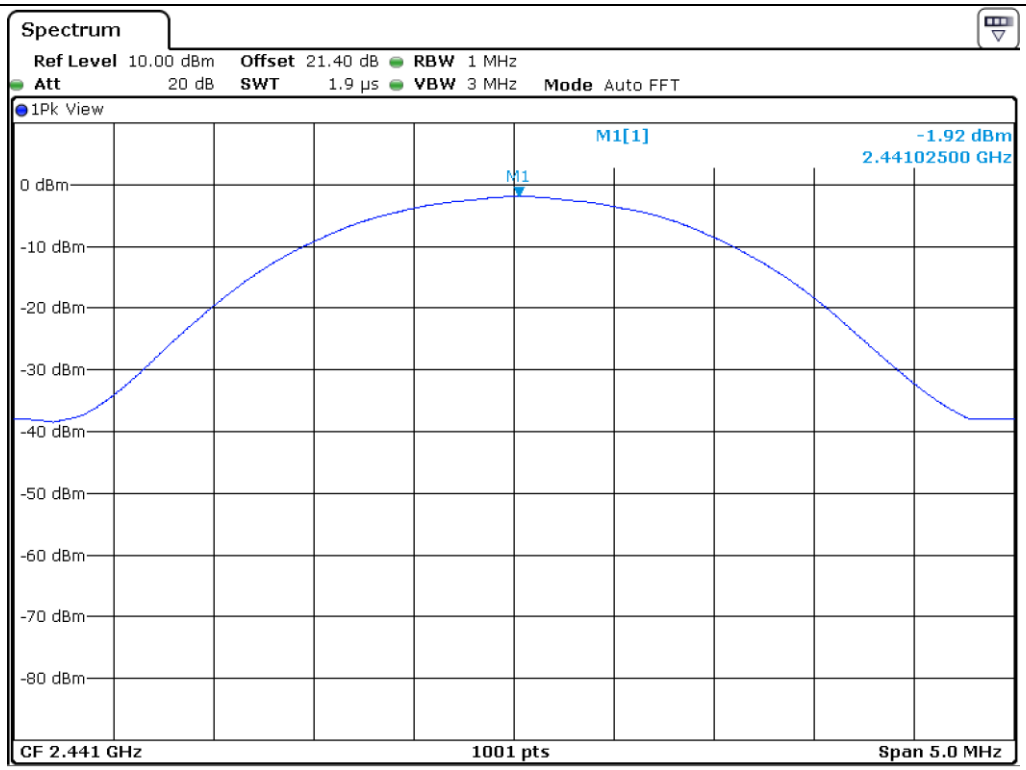
CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 402.00	-1.91	21.00	22.91
MIDDLE	2 441.00	-1.92	21.00	22.92
HIGH	2 480.00	-2.52	21.00	23.52

Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

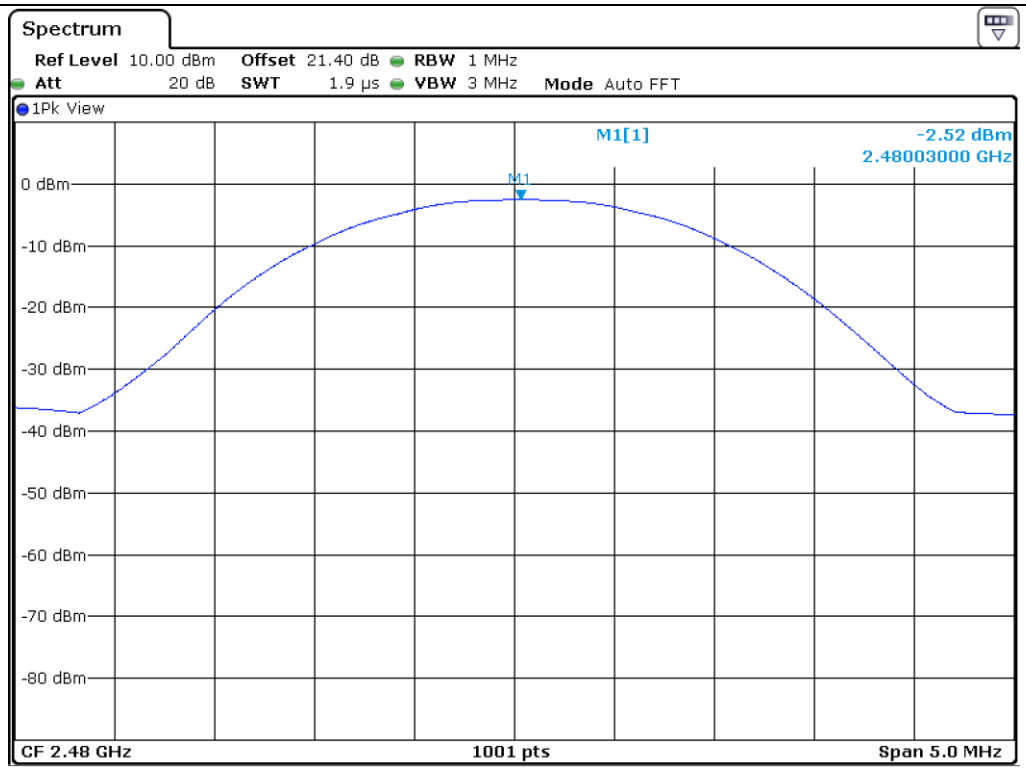
Tested by: Hyung-Kwon, Oh / Assistant Manager



Low Channel



Middle Channel



High Channel

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