RADIO TEST REPORT

Test Report No. 15058381S-A

Customer	**ALPS ALPINE CO., LTD.**
Description of EUT	**Head unit**
Model Number of EUT	**AH00ICB 4**
FCC ID	**A269ZUA171**
Test Regulation	**FCC Part 15 Subpart C**
Test Result	**Complied**
Issue Date	**March 25, 2024**
Remarks	**Wireless LAN (2.4 GHz band) and Bluetooth Low Energy part(s)** **Antenna Terminal Conducted Tests**

Representative Test Engineer	**Approved By**
M. Ikudome	K. Noda
Miku Ikudome Engineer	Kazuya Noda Leader

CERTIFICATE 1266.03

☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan, Inc.

☒ There is no testing item of "Non-accreditation".

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- For test report(s) referred in this report, the latest version (including any revisions) is always referred.

REVISION HISTORY

Original Test Report No.: 15058381S-A

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	15058381S-A	March 25, 2024	-

Reference: Abbreviations (Including words undescribed in this report)

A2LA	The American Association for Laboratory Accreditation	ICES	Interference-Causing Equipment Standard
AC	Alternating Current	IEC	International Electrotechnical Commission
AFH	Adaptive Frequency Hopping	IEEE	Institute of Electrical and Electronics Engineers
AM	Amplitude Modulation	IF	Intermediate Frequency
Amp, AMP	Amplifier	ILAC	International Laboratory Accreditation Conference
ANSI	American National Standards Institute	ISED	Innovation, Science and Economic Development Canada
Ant, ANT	Antenna	ISO	International Organization for Standardization
AP	Access Point	JAB	Japan Accreditation Board
ASK	Amplitude Shift Keying	LAN	Local Area Network
Atten., ATT	Attenuator	LIMS	Laboratory Information Management System
AV	Average	MCS	Modulation and Coding Scheme
BPSK	Binary Phase-Shift Keying	MRA	Mutual Recognition Arrangement
BR	Bluetooth Basic Rate	N/A	Not Applicable
BT	Bluetooth	NIST	National Institute of Standards and Technology
BT LE	Bluetooth Low Energy	NS	No signal detect.
BW	BandWidth	NSA	Normalized Site Attenuation
Cal Int	Calibration Interval	NVLAP	National Voluntary Laboratory Accreditation Program
CCK	Complementary Code Keying	OBW	Occupied Band Width
Ch., CH	Channel	OFDM	Orthogonal Frequency Division Multiplexing
CISPR	Comite International Special des Perturbations Radioelectriques	P/M	Power meter
CW	Continuous Wave	PCB	Printed Circuit Board
DBPSK	Differential BPSK	PER	Packet Error Rate
DC	Direct Current	PHY	Physical Layer
D-factor	Distance factor	PK	Peak
DFS	Dynamic Frequency Selection	PN	Pseudo random Noise
DQPSK	Differential QPSK	PRBS	Pseudo-Random Bit Sequence
DSSS	Direct Sequence Spread Spectrum	PSD	Power Spectral Density
EDR	Enhanced Data Rate	QAM	Quadrature Amplitude Modulation
EIRP, e.i.r.p.	Equivalent Isotropically Radiated Power	QP	Quasi-Peak
EMC	ElectroMagnetic Compatibility	QPSK	Quadri-Phase Shift Keying
EMI	ElectroMagnetic Interference	RBW	Resolution Band Width
EN	European Norm	RDS	Radio Data System
ERP, e.r.p.	Effective Radiated Power	RE	Radio Equipment
EU	European Union	RF	Radio Frequency
EUT	Equipment Under Test	RMS	Root Mean Square
Fac.	Factor	RSS	Radio Standards Specifications
FCC	Federal Communications Commission	Rx	Receiving
FHSS	Frequency Hopping Spread Spectrum	SA, S/A	Spectrum Analyzer
FM	Frequency Modulation	SG	Signal Generator
Freq.	Frequency	SVSWR	Site-Voltage Standing Wave Ratio
FSK	Frequency Shift Keying	TR	Test Receiver
GFSK	Gaussian Frequency-Shift Keying	Tx	Transmitting
GNSS	Global Navigation Satellite System	VBW	Video BandWidth
GPS	Global Positioning System	Vert.	Vertical
Hori.	Horizontal	WLAN	Wireless LAN

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SECTION 1: Customer Information

Company Name	ALPS ALPINE CO., LTD.
Address	20-1 Yoshima Industrial park, Iwaki, Fukushima, Japan 970-1192
Telephone Number	+81-246-36-4111
Contact Person	Kenji Nagase

The information provided by the customer is as follows;
- Customer, Description of EUT, Model Number of EUT, FCC ID on the cover and other relevant pages
- Operating/Test Mode(s) (Mode(s)) on all the relevant pages
- SECTION 1: Customer Information
- SECTION 2: Equipment Under Test (EUT) other than the Receipt Date and Test Date
- SECTION 4: Operation of EUT during testing

SECTION 2: Equipment Under Test (EUT)

2.1 Identification of EUT

Description	Head unit
Model Number	AH00ICB 4
Serial Number	Refer to SECTION 4.2
Condition	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	No Modification by the test lab
Receipt Date	January 12, 2024
Test Date	January 20 to February 7, 2024

2.2 Product Description

General Specification

Rating	DC 13.2 V
Operating temperature	-30 deg. C - +70 deg. C

Radio Specification

This report contains data provided by the customer which can impact the validity of results. UL Japan, Inc. is only responsible for the validity of results after the integration of the data provided by the customer. The data provided by the customer is marked “a)” in the table below.

Bluetooth (BR / EDR / Low Energy)

Equipment Type	Transceiver
Frequency of Operation	2402 MHz to 2480 MHz
Type of Modulation	BT: FHSS (GFSK, π/4 DQPSK, 8 DPSK) BT LE: GFSK
Antenna Type	Planar Inverted-F Antenna
Antenna Gain[a)]	-0.2 dBi

WLAN (IEEE802.11b/11g/11n-20)

Equipment Type	Transceiver
Frequency of Operation	2412 MHz to 2462 MHz
Type of Modulation	DSSS, OFDM
Antenna Type	Planar Inverted-F Antenna
Antenna Gain[a)]	-0.78 dBi

WLAN (IEEE802.11a/11n-20/11ac-20/11n-40/11ac-40/11ac-80)

Equipment Type	Transceiver	
Frequency of Operation	20 MHz Band	5180 MHz to 5240 MHz 5260 MHz to 5320 MHz 5500 MHz to 5720 MHz 5745 MHz to 5825 MHz
	40 MHz Band	5190 MHz to 5230 MHz 5270 MHz to 5310 MHz 5510 MHz to 5710 MHz 5755 MHz to 5795 MHz
	80 MHz Band	5210 MHz 5290 MHz 5530 MHz to 5690 MHz 5775 MHz
Type of Modulation	OFDM	
Antenna Type	Planar Inverted-F Antenna	
Antenna Gain[a)]	+2.71 dBi (Chain 1) +2.29 dBi (Chain 2)	

SECTION 3: Test Specification, Procedures & Results

3.1 Test Specification

Test Specification	FCC Part 15 Subpart C The latest version on the first day of the testing period
Title	FCC 47 CFR Part 15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits Section 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

* Also the EUT complies with FCC Part 15 Subpart B.

3.2 Procedures and Results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	**FCC:** ANSI C63.10-2013 6. Standard test methods	**FCC:** Section 15.207	-	N/A	*1)
	ISED: RSS-Gen 8.8	**ISED:** RSS-Gen 8.8			
6dB Bandwidth	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05r02	**FCC:** Section 15.247(a)(2)	See data.	Complied	Conducted
	ISED: -	**ISED:** RSS-247 5.2(a)			
Maximum Peak Output Power	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05r02	**FCC:** Section 15.247(b)(3)		Complied	Conducted
	ISED: RSS-Gen 6.12	**ISED:** RSS-247 5.4(d)			
Power Density	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05r02	**FCC:** Section 15.247(e)		Complied	Conducted
	ISED: -	**ISED:** RSS-247 5.2(b)			
Spurious Emission (below 30 MHz)	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05r02	**FCC:** Section15.247(d)	See data.	Complied	Conducted
	ISED: RSS-Gen 6.13	**ISED:** RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10			
Note: UL Japan, Inc.'s EMI Work Procedures: Work Instructions-ULID-003591 and Work Instructions-ULID-003593. * In case any questions arise about test procedure, ANSI C63.10: 2013 is also referred. *1) The test is not applicable since the EUT does not have AC Mains.					

FCC Part 15.31 (e)
The EUT provides stable voltage constantly to the RF Part regardless of input voltage. Instead of a new battery, DC power supply was used for the test. That does not affect the test result, therefore the EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.3 Addition to Standard

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
99 % Occupied Bandwidth	**ISED:** RSS-Gen 6.7	**ISED:** -	N/A	-	Conducted

Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

Measurement uncertainty is not taken into account when stating conformity with a specified requirement.
Note: When margins obtained from test results are less than the measurement uncertainty, the test results may exceed the limit.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor *k* = 2.

Antenna terminal test	**Uncertainty (+/-)**
Power Measurement above 1 GHz (Average Detector) SPM-06	1.1 dB
Power Measurement above 1 GHz (Peak Detector) SPM-06	1.8 dB
Power Measurement above 1 GHz (Average Detector) SPM-07	1.0 dB
Power Measurement above 1 GHz (Peak Detector) SPM-07	1.2 dB
Power Measurement above 1 GHz (Average Detector) SPM-13	0.81 dB
Power Measurement above 1 GHz (Peak Detector) SPM-13	1.1 dB
Spurious Emission (Conducted) below 1 GHz	0.91 dB
Conducted Emissions Power Density Measurement 1 GHz to 3 GHz	1.3 dB
Conducted Emissions Power Density Measurement 3 GHz to 18 GHz	2.5 dB
Spurious Emission (Conducted) 18 GHz to 26.5 GHz	2.8 dB
Spurious Emission (Conducted) 26.5 GHz to 40 GHz	2.6 dB
Bandwidth Measurement	0.012 %
Duty Cycle and Time Measurement	0.27 %
Temperature_SCH-01	0.96 deg.C.
Humidity_SCH-01	4.0 %
Temperature_SCH-02	2.2 deg.C.
Voltage	0.74 %

3.5 Test Location

UL Japan, Inc. Shonan EMC Lab.
1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 Japan
Telephone: +81-463-50-6400
A2LA Certificate Number: 1266.03
(FCC test firm registration number: 626366, ISED lab company number: 2973D / CAB identifier: JP0001)

Test room	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber (SAC1)	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.2 Semi-anechoic chamber (SAC2)	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber (SAC3)	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
No.4 Semi-anechoic chamber (SAC4)	8.1 x 5.1 x 3.55	8.1 x 5.1	-
Wireless anechoic chamber 1 (WAC1)	9.5 x 6.0 x 5.4	9.5 x 6.0	3 m
Wireless anechoic chamber 2 (WAC2)	9.5 x 6.0 x 5.4	9.5 x 6.0	3 m
No.1 Shielded room	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.2 Shielded room	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.3 Shielded room	6.3 x 4.7 x 2.7	6.3 x 4.7	-
No.4 Shielded room	4.4 x 4.7 x 2.7	4.4 x 4.7	-
No.5 Shielded room	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.6 Shielded room	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.8 Shielded room	3.45 x 5.5 x 2.4	3.45 x 5.5	-
No.1 Measurement room	2.55 x 4.1 x 2.5	-	-
No.2 Measurement room	4.5 x 3.5 x 2.5	-	-
Wireless shielded room 1	3.0 x 4.5 x 2.7	3.0 x 4.5	-
Wireless shielded room 2	3.0 x 4.5 x 2.7	3.0 x 4.5	-

3.6 Test Data, Test Instruments, and Test Set Up

Refer to APPENDIX.

SECTION 4: Operation of EUT during testing

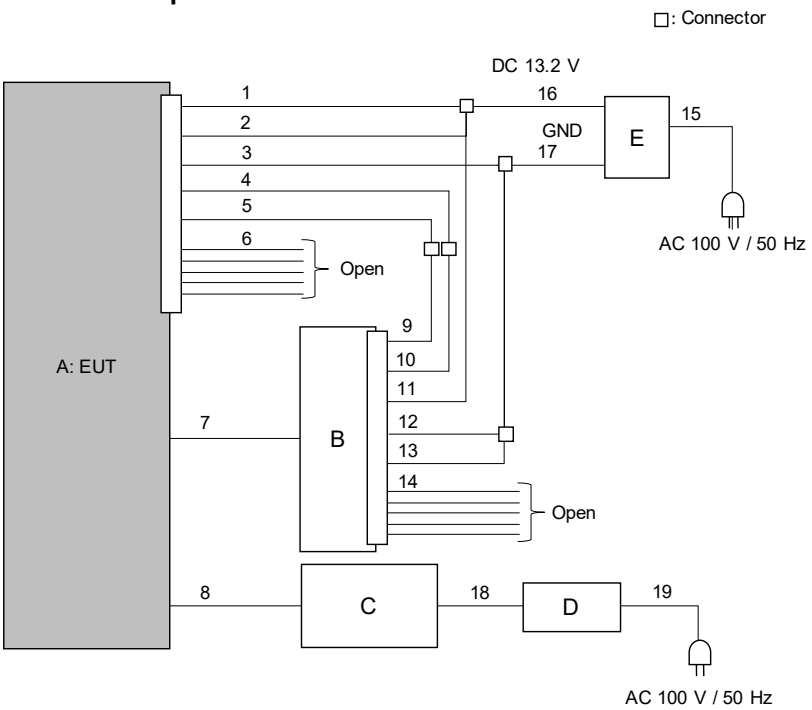
4.1 Operating Mode(s)

Mode	Remarks*
IEEE 802.11b (11b)	2 Mbps (Short), PN9
IEEE 802.11g (11g)	54 Mbps, PN9
IEEE 802.11n (11n-20)	MCS 7, PN9
Bluetooth Low Energy (BT LE)	Uncoded 1 M-PHY(1M-PHY), Maximum Packet Size, PRBS9
	125 kbps, Coded PHY S-8 coding(coded_S-8), Maximum Packet Size, PRBS9
	500 kbps, Coded PHY S-2 coding(coded_S-2), Maximum Packet Size, PRBS9
	Uncoded 2 M-PHY(2M-PHY), Maximum Packet Size, PRBS9
*The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
*Power of the EUT was set by the software as follows; Power Setting: 11b: 14 dBm, 11g/n-20: 11 dBm BT LE: 8 (setting value) Software: QRCT (Qualcomm Radio Control Toolkit) Version: 4.0.00195.0 (Date: 2021.10.18, Storage location: Driven by connected PC) *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product. Test operating mode was determined as follows according to “Section 1 of 6 802.11 a/b/g/n testing - Managing Complex Regulatory Approvals - ” of TCB Council Workshop October 2009.	

*The Details of Operating Mode(s)

Test Item	Operating Mode	Tested Frequency
Conducted Spurious Emission	Tx 11n-20 *1)	2462 MHz
	Tx BT LE, 2M-PHY *1)	2440 MHz
Maximum Peak Output Power	Tx 11b Tx 11g Tx 11n-20	2412 MHz 2437 MHz 2462 MHz
	Tx BT LE, 1M-PHY Tx BT LE, 1M coded S2 Tx BT LE, 1M coded S8 Tx BT LE, 2M-PHY	2402 MHz 2440 MHz 2480 MHz
6 dB Bandwidth, Power Density, 99 % Occupied Bandwidth	Tx 11b Tx 11g Tx 11n-20	2412 MHz 2437 MHz 2462 MHz
	Tx BT LE, 1M-PHY Tx BT LE, 2M-PHY	2402 MHz 2440 MHz 2480 MHz
*1) The mode was tested as a representative, because it had the highest power at antenna terminal test.		

4.2 Configuration and Peripherals



Description of EUT and Support Equipment

No.	Item	Model Number	Serial Number	Manufacturer	Remarks
A	Head unit	AH00ICB 4	No.3	ALPS ALPINE	EUT
B	Display	QH00274A	No.28	ALPS ALPINE	-
C	Laptop Computer	ThinkPad L580	PF-1PMM0X	LENOVO	-
D	AC Adapter	ADLX45YLC2A	8SSA10E75842L1CZ9480J61	LENOVO	-
E	Power Supply(DC)	PW16-5ADP	19100034	GW Instek	-

List of Cables Used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	+B	2.2	Unshielded	Unshielded	-
2	ACC	2.2	Unshielded	Unshielded	-
3	GND	2.2	Unshielded	Unshielded	-
4	BCAN H	2.2	Unshielded	Unshielded	-
5	BCAN L	2.2	Unshielded	Unshielded	-
6	Signal	2.2	Unshielded	Unshielded	-
7	GVIF	2.4	Shielded	Shielded	-
8	USB	2.2 + 1.0	Shielded	Shielded	-
9	BCAN L	0.6	Unshielded	Unshielded	-
10	BCAN H	0.6	Unshielded	Unshielded	-
11	+B	0.6	Unshielded	Unshielded	-
12	GND	0.6	Unshielded	Unshielded	-
13	DISP CONT	0.6	Unshielded	Unshielded	-
14	Signal	0.6	Unshielded	Unshielded	-
15	AC	1.5	Unshielded	Unshielded	-
16	DC+	1.0	Unshielded	Unshielded	-
17	DC-	1.0	Unshielded	Unshielded	-
18	DC	1.8	Unshielded	Unshielded	-
19	AC	0.9	Unshielded	Unshielded	-

SECTION 5: Antenna Terminal Conducted Tests

Test Procedure

The tests were made with below setting connected to the antenna port.

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument Used
6 dB Bandwidth	Enough width to display emission skirts	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99 % Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak/ Average *2)	-	Power Meter (Sensor: 160 MHz BW)
Peak Power Density	1.5 times the 6 dB Bandwidth	3 kHz	9.1 kHz	Auto	Peak	Max Hold	Spectrum Analyzer *3)
Conducted Spurious Emission *4) *5)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	10 kHz	30 kHz				

*1) Peak hold was applied as Worst-case measurement.
*2) Reference data
*3) Section 11.10.2 Method PKPSD (peak PSD) of "ANSI C63.10-2013".
*4) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.
Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.
(9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 10 kHz)
*5) The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ohmes. For example, the measurement at frequency 9 kHz resulted in a level of 45.5 dBuV/m, which is equivalent to 45.5 - 51.5 = -6.0 dBuA/m, which has the same margin, 3 dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

Test results are rounded off and limit are rounded down, so some differences might be observed.
The equipment and cables were not used for factor 0 dB of the data sheets.

Test Data : APPENDIX
Test Result : Pass

APPENDIX 1: Test Data

99 % Occupied Bandwidth and 6 dB Bandwidth

Test place	Shonan EMC Lab. No.1 Wireless Shielded Room
Date	January 26, 2024
Temperature / Humidity	21 deg. C / 28 % RH
Engineer	Yuta Shiba
Mode	Tx

11b

Frequency [MHz]	99 % Occupied Bandwidth [kHz]	6 dB Bandwidth [MHz]	Limit for 6 dB Bandwidth [MHz]
2412	14032.4	8.140	> 0.5000
2437	14055.6	8.144	> 0.5000
2462	14063.0	8.059	> 0.5000

11g

Frequency [MHz]	99 % Occupied Bandwidth [kHz]	6 dB Bandwidth [MHz]	Limit for 6 dB Bandwidth [MHz]
2412	17218.2	16.548	> 0.5000
2437	17211.0	16.547	> 0.5000
2462	17230.6	16.542	> 0.5000

11n-20 (SISO)

Frequency [MHz]	99 % Occupied Bandwidth [kHz]	6 dB Bandwidth [MHz]	Limit for 6 dB Bandwidth [MHz]
2412	18321.4	17.770	> 0.5000
2437	18336.5	17.759	> 0.5000
2462	18361.7	17.775	> 0.5000

99 % Occupied Bandwidth and 6 dB Bandwidth

Test place	Shonan EMC Lab. No.1 Wireless Shielded Room
Date	January 26, 2024
Temperature / Humidity	21 deg. C / 28 % RH
Engineer	Yuta Shiba
Mode	Tx

BT LE 1M-PHY

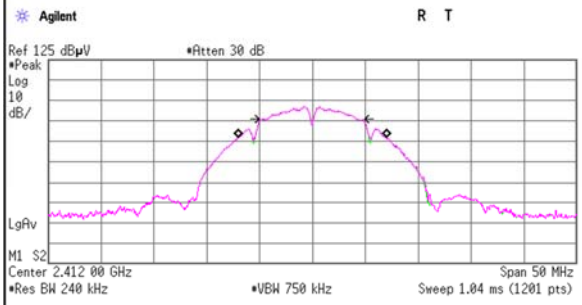
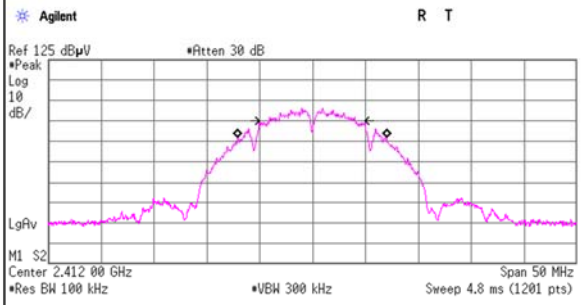
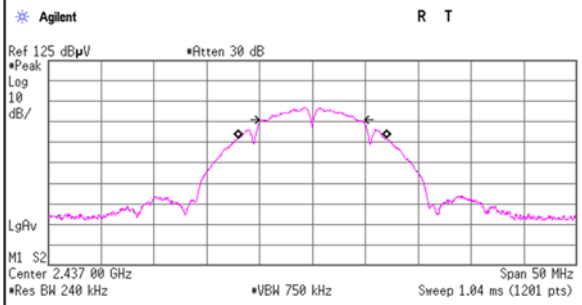
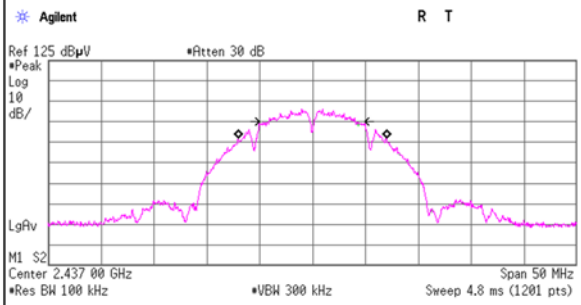
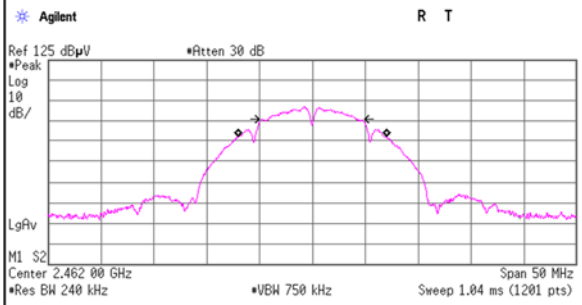
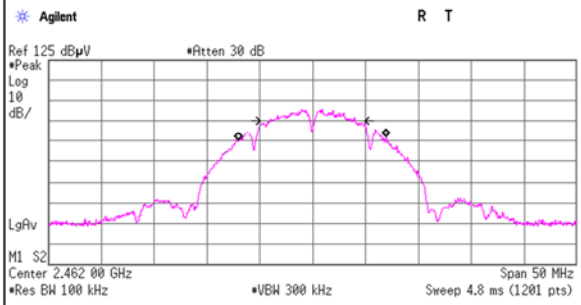
Frequency [MHz]	99 % Occupied Bandwidth [kHz]	6 dB Bandwidth [MHz]	Limit for 6 dB Bandwidth [MHz]
2402	1030.8	0.674	> 0.5000
2440	1029.3	0.666	> 0.5000
2480	1027.7	0.672	> 0.5000

BT LE 2M-PHY

Frequency [MHz]	99 % Occupied Bandwidth [kHz]	6 dB Bandwidth [MHz]	Limit for 6 dB Bandwidth [MHz]
2402	2010.3	1.147	> 0.5000
2440	2009.3	1.151	> 0.5000
2480	2004.4	1.150	> 0.5000

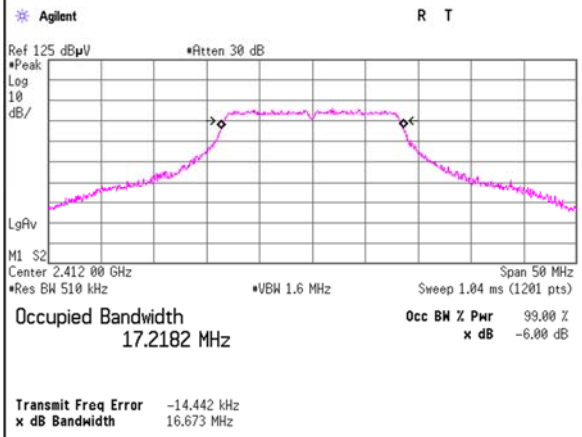
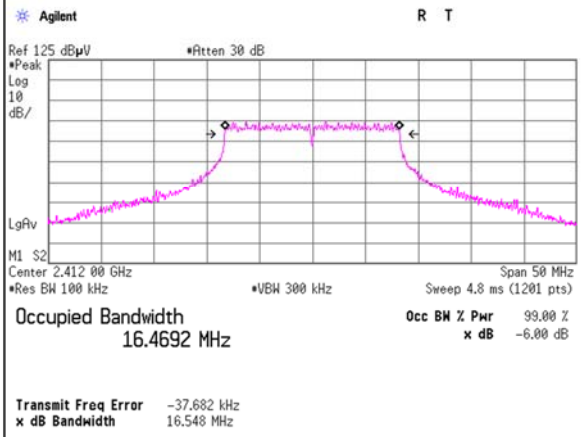
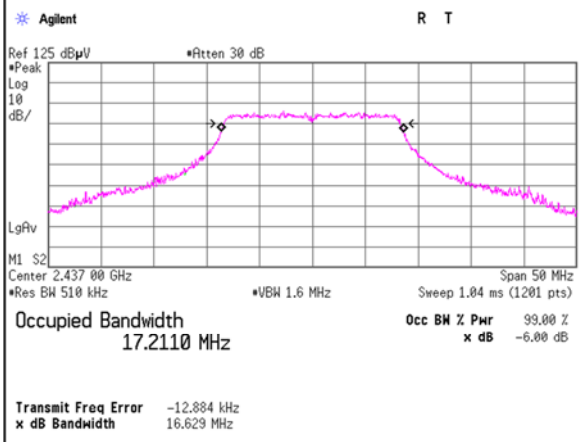
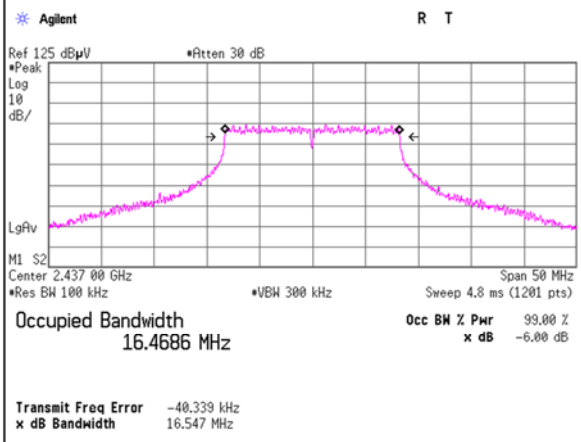
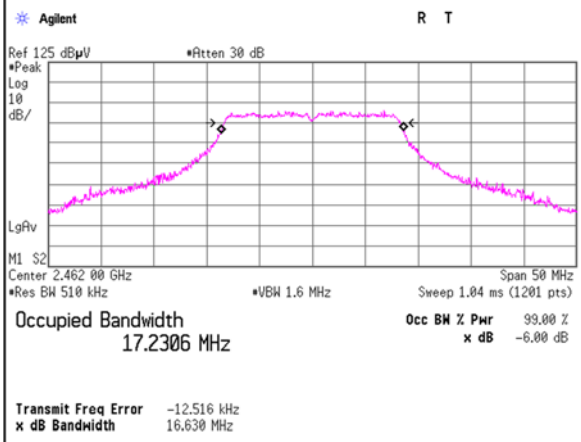
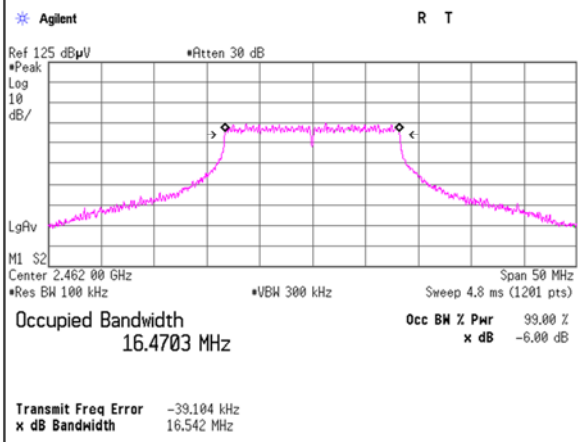
99 % Occupied Bandwidth and 6 dB Bandwidth

11b

99 % Occupied Bandwidth	6 dB Bandwidth
2412 MHz	**2412 MHz**
	
Occupied Bandwidth 14.0324 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error -24.685 kHz x dB Bandwidth 8.248 MHz	Occupied Bandwidth 14.0584 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error -35.250 kHz x dB Bandwidth 8.140 MHz
2437 MHz	**2437 MHz**
	
Occupied Bandwidth 14.0556 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error -34.706 kHz x dB Bandwidth 8.228 MHz	Occupied Bandwidth 14.0330 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error -31.529 kHz x dB Bandwidth 8.144 MHz
2462 MHz	**2462 MHz**
	
Occupied Bandwidth 14.0630 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error -20.715 kHz x dB Bandwidth 8.206 MHz	Occupied Bandwidth 14.0028 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error -21.887 kHz x dB Bandwidth 8.059 MHz

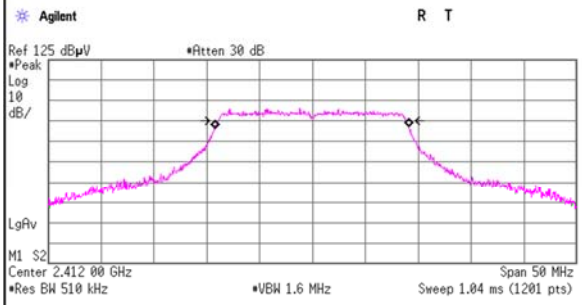
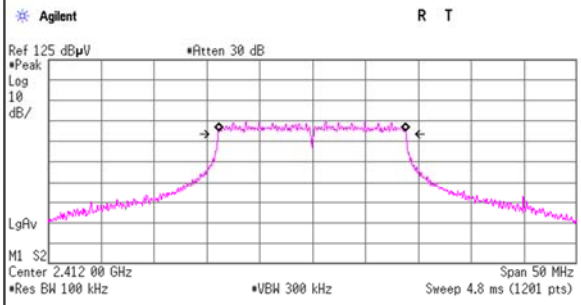
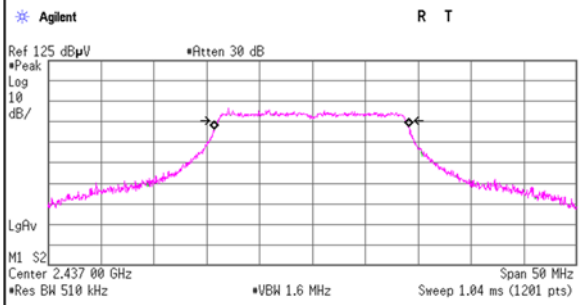
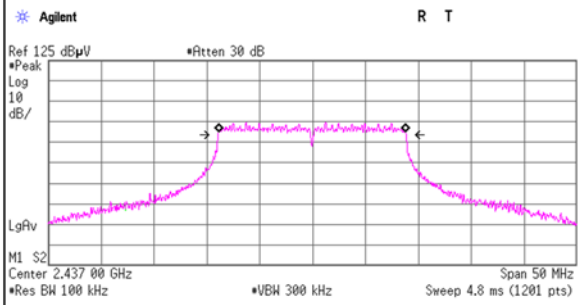
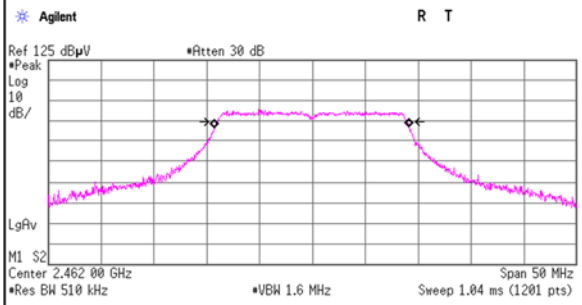
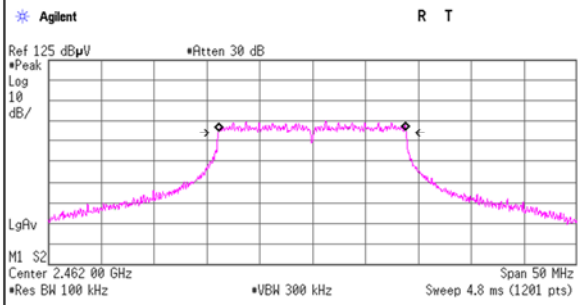
99 % Occupied Bandwidth and 6 dB Bandwidth

11g

99 % Occupied Bandwidth	6 dB Bandwidth
2412 MHz	**2412 MHz**
	
2437 MHz	**2437 MHz**
	
2462 MHz	**2462 MHz**
	

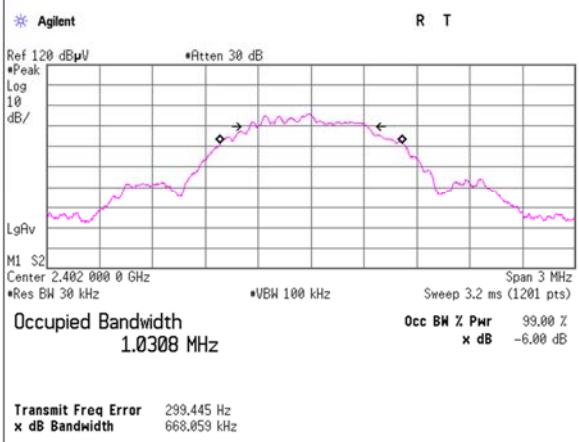
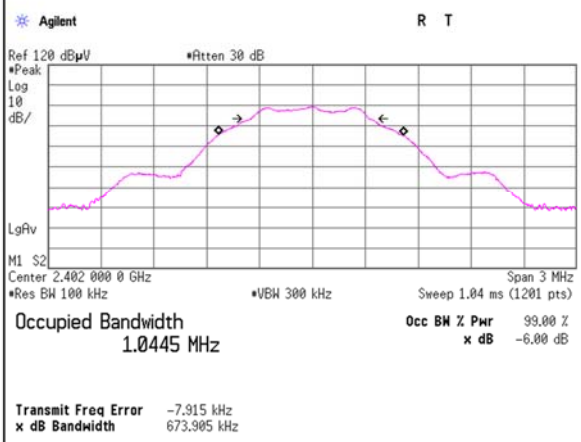
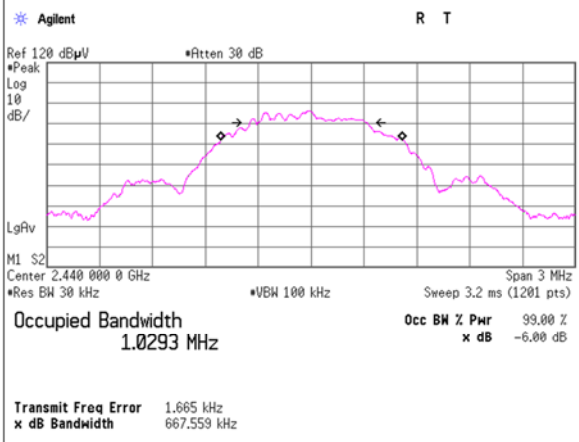
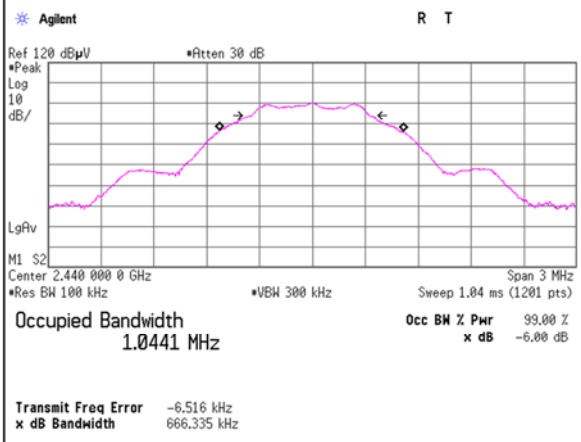
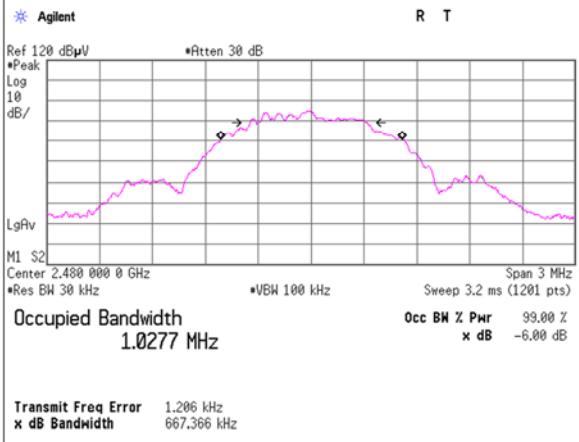
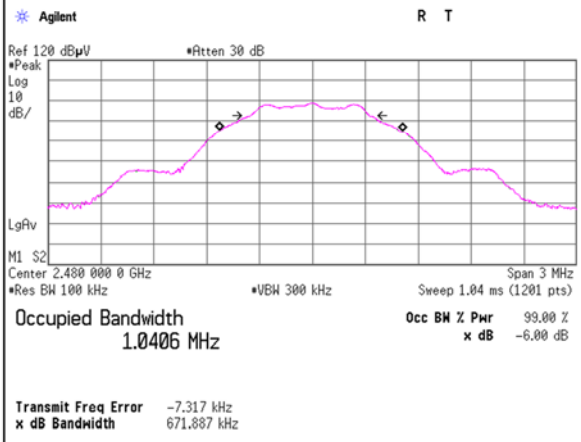
99 % Occupied Bandwidth and 6 dB Bandwidth

11n-20 (SISO)

99 % Occupied Bandwidth	6 dB Bandwidth
2412 MHz	**2412 MHz**
	
Occupied Bandwidth 18.3214 MHz; Occ BW % Pwr 99.00 %; x dB -6.00 dB; Transmit Freq Error -57.235 kHz; x dB Bandwidth 17.703 MHz	Occupied Bandwidth 17.6762 MHz; Occ BW % Pwr 99.00 %; x dB -6.00 dB; Transmit Freq Error -51.993 kHz; x dB Bandwidth 17.770 MHz
2437 MHz	**2437 MHz**
	
Occupied Bandwidth 18.3365 MHz; Occ BW % Pwr 99.00 %; x dB -6.00 dB; Transmit Freq Error -62.381 kHz; x dB Bandwidth 17.668 MHz	Occupied Bandwidth 17.6733 MHz; Occ BW % Pwr 99.00 %; x dB -6.00 dB; Transmit Freq Error -50.040 kHz; x dB Bandwidth 17.759 MHz
2462 MHz	**2462 MHz**
	
Occupied Bandwidth 18.3617 MHz; Occ BW % Pwr 99.00 %; x dB -6.00 dB; Transmit Freq Error -67.010 kHz; x dB Bandwidth 17.835 MHz	Occupied Bandwidth 17.6814 MHz; Occ BW % Pwr 99.00 %; x dB -6.00 dB; Transmit Freq Error -44.054 kHz; x dB Bandwidth 17.775 MHz

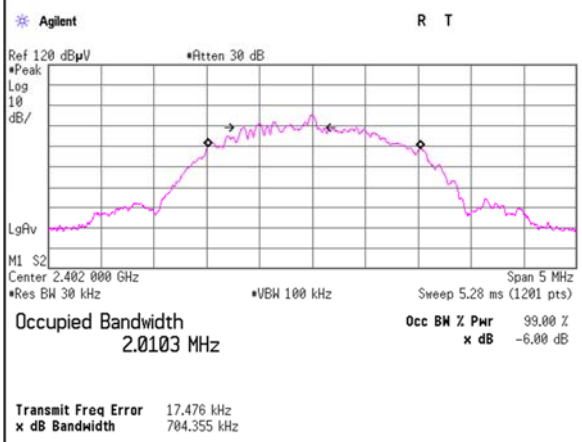
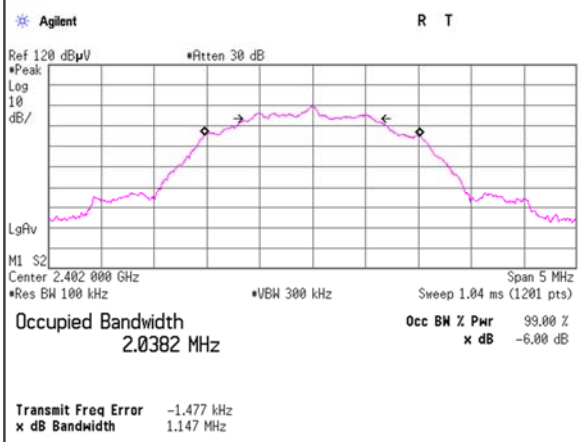
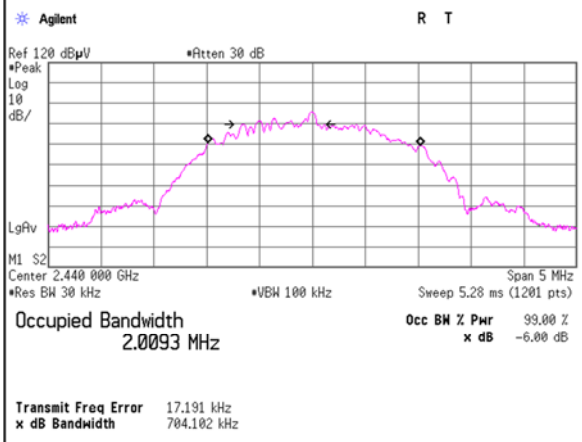
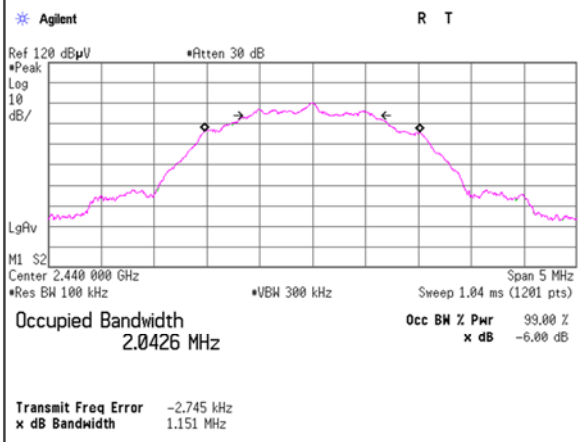
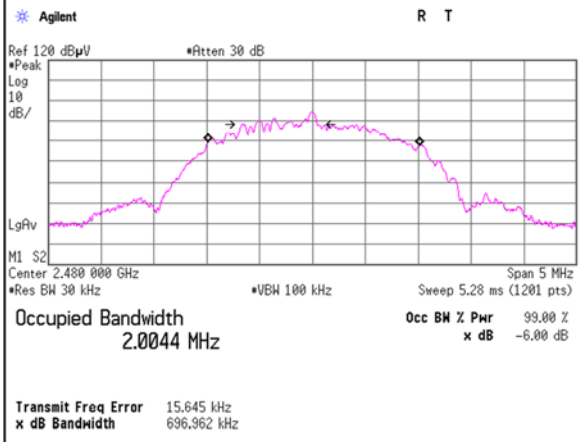
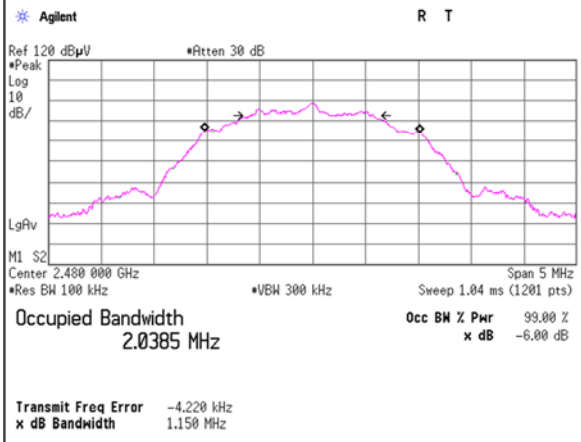
99 % Occupied Bandwidth and 6 dB Bandwidth

BT LE 1M-PHY

99 % Occupied Bandwidth	6 dB Bandwidth
2402 MHz	**2402 MHz**
	
2440 MHz	**2440 MHz**
	
2480 MHz	**2480 MHz**
	

99 % Occupied Bandwidth and 6 dB Bandwidth

BT LE 2M-PHY

99 % Occupied Bandwidth	6 dB Bandwidth
2402 MHz	**2402 MHz**
	
2440 MHz	**2440 MHz**
	
2480 MHz	**2480 MHz**
	

Maximum Peak Output Power

Test place	Shonan EMC Lab. No.5 Shielded Room
Date	January 20, 2024
Temperature / Humidity	23 deg. C / 26 % RH
Engineer	Miku Ikudome
Mode	Tx

11b

Maximum peak output power 2 Mbps (short) (worst)

				Conducted Power					e.i.r.p. for RSS-247					
Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	4.52	1.00	9.95	15.47	35.24	30.00	1000	14.53	-0.78	14.69	29.44	36.02	4000	21.33
2437	4.48	1.02	9.95	15.45	35.08	30.00	1000	14.55	-0.78	14.67	29.31	36.02	4000	21.35
2462	4.41	1.03	9.95	15.39	34.59	30.00	1000	14.61	-0.78	14.61	28.91	36.02	4000	21.41

11g

Maximum peak output power 54 Mbps (worst)

				Conducted Power					e.i.r.p. for RSS-247					
Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	7.75	1.00	9.95	18.70	74.13	30.00	1000	11.30	-0.78	17.92	61.94	36.02	4000	18.10
2437	8.19	1.02	9.95	19.16	82.41	30.00	1000	10.84	-0.78	18.38	68.87	36.02	4000	17.64
2462	8.23	1.03	9.95	19.21	83.37	30.00	1000	10.79	-0.78	18.43	69.66	36.02	4000	17.59

11n-20 (SISO)

Maximum peak output power MCS 7 (worst)

				Conducted Power					e.i.r.p. for RSS-247					
Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2412	7.94	1.00	9.95	18.89	77.45	30.00	1000	11.11	-0.78	18.11	64.71	36.02	4000	17.91
2437	8.10	1.02	9.95	19.07	80.72	30.00	1000	10.93	-0.78	18.29	67.45	36.02	4000	17.73
2462	8.30	1.03	9.95	19.28	84.72	30.00	1000	10.72	-0.78	18.50	70.79	36.02	4000	17.52

Sample Calculation:
Result = Reading + Cable Loss + Attenuator Loss
e.i.r.p. Result = Conducted Power Result + Antenna Gain

Maximum Peak Output Power

Test place	Shonan EMC Lab. No.5 Shielded Room
Date	January 20, 2024
Temperature / Humidity	23 deg. C / 26 % RH
Engineer	Miku Ikudome
Mode	Tx

(Peak)

11b 2437 MHz

Rate [Mbps]	Reading [dBm]	Remark
1	4.34	
2 (Long)	4.36	
2 (short)	4.48	*
5.5 (Long)	4.36	
5.5 (short)	4.45	
11 (Long)	4.36	
11 (short)	4.47	

*: Worst Rate

11g 2437 MHz

Rate [Mbps]	Reading [dBm]	Remark
6	3.77	
9	3.88	
12	3.94	
18	5.71	
24	5.72	
36	8.04	
48	8.10	
54	8.19	*

*: Worst Rate

11n-20 (SISO) 2437 MHz

MCS	Reading [dBm]	Remark
0	3.89	
1	3.88	
2	5.75	
3	5.73	
4	7.79	
5	7.72	
6	7.74	
7	8.10	*

*: Worst Rate

* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

* All comparisons were carried out on same frequency and measurement factors.

* This result value is not the final data and does not include cable attenuation or attenuation of attenuators.

Maximum Peak Output Power

Test place	Shonan EMC Lab. No.5 Shielded Room
Date	January 20, 2024
Temperature / Humidity	23 deg. C / 26 % RH
Engineer	Miku Ikudome
Mode	Tx

BT LE 1M-PHY

Maximum peak output power

				Conducted Power					e.i.r.p. for RSS-247					
Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2402	-7.11	1.00	9.95	3.84	2.42	30.00	1000	26.16	-0.20	3.64	2.31	36.02	4000	32.38
2440	-6.76	1.02	9.95	4.21	2.64	30.00	1000	25.79	-0.20	4.01	2.52	36.02	4000	32.01
2480	-7.99	1.02	9.95	2.98	1.99	30.00	1000	27.02	-0.20	2.78	1.90	36.02	4000	33.24

BT LE 2M-PHY

Maximum peak output power

				Conducted Power					e.i.r.p. for RSS-247					
Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2402	-6.90	1.00	9.95	4.05	2.54	30.00	1000	25.95	-0.20	3.85	2.43	36.02	4000	32.17
2440	-6.54	1.02	9.95	4.43	2.77	30.00	1000	25.57	-0.20	4.23	2.65	36.02	4000	31.79
2480	-7.80	1.02	9.95	3.17	2.07	30.00	1000	26.83	-0.20	2.97	1.98	36.02	4000	33.05

BT LE 1M coded S2

Maximum peak output power

				Conducted Power					e.i.r.p. for RSS-247					
Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2402	-7.12	1.00	9.95	3.83	2.42	30.00	1000	26.17	-0.20	3.63	2.31	36.02	4000	32.39
2440	-6.77	1.02	9.95	4.20	2.63	30.00	1000	25.80	-0.20	4.00	2.51	36.02	4000	32.02
2480	-7.93	1.02	9.95	3.04	2.01	30.00	1000	26.96	-0.20	2.84	1.92	36.02	4000	33.18

BT LE 1M coded S8

Maximum peak output power

				Conducted Power					e.i.r.p. for RSS-247					
Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2402	-7.14	1.00	9.95	3.81	2.40	30.00	1000	26.19	-0.20	3.61	2.30	36.02	4000	32.41
2440	-6.82	1.02	9.95	4.15	2.60	30.00	1000	25.85	-0.20	3.95	2.48	36.02	4000	32.07
2480	-8.02	1.02	9.95	2.95	1.97	30.00	1000	27.05	-0.20	2.75	1.88	36.02	4000	33.27

Sample Calculation:
Result = Reading + Cable Loss + Attenuator Loss
e.i.r.p. Result = Conducted Power Result + Antenna Gain

Average Output Power
(Reference data for RF Exposure)

Test place	Shonan EMC Lab. No.5 Shielded Room
Date	January 20, 2024
Temperature / Humidity	23 deg. C / 26 % RH
Engineer	Miku Ikudome
Mode	Tx

11b

Average power 2 Mbps (short) (worst)

Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2412	2.29	1.00	9.95	13.24	21.09	0.03	13.27	21.23
2437	2.72	1.02	9.95	13.69	23.39	0.03	13.72	23.55
2462	2.20	1.03	9.95	13.18	20.80	0.03	13.21	20.94

11g

Average power 24 Mbps (worst)

Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2412	-0.60	1.00	9.95	10.35	10.84	0.41	10.76	11.91
2437	-0.53	1.02	9.95	10.44	11.07	0.41	10.85	12.16
2462	-0.32	1.03	9.95	10.66	11.64	0.41	11.07	12.79

11n-20 (SISO)

Average power MCS 3 (worst)

Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2412	-0.68	1.00	9.95	10.27	10.64	0.42	10.69	11.72
2437	-0.62	1.02	9.95	10.35	10.84	0.42	10.77	11.94
2462	-0.37	1.03	9.95	10.61	11.51	0.42	11.03	12.67

Sample Calculation:

Result (Time average) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

Result (Burst power average) = Result (Time average) + Duty factor

Average Output Power
(Reference data for RF Exposure)

Test place	Shonan EMC Lab. No.5 Shielded Room
Date	January 20, 2024
Temperature / Humidity	23 deg. C / 26 % RH
Engineer	Miku Ikudome
Mode	Tx

(Average)

11b 2437 MHz

Rate [Mbps]	Reading [dBm]	Duty Factor [dB]	Result [dBm]	Remark
1	2.28	0.01	2.29	
2 (Long)	2.58	0.03	2.61	
2 (short)	2.72	0.03	2.75	*
5.5 (Long)	2.15	0.07	2.22	
5.5 (short)	2.27	0.08	2.35	
11 (Long)	2.03	0.14	2.17	
11 (short)	2.14	0.15	2.29	

*: Worst Rate

11g 2437 MHz

Rate [Mbps]	Reading [dBm]	Duty Factor [dB]	Result [dBm]	Remark
6	-0.75	0.11	-0.64	
9	-0.79	0.16	-0.63	
12	-0.80	0.22	-0.58	
18	-0.47	0.31	-0.16	
24	-0.53	0.41	-0.12	*
36	-1.29	0.57	-0.72	
48	-1.54	0.71	-0.83	
54	-1.49	0.79	-0.70	

*: Worst Rate

11n-20 (SISO) 2437 MHz

MCS	Reading [dBm]	Duty Factor [dB]	Result [dBm]	Remark
0	-0.83	0.12	-0.71	
1	-0.94	0.23	-0.71	
2	-0.58	0.33	-0.25	
3	-0.62	0.42	-0.20	*
4	-1.32	0.58	-0.74	
5	-1.38	0.70	-0.68	
6	-1.54	0.79	-0.75	
7	-1.56	0.82	-0.74	

*: Worst Rate

Sample Calculation: Result [dBm] = Reading [dBm] + Duty Factor [dB]

* All comparisons were carried out on same frequency and measurement factors.

* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

* This result value is not the final data and does not include cable attenuation or attenuation of attenuators.

Average Output Power
(Reference data for RF Exposure)

Test place	Shonan EMC Lab. No.5 Shielded Room
Date	January 20, 2024
Temperature / Humidity	23 deg. C / 26 % RH
Engineer	Miku Ikudome
Mode	Tx

BT LE 1M-PHY
Average power

Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2402	-9.56	1.00	9.95	1.39	1.38	1.75	3.14	2.06
2440	-9.21	1.02	9.95	1.76	1.50	1.75	3.51	2.24
2480	-10.47	1.02	9.95	0.50	1.12	1.75	2.25	1.68

BT LE 2M-PHY
Average power

Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2402	-12.26	1.00	9.95	-1.31	0.74	4.30	2.99	1.99
2440	-11.93	1.02	9.95	-0.96	0.80	4.30	3.34	2.16
2480	-13.17	1.02	9.95	-2.20	0.60	4.30	2.10	1.62

BT LE 1M coded S2
Average power

Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2402	-9.91	1.00	9.95	1.04	1.27	2.33	3.37	2.17
2440	-9.57	1.02	9.95	1.40	1.38	2.33	3.73	2.36
2480	-10.83	1.02	9.95	0.14	1.03	2.33	2.47	1.77

BT LE 1M coded S8
Average power

Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2402	-8.35	1.00	9.95	2.60	1.82	0.79	3.39	2.18
2440	-8.01	1.02	9.95	2.96	1.98	0.79	3.75	2.37
2480	-9.27	1.02	9.95	1.70	1.48	0.79	2.49	1.77

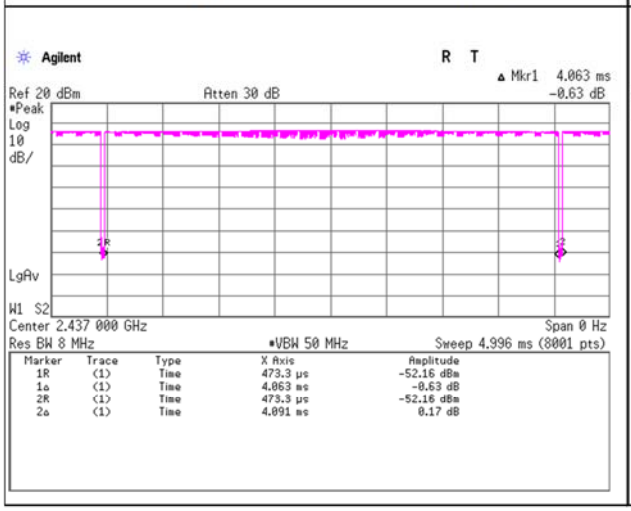
Sample Calculation:
Result (Time average) = Reading + Cable Loss + Attenuator Loss
Result (Burst power average) = Result (Time average) + Duty factor

Burst rate confirmation

Test place	Shonan EMC Lab. No.5 Shielded Room
Date	January 20, 2024
Temperature / Humidity	23 deg. C / 26 % RH
Engineer	Miku Ikudome
Mode	Tx

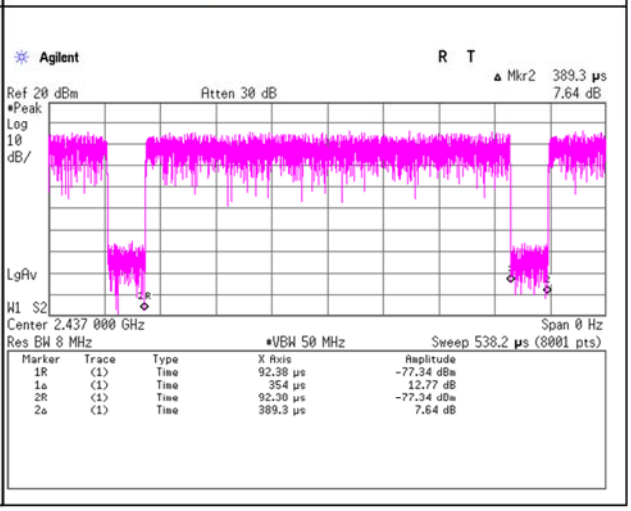
11b, 2 Mbps (short)

Tx on / (Tx on + Tx off) =	0.993
Tx on / (Tx on + Tx off) * 100 =	99.3 %
Duty factor = 10 * log (4.091 / 4.063) =	0.03 dB



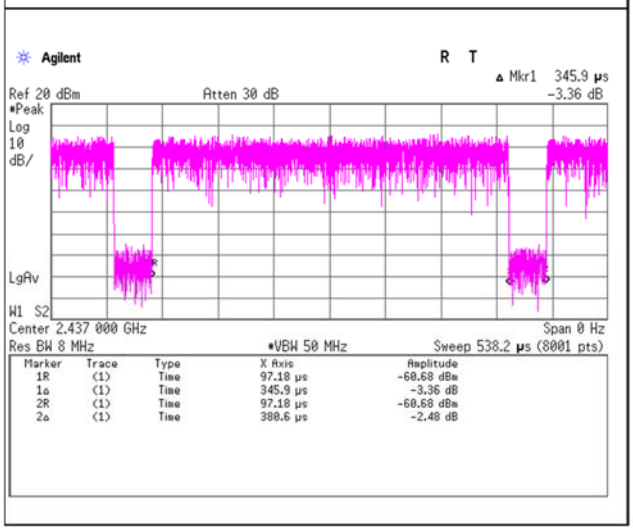
11g, 24 Mbps

Tx on / (Tx on + Tx off) =	0.910
Tx on / (Tx on + Tx off) * 100 =	91.0 %
Duty factor = 10 * log (0.389 / 0.354) =	0.41 dB



11n-20 (SISO), MCS 3

Tx on / (Tx on + Tx off) =	0.908
Tx on / (Tx on + Tx off) * 100 =	90.8 %
Duty factor = 10 * log (0.381 / 0.346) =	0.42 dB

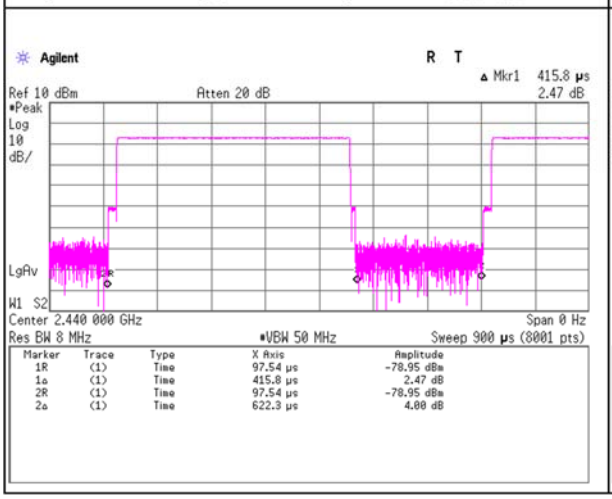


Burst rate confirmation

Test place	Shonan EMC Lab. No.5 Shielded Room
Date	January 20, 2024
Temperature / Humidity	23 deg. C / 26 % RH
Engineer	Miku Ikudome
Mode	Tx

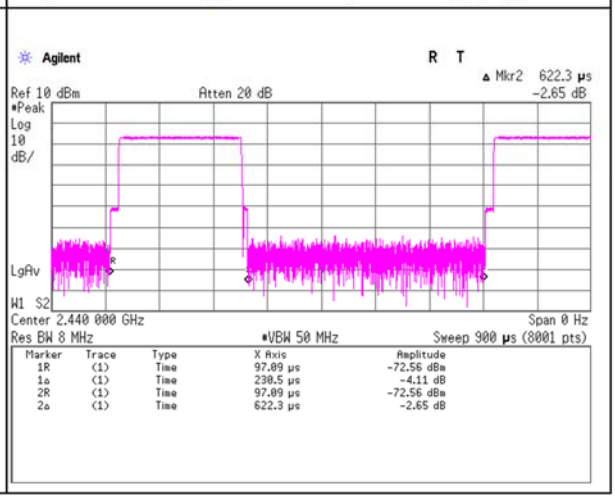
BT LE 1M-PHY

Tx on / (Tx on + Tx off) =	0.669
Tx on / (Tx on + Tx off) * 100 =	66.9 %
Duty factor = 10 * log (0.622 / 0.416) =	1.75 dB



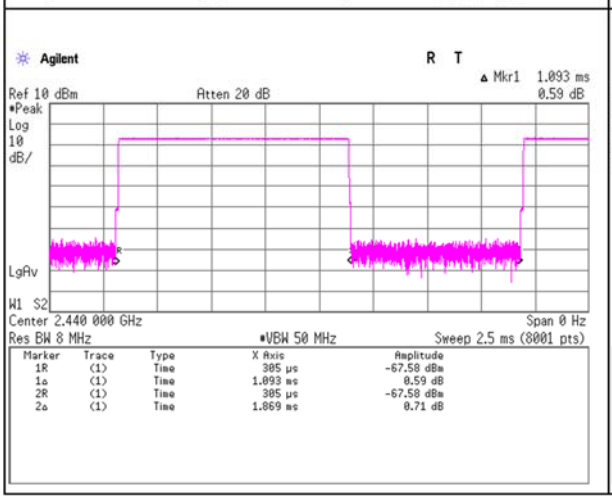
BT LE 2M-PHY

Tx on / (Tx on + Tx off) =	0.371
Tx on / (Tx on + Tx off) * 100 =	37.1 %
Duty factor = 10 * log (0.622 / 0.231) =	4.30 dB



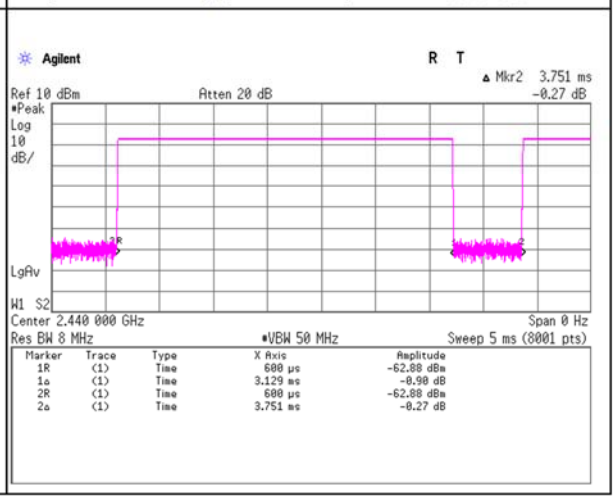
BT LE 1M coded S2

Tx on / (Tx on + Tx off) =	0.585
Tx on / (Tx on + Tx off) * 100 =	58.5 %
Duty factor = 10 * log (1.869 / 1.093) =	2.33 dB



BT LE 1M coded S8

Tx on / (Tx on + Tx off) =	0.834
Tx on / (Tx on + Tx off) * 100 =	83.4 %
Duty factor = 10 * log (3.751 / 3.129) =	0.79 dB

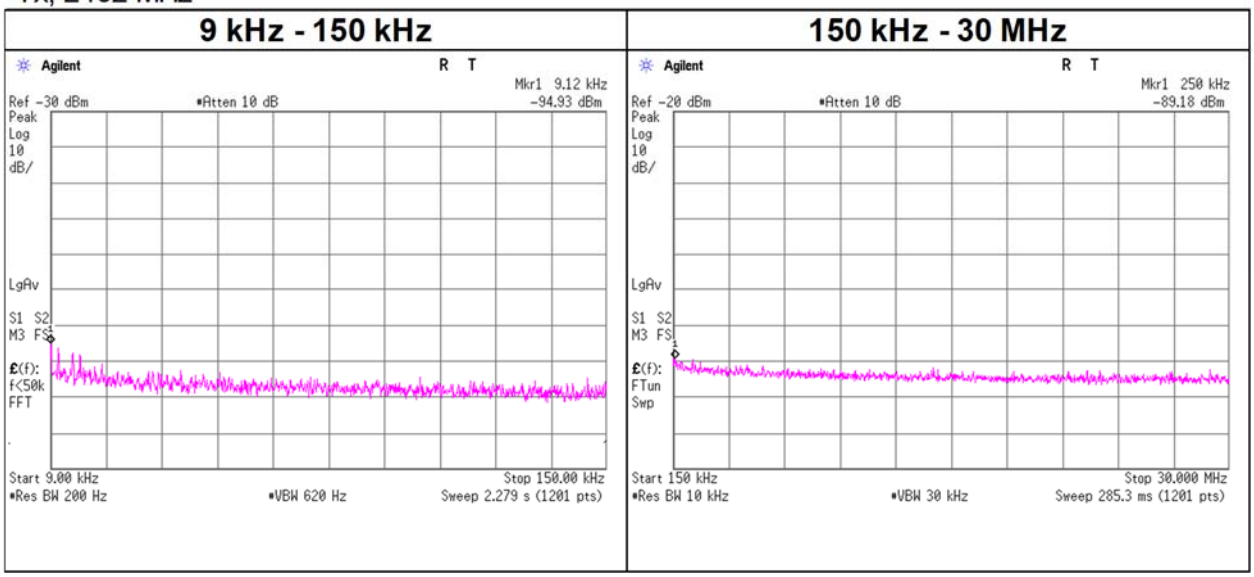


* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

Conducted Spurious Emission

Test place	Shonan EMC Lab. No.1 Wireless Shielded Room
Date	February 7, 2024
Temperature / Humidity	24 deg. C / 26 % RH
Engineer	Masahide Ozaki
Mode	Tx 11n-20 2462 MHz

Tx, 2462 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain * [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
9.12	-94.93	0.01	9.90	2.0	1.0	-83.0	300	6.0	-21.8	48.4	70.2	-
250.00	-89.18	0.01	9.90	2.0	1.0	-77.3	300	6.0	-16.0	19.6	35.6	-

E [dBuV/m] = EIRP [dBm] - 20 log (Distance [m]) + Ground bounce [dB] + 104.8 [dBuV/m]

EIRP[dBm] = Reading [dBm] + Cable loss [dB] + Attenuator Loss [dB] + Antenna gain [dBi] + 10 * log (N)

N: Number of output

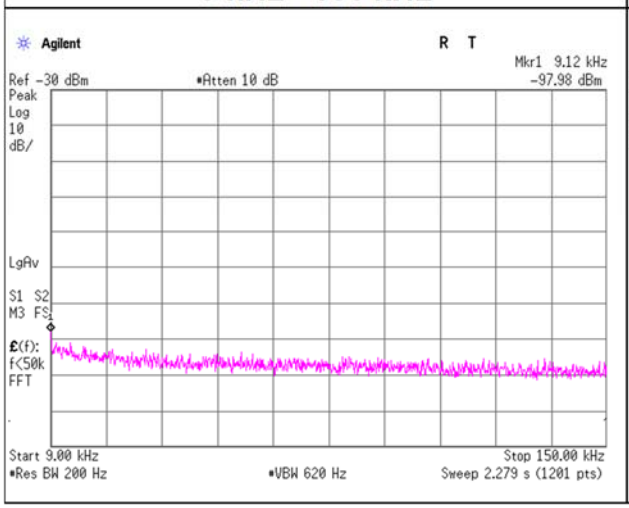
*2.0 dBi was applied to the test result based on ANSI C63.10 since antenna gain was less than 2.0 dBi.

Conducted Spurious Emission

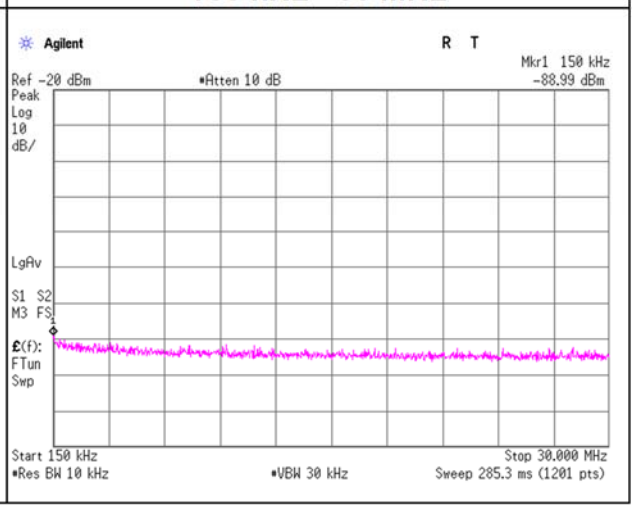
Test place	Shonan EMC Lab. No.1 Wireless Shielded Room
Date	February 7, 2024
Temperature / Humidity	24 deg. C / 26 % RH
Engineer	Masahide Ozaki
Mode	Tx BT LE 2M-PHY 2440 MHz

Tx, 2440 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain * [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
9.12	-97.98	0.01	9.90	2.0	1.0	-86.1	300	6.0	-24.8	48.4	73.2	-
150.00	-88.99	0.01	9.90	2.0	1.0	-77.1	300	6.0	-15.8	24.0	39.8	-

E [dBuV/m] = EIRP [dBm] - 20 log (Distance [m]) + Ground bounce [dB] + 104.8 [dBuV/m]

EIRP[dBm] = Reading [dBm] + Cable loss [dB] + Attenuator Loss [dB] + Antenna gain [dBi] + 10 * log (N)

N: Number of output

*2.0 dBi was applied to the test result based on ANSI C63.10 since antenna gain was less than 2.0 dBi.

Power Density

Test place	Shonan EMC Lab. No.1 Wireless Shielded Room
Date	January 31, 2024
Temperature / Humidity	21 deg. C / 23 % RH
Engineer	Kouki Yamada
Mode	Tx

11b

Frequency [MHz]	Measured Frequency [MHz]	Reading [dBm/3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm/3 kHz]	Limit [dBm/3 kHz]	Margin [dB]
2412	2410.954	-6.13	1.00	9.95	4.82	8.00	3.18
2437	2435.954	-6.24	1.02	9.95	4.73	8.00	3.27
2462	2460.954	-6.21	1.03	9.95	4.77	8.00	3.23

11g

Frequency [MHz]	Measured Frequency [MHz]	Reading [dBm/3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm/3 kHz]	Limit [dBm/3 kHz]	Margin [dB]
2412	2414.448	-26.95	1.00	9.95	-16.00	8.00	24.00
2437	2434.468	-27.10	1.02	9.95	-16.13	8.00	24.13
2462	2464.407	-26.47	1.03	9.95	-15.49	8.00	23.49

11n-20 (SISO)

Frequency [MHz]	Measured Frequency [MHz]	Reading [dBm/3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm/3 kHz]	Limit [dBm/3 kHz]	Margin [dB]
2412	2419.788	-26.14	1.00	9.95	-15.19	8.00	23.19
2437	2441.962	-26.26	1.02	9.95	-15.29	8.00	23.29
2462	2455.659	-25.19	1.03	9.95	-14.21	8.00	22.21

Sample Calculation:
Result = Reading + Cable Loss + Attenuator Loss

Power Density

Test place	Shonan EMC Lab. No.1 Wireless Shielded Room
Date	January 31, 2024
Temperature / Humidity	21 deg. C / 23 % RH
Engineer	Kouki Yamada
Mode	Tx

BT LE 1M-PHY

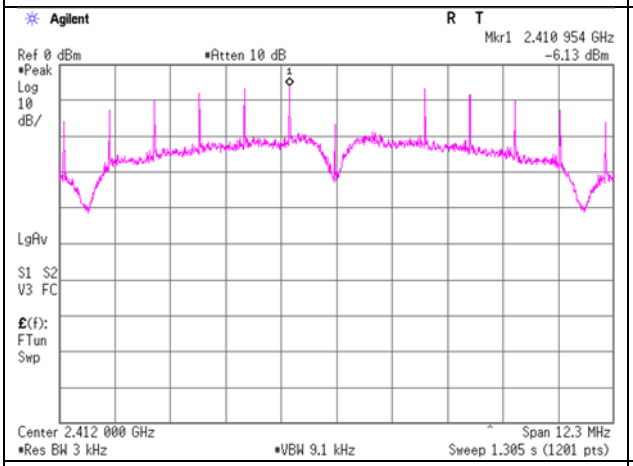
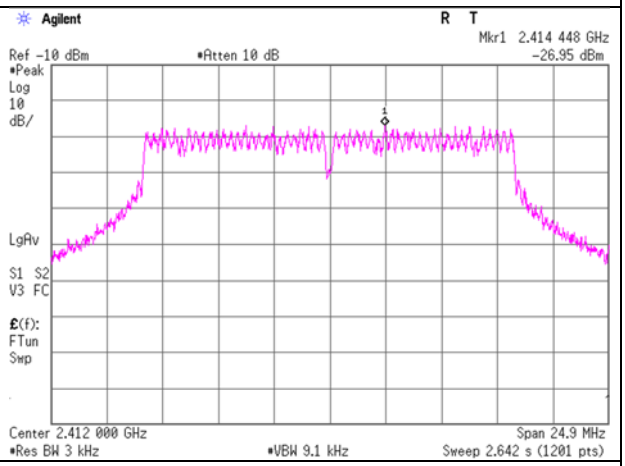
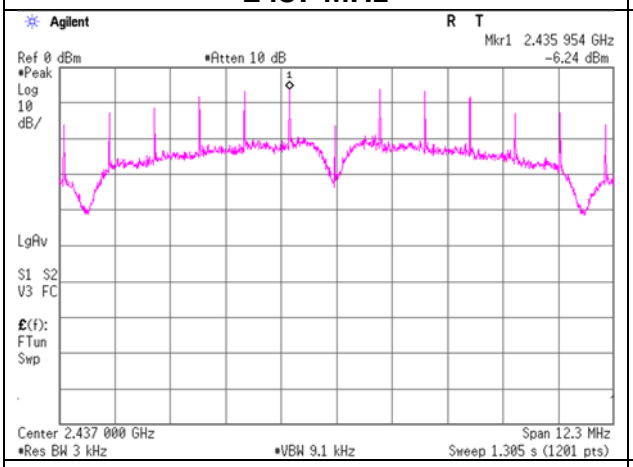
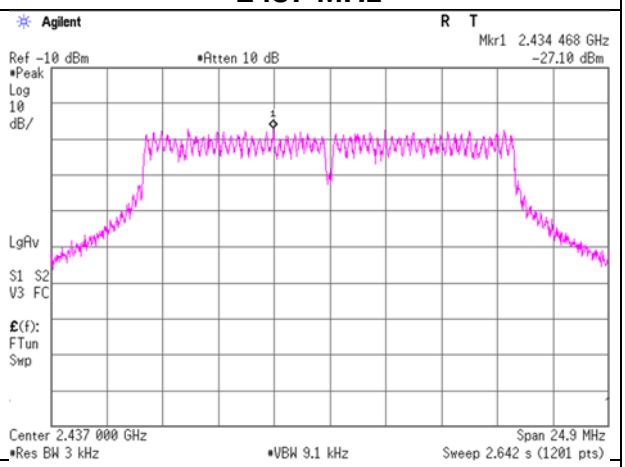
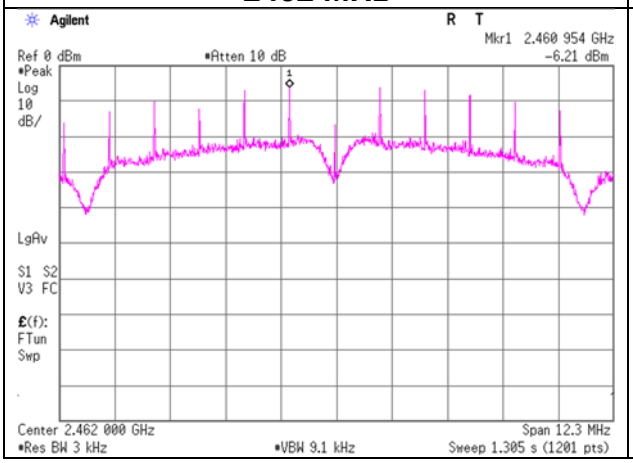
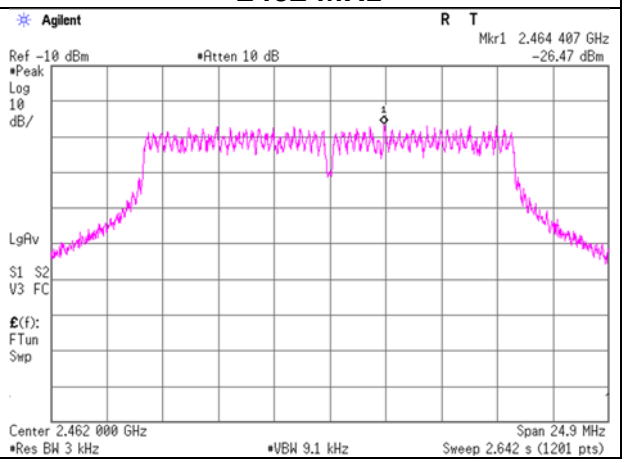
Frequency [MHz]	Measured Frequency [MHz]	Reading [dBm/3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm/3 kHz]	Limit [dBm/3 kHz]	Margin [dB]
2402	2401.971	-22.27	1.00	9.95	-11.32	8.00	19.32
2440	2439.971	-21.88	1.02	9.95	-10.91	8.00	18.91
2480	2479.970	-23.22	1.02	9.95	-12.25	8.00	20.25

BT LE 2M-PHY

Frequency [MHz]	Measured Frequency [MHz]	Reading [dBm/3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm/3 kHz]	Limit [dBm/3 kHz]	Margin [dB]
2402	2401.951	-25.17	1.00	9.95	-14.22	8.00	22.22
2440	2439.951	-24.87	1.02	9.95	-13.90	8.00	21.90
2480	2479.951	-26.09	1.02	9.95	-15.12	8.00	23.12

Sample Calculation:
Result = Reading + Cable Loss + Attenuator Loss

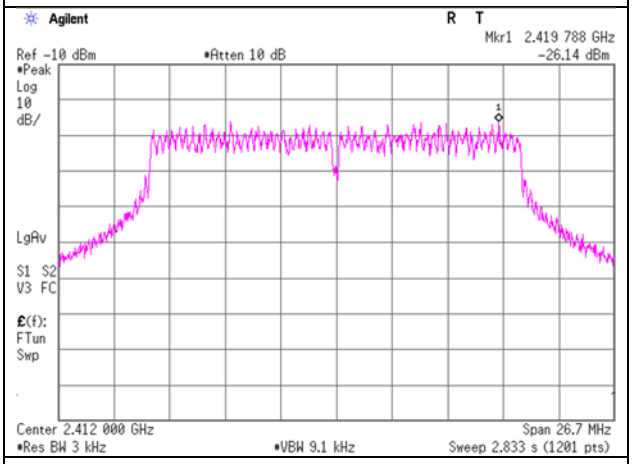
Power Density

11b	11g
2412 MHz	**2412 MHz**
	
2437 MHz	**2437 MHz**
	
2462 MHz	**2462 MHz**
	

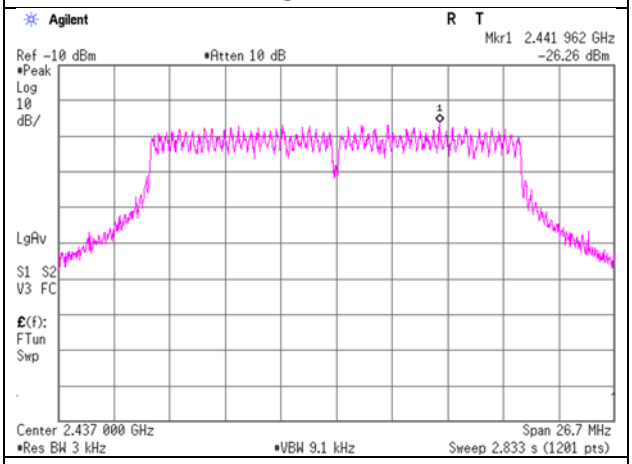
Power Density

11n-20

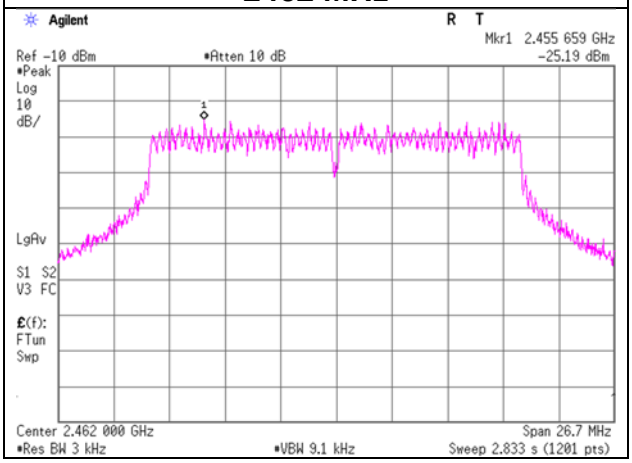
2412 MHz



2437 MHz



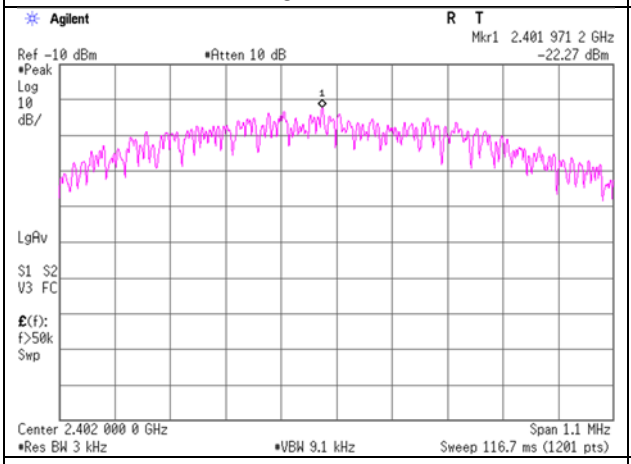
2462 MHz



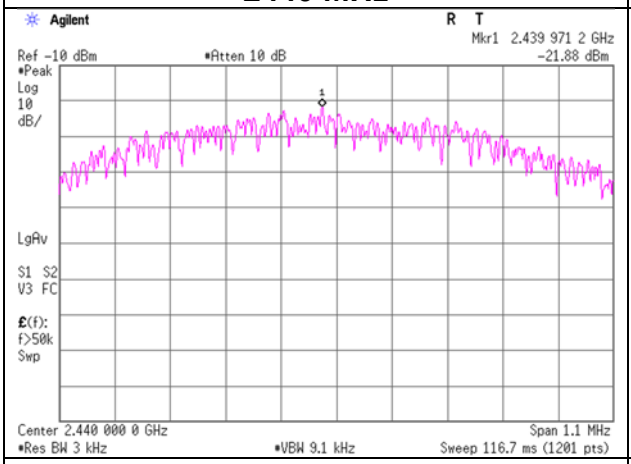
Power Density

BT LE 1M-PHY

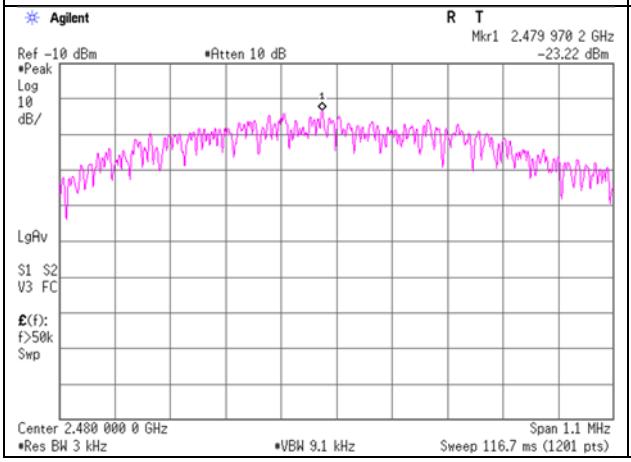
2402 MHz



2440 MHz

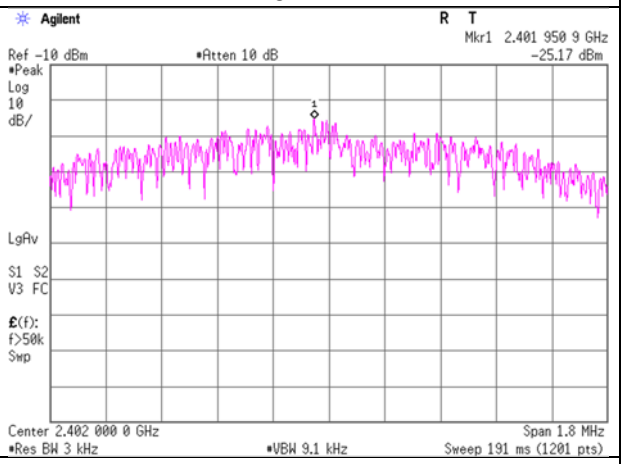


2480 MHz

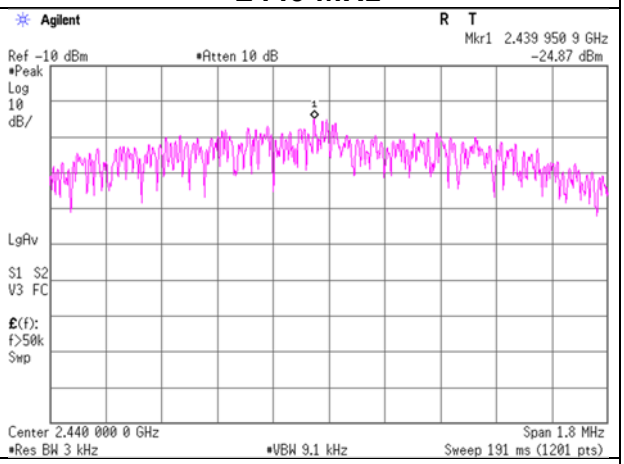


BT LE 2M-PHY

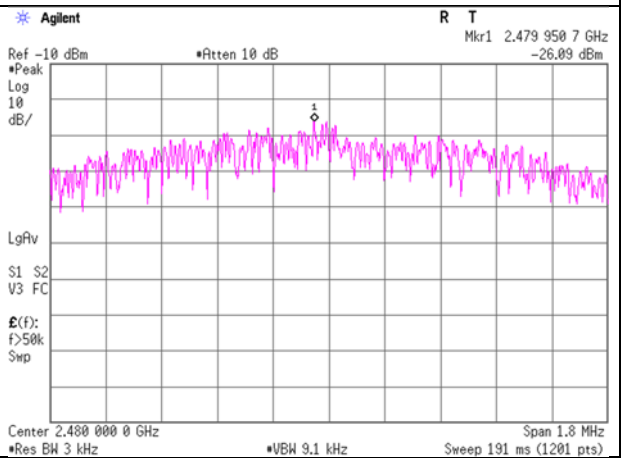
2402 MHz



2440 MHz



2480 MHz



APPENDIX 2: Test Instruments

Test Equipment

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	145800	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY48250106	2023/03/01	12
AT	145801	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY48250152	2023/09/23	12
AT	146212	Digital Hitester	HIOKI E.E. CORPORATION	3805-50	80997828	2023/09/25	12
AT	146247	Power Meter	Keysight Technologies Inc	8990B	MY51000272	2023/05/29	12
AT	146310	Power sensor	Keysight Technologies Inc	N1923A	MY5326009	2023/05/29	12
AT	191840	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	-	2023/08/03	12
AT	191845	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	-	2023/08/07	12
AT	197395	Microwave cable	RS Pro	R-132G7210 100CO	-	2023/04/06	12
AT	197396	Microwave cable	RS Pro	R-132G7210 100CO	-	2023/04/12	12
AT	204924	Terminator	Weinschel - API Technologies Corp	M1459A	110107	2024/02/14	12
AT	235604	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY45300743	2023/05/18	12
AT	235639	DIGITAL MULTIMETER	HIOKI E.E. CORPORATION	DT4261	230313156	2023/05/26	12
AT	235739	Thermo-Hygrometer	CUSTOM. Inc	CTH-230	-	2023/04/26	12
AT	239651	Coaxial Cable	Huber+Suhner	SUCOFLEX 102	2001219/2	2023/08/22	12
AT	242067	Attenuator	Weinschel Corp.	54A-10	120523	2023/11/02	12

***Hyphens for Last Calibration Date and Cal Int (month) are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.**

The expiration date of the calibration is the end of the expired month.
As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

Test item:

AT: Antenna Terminal Conducted test