



FCC Part 15.247

TEST REPORT

For

Acer Incorporated

8F, 88, Sec.1, Xintai 5th Rd. Xizhi, New Taipei City 221, Taiwan

FCC ID: HLZAMR030

Report Type	Original Report
Product Name:	ACER MOUSE RS
Model Name:	AMR030
Report Number :	RXZ200723002-02-00A
Report Date :	2020/08/27
Reviewed By :	Zeus Chen <i>Zeus Chen</i>
Prepared By:	Bay Area Compliance Laboratories Corp.(Linkou Laboratory) No. 6, Wende 2Rd., Guishan Dist., Taoyuan City 33382, Taiwan (R.O.C.) Tel: +886 (3)3961072; Fax: +886 (3) 3961027 www.bacl.com.tw

Note: This test report is prepared for the customer shown above and for the device described herein.
It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Linkou Laboratory)

24/06/20

Revision History

Revision	Report Number	Issue Date	Description
1.0	RXZ200723002-02-00A	2020/08/27	Original Report

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1 General Information

1.1 Product Description for Equipment under Test (EUT)

Applicant	Acer Incorporated 8F, 88, Sec.1, Xintai 5th Rd. Xizhi, New Taipei City 221, Taiwan
Manufacturer	Acer Incorporated 8F, 88, Sec.1, Xintai 5th Rd. Xizhi, New Taipei City 221, Taiwan
Brand Name	acer
Product (Equipment)	ACER MOUSE RS
Model Name	AMR030
Frequency Range	2.4G SRD: 2405 - 2474 MHz; BLE-1Mbps : 2402-2480 MHz
Number of Channels	2.4G SRD:12 Channels; BLE: 40 Channels;
Output Power	2.4G SRD: 3.84 dBm (0.0024 W) BLE-1Mbps: 4.14 dBm (0.0026W)
Modulation Type	GFSK
Related Submittal(s)/Grant(s)	N/A
Received Date	Aug 05, 2020
Date of Test	Aug. 12, 2020 ~ Aug. 13, 2020

**All measurement and test data in this report was gathered from production sample serial number: 200723002-02*

Assigned by BACL, Linkou Laboratory).

1.2 Operation Condition of EUT

Power Operation (Voltage Range)	<input type="checkbox"/> AC 120 V/60 Hz <input type="checkbox"/> Adapter <input type="checkbox"/> By Power Cord.
	<input checked="" type="checkbox"/> DC Type <input type="checkbox"/> From Host System 5Vdc <input checked="" type="checkbox"/> Battery: 3Vdc <input type="checkbox"/> External from USB Cable <input type="checkbox"/> External DC Adapter

1.3 Objective and Test Methodology

The Objective of this Test Report was to document the compliance of the Acer Incorporated. Appliance (Model: AMR030) to the requirements of the following Standards:

- Part 2, Subpart J, Part 15, Subparts A and C, section 15.247 of the Federal Communication Commission's rules.
- ANSI C63.10-2013 of the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

1.4 Measurement Uncertainty

Parameter	Expanded Measurement uncertainty
RF output power	± 1.488 dB
Occupied Channel Bandwidth	± 453.927 Hz
RF Conducted Emission test	± 2.77 dB
AC Power Line Conducted Emission	± 2.66 dB
Radiated Below 1G	± 3.57 dB
Radiated Above 1G	± 5.32 dB

The test results with statement of conformity, the decision rules are based on the specifications and standards. The test results will not take the measurement uncertainty into account.

1.5 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Linkou Laboratory) to collect test data is located on

☒ No.6, Wende 2Rd., Guishan Dist., Taoyuan City 33382, Taiwan (R.O.C.).

Bay Area Compliance Laboratories Corp. (Linkou Laboratory) Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 3546) by Mutual Recognition Agreement (MRA). The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database. The FCC Registration No.: 0027578244. Designation No.: TW1119. The Test Firm Registration No.: 311381. ISED#: 25102 and CAB identifier is TW3546.

2 System Test Configuration

2.1 Test Channels and Description of Worst Test Configuration

The system was configured for testing in testing mode which was provided by manufacturer.

No special accessory, No modification was made to the EUT and No special equipment used during test.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2405	7	2442
2	2407	8	2447
3	2418	9	2458
4	2426	10	2469
5	2430	11	2471
6	2437	12	2474

For SRD: Channel **1, 7** and **12** were tested.

For BLE, there are totally 40 channels.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2442
1	2404	--	--
2	2406	--	--
3	2408	37	2476
--	--	38	2478
19	2440	39	2480

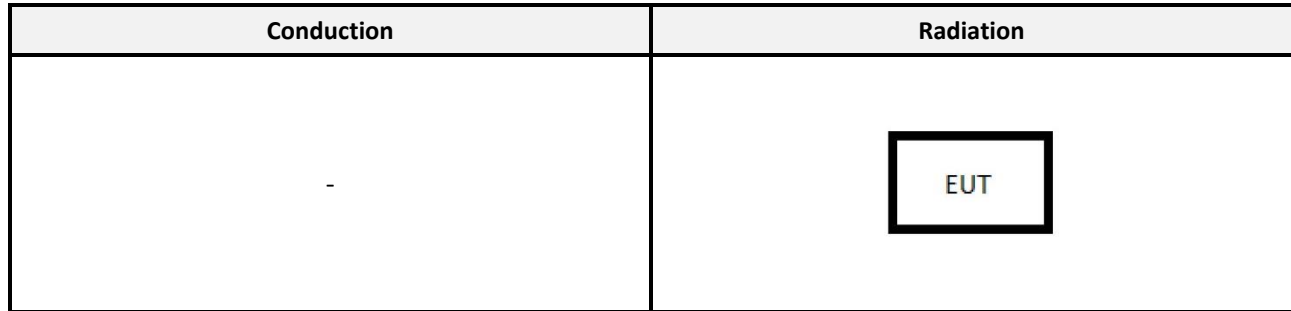
For BLE: Channel **0, 19** and **39** were tested.

Worst Case of Power Setting				
EUT Exercise Software		EMI Test and BTool		
Configuration	NTX	Low CH	Mid CH	High CH
2.4G SRD	1	4	4	4
BLE-1Mbps	1	4	4	4

2.2 Support Equipment List and External Cable List

No.	Description	Manufacturer	Model Number
1.	Notebook	DELL	Latitude E5550
2	DC Power Supply	GW Instek	SPS-2415

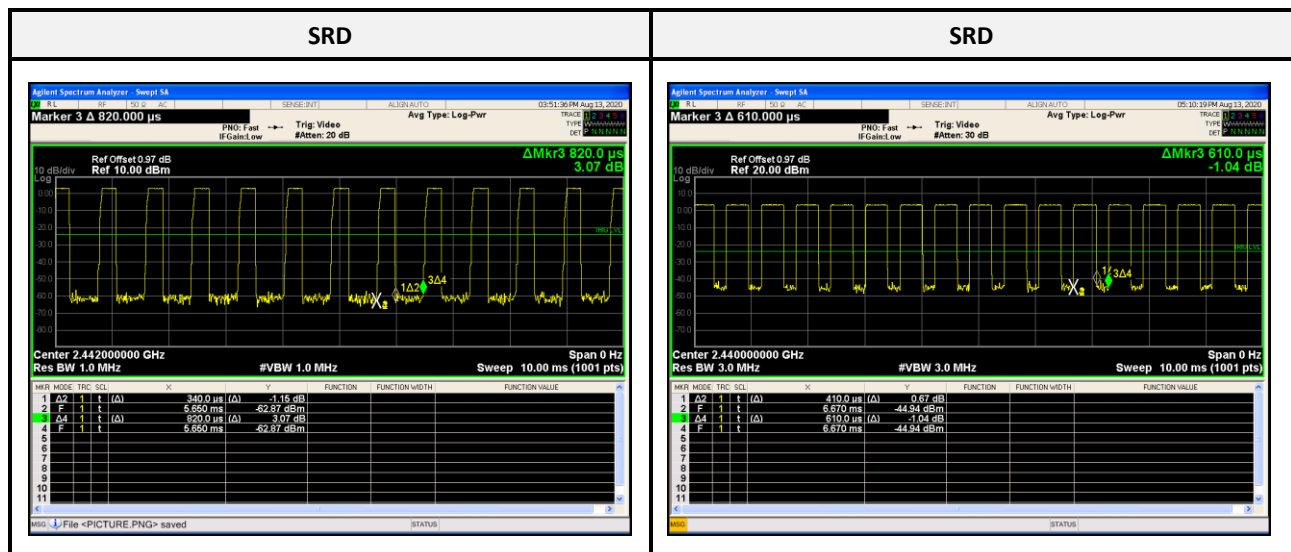
2.3 Block Diagram of Test Setup



2.4 Duty Cycle

All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle, x, and maximum power transmission duration, T, are required for each tested mode of operation.

Configuration	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Factor (dB)
2.4G SRD	0.34	0.82	41.46	3.82
BLE-1Mbps	0.41	0.61	67.21	1.73



*Note: Duty Factor = 10*log (1/Duty cycle)

2.5 Environmental Conditions and Test Date

Test Site	Test Date	Temperature (°C)	Relative Humidity (% RH)	Test Engineer
Radiated (966A)	Aug. 12, 2020 – Aug. 13, 2020	21.5~21.9	51~54	Leo Cheng
Conducted (TH-02)	Aug. 13, 2020	22.7	55	Ethan Shao

3 Summary of Test Results

FCC Rules	Description of Test	Result
§15.247(i), §1.1307, § 2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conducted Emissions	Not Applicable ^{Note1}
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247(a)(2)	6 dB Emission Bandwidth	Compliance
§15.247(b)(3)	Maximum Peak Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

Note: EUT Power by Battery.

4 FCC §15.247(i), §1.1307, § 2.1093 – RF Exposure

4.1 Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance v06

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot$

$[\sqrt{f}(\text{GHz})] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

1. $f(\text{GHz})$ is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

4.2 RF Exposure Evaluation Result

RF Exposure Evaluation:

Configuration	Frequency (MHz)	Turn-up Power		Evaluation Distance (mm)	SAR Exclusion Result	Extremity SAR Exclusion Limit (10g SAR)
		(dBm)	(mW)			
2.4G SRD	2405-2474	4.00	2.512	5	0.79	3
BLE	2402-2480	4.50	2.818	5	0.89	3

Result: SAR evaluation is not necessary.

5 FCC §15.203 - Antenna Requirements

5.1 Applicable Standard

According to § 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. 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 user of a standard antenna jack or electrical connector is prohibited.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna does not exceed 6dBi

5.2 Antenna List and Details

Antenna Type	Brand	Model	Antenna Gain	Result
PCB Antenna	acer	Mouse-2.4G SRD	-2.08 dBi	Compliance
PCB Antenna	acer	Mouse-BT	-3.93 dBi	Compliance

The EUT has an internal dedicated antennas arrangement, fulfill the requirement of this section.

6 FCC §15.209, §15.205, §15.247(d) – Spurious Emissions

6.1 Applicable Standard

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function.

Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1MHz.

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	13.36-13.41	399.9-410	4.5-5.15
0.495-0.505	16.42-16.423	608-614	5.35-5.46
2.1735-2.1905	16.69475-16.69525	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6

As per FCC §15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

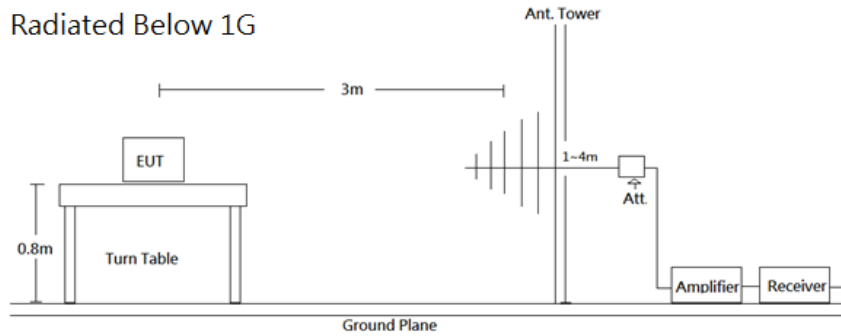
Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

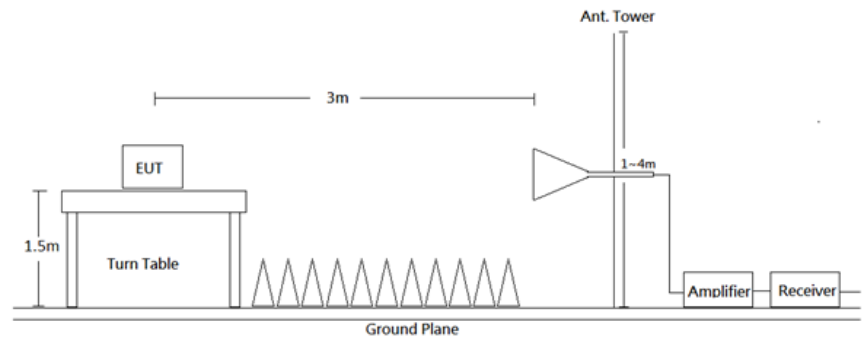
As per FCC §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

6.2 EUT Setup and Test Procedure

Radiated Below 1G



Radiated Above 1G



Radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC Part 15.209 and FCC 15.247 Limits.

The system was investigated from 30 MHz to 26.5 GHz. During the radiated emission test, the EMI test receiver was set with the following configurations measurement method 6.3 in ANSI C63.10.

Frequency Range	RBW	VBW	Duty cycle	Measurement method
30-1000 MHz	120 kHz	/	-	QP
Above 1 GHz	1 MHz	3 MHz	-	PK
	1 MHz	10 Hz	>98%	Ave
	1 MHz	1/T	<98%	Ave

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations. All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz and PK and average detector modes for frequencies above 1 GHz.

6.3 Test Equipment List and Details

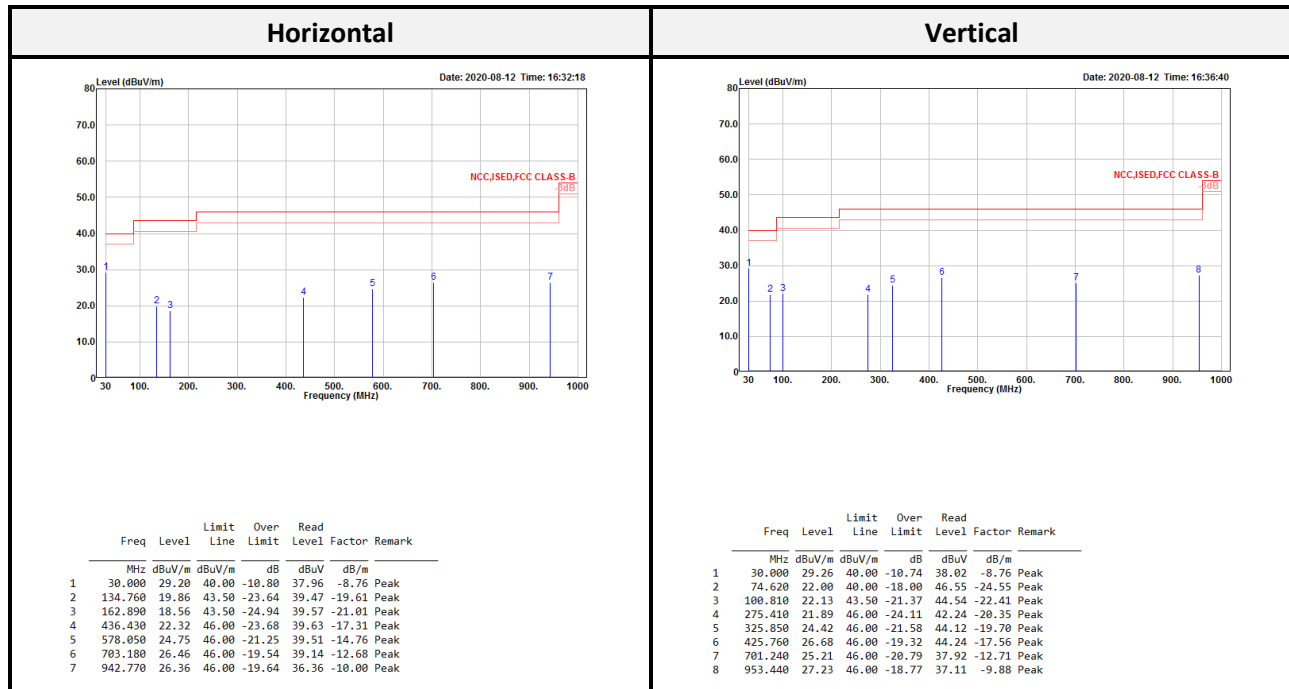
Description	Manufacture	Model	Serial No.	Cal. Date.	Cal. Due.
Radiation 3M Room (966A)					
Active Loop	EMCO	6502	0001-3322	2020/03/16	2021/03/15
Bilog Antenna/6 dB Attenuator	SUNOL SCIENCES & EMEC /EMCI	JB3/N-6-06	A111513/AT-N0668	2020/03/19	2021/03/18
Horn Antenna	ETS-Lindgren	3115	00085775	2019/09/11	2020/09/10
Horn Antenna	ETS-Lindgren	3160-09	00123853	2019/09/12	2020/09/11
Preamplifier	A.H. Systems	PAM-0118	470	2020/03/16	2021/03/15
Preamplifier	A.H. Systems	PAM-1840VH	174	2020/03/25	2021/03/24
Signal Analyzer 40GHZ	Rohde & Schwarz	FSV40-N	102248	2019/09/11	2020/09/10
Microflex Cable (1m)	EMCI	EMC106-SM-SM-2000	180515	2020/08/06	2021/08/05
Microflex Cable (2m)	MTJ	H0919	00000-MT28A-100	2020/08/06	2021/08/05
Microflex Cable (8m)	UTIFLEX	UFA210A-1-3149-300300	MFR 64639 232490-001	2020/08/06	2021/08/05
Turn Table	Chaintek	T-200-S-1	003501	N.C.R	N.C.R
Antenna Tower	Chaintek	MBD-400-1	003504	N.C.R	N.C.R
Controller	Chaintek	3000-1	003507	N.C.R	N.C.R
Software	Audix	e3 v9	E3LK-01	N.C.R	N.C.R
Conducted Room(TH-02)					
Signal Analyzer 40GHZ	Rohde & Schwarz	FSV40-N	102248	2019/09/11	2020/09/10
RF Cable	MTJ	MT40S	MT40S-001	Each Use	/

***Statement of Traceability:** The testing equipment's listed above have finished the calibration by Electronics Testing Center, Taiwan (ETC) or other laboratories which were accredited by TAF or equivalent organizations. The calibration result could be traceable to the International System of Units (SI).

6.4 Test Result

● 2.4G SRD:

Below 1G (30 MHz-1 GHz)



Result = Reading + Correct Factor

Margin = Result – Limit

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

Spurious emissions more than 20 dB below the limit were not reported

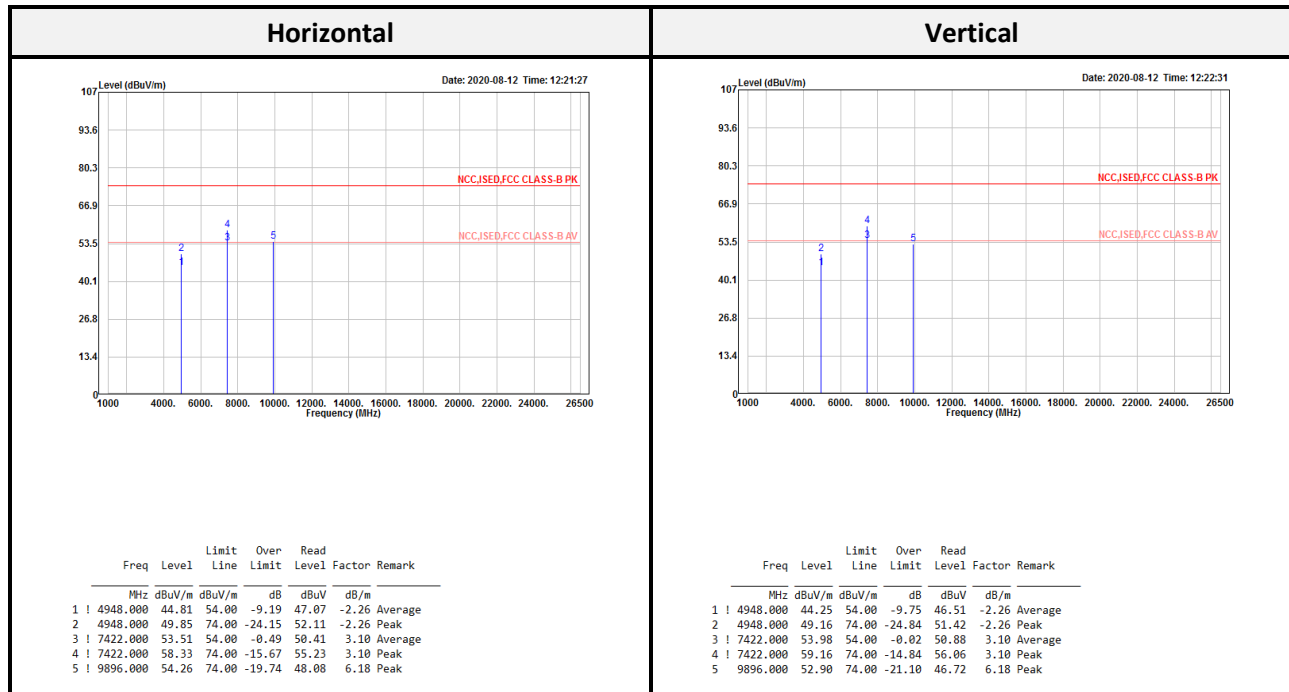
Above 1G (1 GHz-26.5 GHz)

Low CH													
Horizontal							Vertical						
Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2376.600	32.44	54.00	-21.56	41.73	-9.29	Average	2389.100	32.46	54.00	-21.54	41.70	-9.24	Average
2376.600	50.90	74.00	-23.10	60.19	-9.29	Peak	2389.100	49.76	74.00	-24.24	59.00	-9.24	Peak
2405.100	91.42			100.60	-9.18	Average	2405.000	87.04			96.22	-9.18	Average
2405.100	92.70			101.88	-9.18	Peak	2405.000	88.36			97.54	-9.18	Peak
4810.000	46.12	54.00	-7.88	48.84	-2.72	Average	4810.000	44.80	54.00	-9.20	47.52	-2.72	Average
4810.000	50.61	74.00	-23.39	53.33	-2.72	Peak	4810.000	49.55	74.00	-24.45	52.27	-2.72	Peak
7215.000	53.93	54.00	-0.07	51.53	2.40	Average	7215.000	53.05	54.00	-0.95	50.65	2.40	Average
7215.000	58.94	74.00	-15.06	56.54	2.40	Peak	7215.000	57.80	74.00	-16.20	55.40	2.40	Peak
9620.000	57.90	74.00	-16.10	51.85	6.05	Peak	9620.000	58.01	74.00	-15.99	51.96	6.05	Peak

Middle CH													
Horizontal							Vertical						
Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2379.938	32.57	54.00	-21.43	41.85	-9.28	Average	2349.204	32.40	54.00	-21.60	41.81	-9.41	Average
2379.938	45.67	74.00	-28.33	54.95	-9.28	Peak	2349.204	45.03	74.00	-28.97	54.44	-9.41	Peak
2441.890	89.87			98.90	-9.03	Average	2442.132	88.23			97.26	-9.03	Average
2441.890	91.11			100.14	-9.03	Peak	2442.132	89.55			98.58	-9.03	Peak
2490.532	33.36	54.00	-20.64	42.17	-8.81	Average	2531.914	33.68	54.00	-20.32	42.34	-8.66	Average
2490.532	46.22	74.00	-27.78	55.03	-8.81	Peak	2531.914	46.06	74.00	-27.94	54.72	-8.66	Peak
4884.000	42.70	54.00	-11.30	45.19	-2.49	Average	4884.000	42.67	54.00	-11.33	45.16	-2.49	Average
4884.000	47.90	74.00	-26.10	50.39	-2.49	Peak	4884.000	48.47	74.00	-25.53	50.96	-2.49	Peak
7326.000	52.94	54.00	-1.06	50.17	2.77	Average	7326.000	53.86	54.00	-0.14	51.09	2.77	Average
7326.000	52.22	74.00	-21.78	49.45	2.77	Peak	7326.000	58.44	74.00	-15.56	55.67	2.77	Peak
9768.000	55.71	74.00	-18.29	49.65	6.06	Peak	9768.000	55.81	74.00	-18.19	49.75	6.06	Peak

High CH													
Horizontal							Vertical						
Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2474.018	91.42			100.30	-8.88	Average	2474.018	87.58			96.46	-8.88	Average
2474.018	92.77			101.65	-8.88	Peak	2474.018	88.93			97.81	-8.88	Peak
2483.776	33.98	54.00	-20.02	42.82	-8.84	Average	2483.530	32.91	54.00	-21.09	41.75	-8.84	Average
2483.776	56.69	74.00	-17.31	65.53	-8.84	Peak	2483.530	53.78	74.00	-20.22	62.62	-8.84	Peak
4948.000	44.81	54.00	-9.19	47.07	-2.26	Average	4948.000	44.25	54.00	-9.75	46.51	-2.26	Average
4948.000	49.85	74.00	-24.15	52.11	-2.26	Peak	4948.000	49.16	74.00	-24.84	51.42	-2.26	Peak
7422.000	53.51	54.00	-0.49	50.41	3.10	Average	7422.000	53.98	54.00	-0.02	50.88	3.10	Average
7422.000	58.33	74.00	-15.67	55.23	3.10	Peak	7422.000	59.16	74.00	-14.84	56.06	3.10	Peak
9896.000	54.26	74.00	-19.74	48.08	6.18	Peak	9896.000	52.90	74.00	-21.10	46.72	6.18	Peak

Above 1G (1 GHz-26.5 GHz)



Result = Reading + Correct Factor

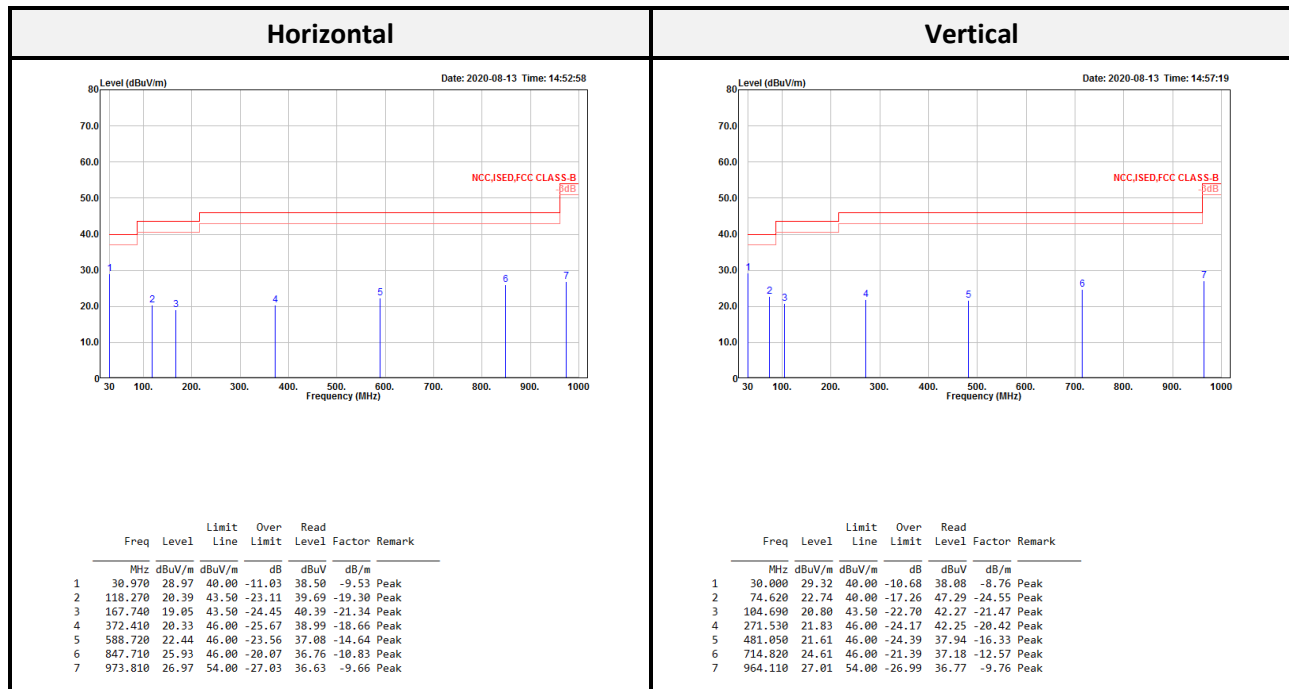
Margin = Result – Limit

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

Spurious emissions more than 20 dB below the limit were not reported

● **BLE-1Mbps:**

Below 1G (30 MHz-1 GHz)



Result = Reading + Correct Factor

Margin = Result – Limit

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

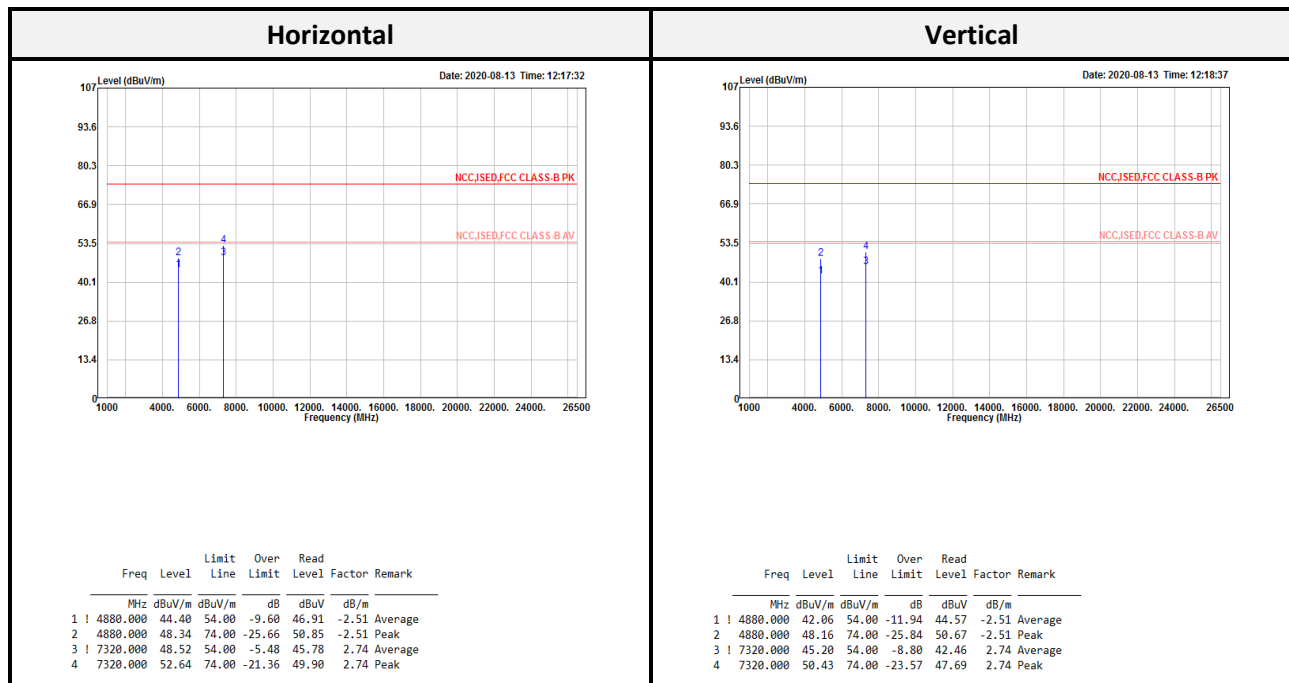
Spurious emissions more than 20 dB below the limit were not reported

Above 1G (1 GHz-26.5 GHz)

Low CH													
Horizontal							Vertical						
Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2337.500	44.43	54.00	-9.57	53.89	-9.46	Average	2338.000	37.25	54.00	-16.75	46.71	-9.46	Average
2337.500	52.13	74.00	-21.87	61.59	-9.46	Peak	2338.000	46.93	74.00	-27.07	56.39	-9.46	Peak
2402.000	92.94			102.13	-9.19	Average	2402.400	86.18			95.37	-9.19	Average
2402.000	94.07			103.26	-9.19	Peak	2402.400	87.31			96.50	-9.19	Peak
4804.000	45.90	54.00	-8.10	48.64	-2.74	Average	4804.000	43.25	54.00	-10.75	45.99	-2.74	Average
4804.000	44.79	74.00	-29.21	47.53	-2.74	Peak	4804.000	49.57	74.00	-24.43	52.31	-2.74	Peak
7206.000	48.47	54.00	-5.53	46.10	2.37	Average	7206.000	45.97	54.00	-8.03	43.60	2.37	Average
7206.000	52.82	74.00	-21.18	50.45	2.37	Peak	7206.000	50.86	74.00	-23.14	48.49	2.37	Peak

Middle CH													
Horizontal							Vertical						
Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2374.856	45.71	54.00	-8.29	55.01	-9.30	Average	2374.372	37.30	54.00	-16.70	46.60	-9.30	Average
2374.856	52.26	74.00	-21.74	61.56	-9.30	Peak	2374.372	46.80	74.00	-27.20	56.10	-9.30	Peak
2440.196	91.41			100.44	-9.03	Average	2440.196	85.40			94.43	-9.03	Average
2440.196	92.75			101.78	-9.03	Peak	2440.196	86.52			95.55	-9.03	Peak
2505.778	40.97	54.00	-13.03	49.72	-8.75	Average	2506.020	37.12	54.00	-16.88	45.87	-8.75	Average
2505.778	49.67	74.00	-24.33	58.42	-8.75	Peak	2506.020	46.81	74.00	-27.19	55.56	-8.75	Peak
4880.000	44.40	54.00	-9.60	46.91	-2.51	Average	4880.000	42.06	54.00	-11.94	44.57	-2.51	Average
4880.000	48.34	74.00	-25.66	50.85	-2.51	Peak	4880.000	48.16	74.00	-25.84	50.67	-2.51	Peak
7320.000	48.52	54.00	-5.48	45.78	2.74	Average	7320.000	45.20	54.00	-8.80	42.46	2.74	Average
7320.000	52.64	74.00	-21.36	49.90	2.74	Peak	7320.000	50.43	74.00	-23.57	47.69	2.74	Peak

High CH													
Horizontal							Vertical						
Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2480.004	89.71			98.56	-8.85	Average	2480.332	85.99			94.84	-8.85	Average
2480.004	90.90			99.75	-8.85	Peak	2480.332	87.10			95.95	-8.85	Peak
2483.612	42.40	54.00	-11.60	51.24	-8.84	Average	2483.612	38.75	54.00	-15.25	47.59	-8.84	Average
2483.612	53.01	74.00	-20.99	61.85	-8.84	Peak	2483.612	50.53	74.00	-23.47	59.37	-8.84	Peak
4960.000	42.08	54.00	-11.92	44.30	-2.22	Average	4960.000	40.68	54.00	-13.32	42.90	-2.22	Average
4960.000	47.64	74.00	-26.36	49.86	-2.22	Peak	4960.000	46.98	74.00	-27.02	49.20	-2.22	Peak
7440.000	46.70	54.00	-7.30	43.53	3.17	Average	7440.000	43.36	54.00	-10.64	40.19	3.17	Average
7440.000	51.66	74.00	-22.34	48.49	3.17	Peak	7440.000	50.01	74.00	-23.99	46.84	3.17	Peak

Above 1G (1 GHz-26.5 GHz):

Level = Read Level + Factor

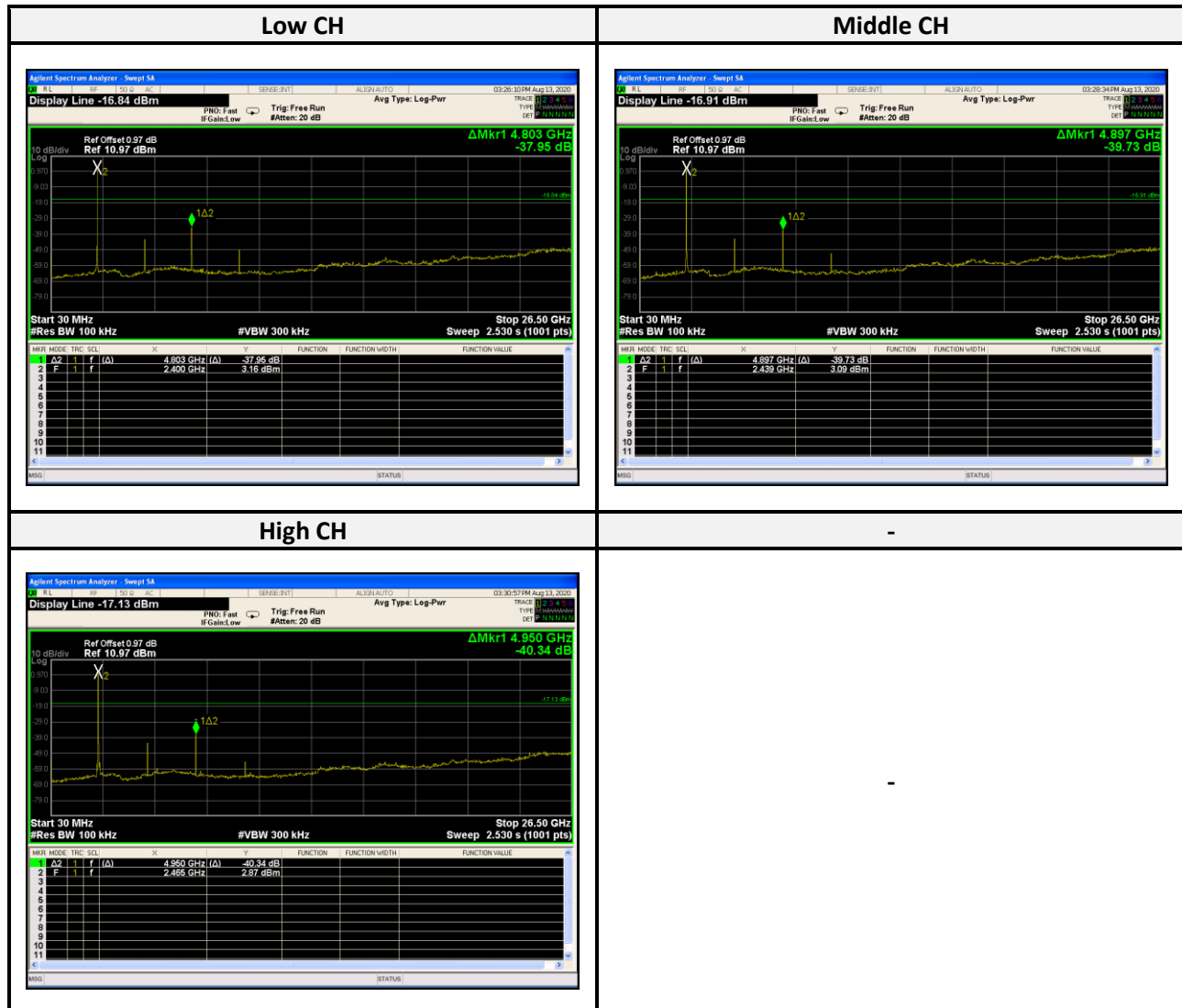
Over Limit = Level – Limit

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

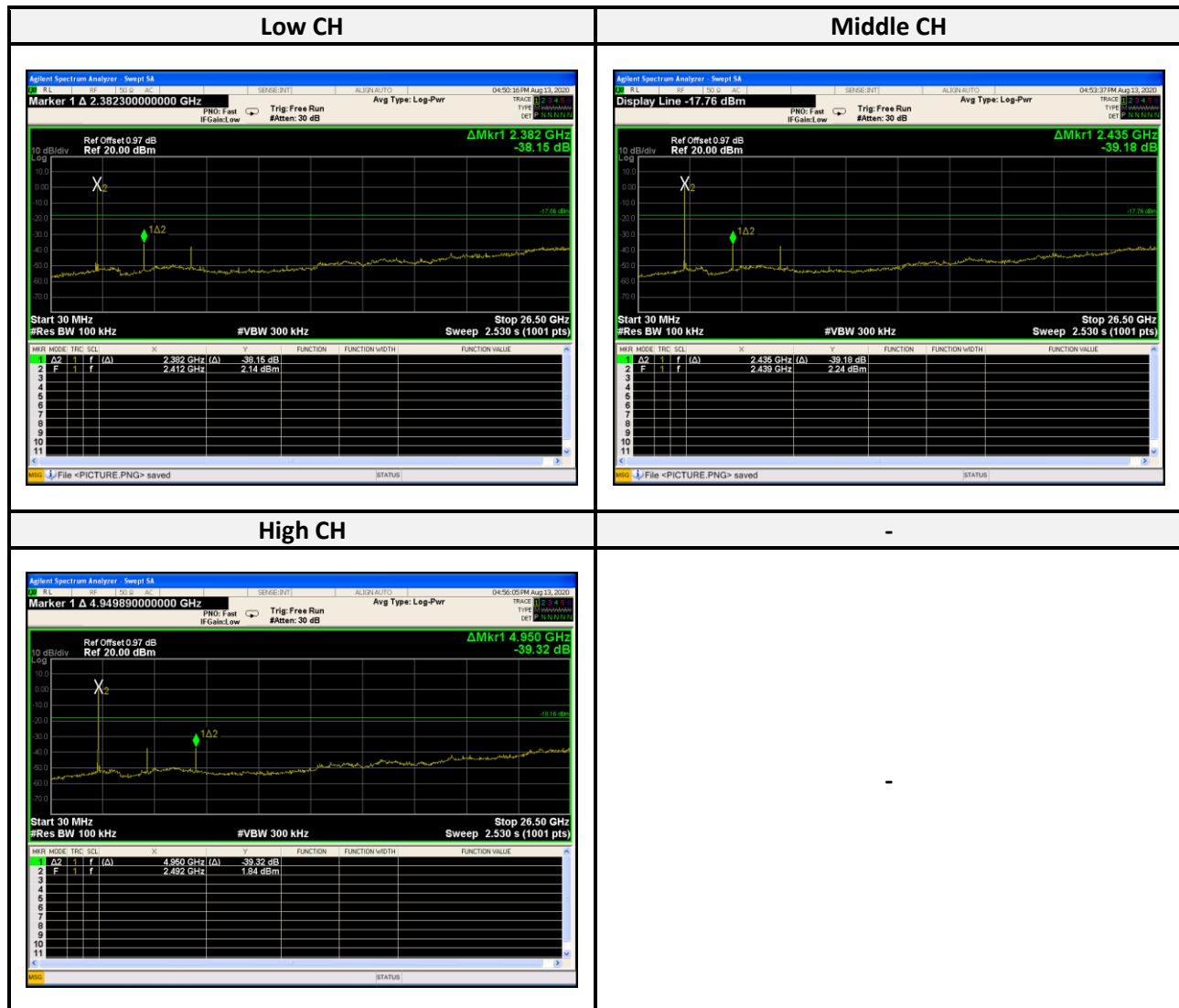
Spurious emissions more than 20 dB below the limit were not reported

Conducted Spurious Emissions:

Configuration	Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
2.4G SRD	Low	2405	37.95	≥ 20	Compliance
	Mid	2442	39.73	≥ 20	Compliance
	High	2474	40.34	≥ 20	Compliance



Configuration	Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
BLE-1Mbps	Low	2402	38.15	≥ 20	Compliance
	Mid	2440	39.18	≥ 20	Compliance
	High	2480	39.32	≥ 20	Compliance



7 FCC §15.247(a)(2) – 6 dB Emission Bandwidth

7.1 Applicable Standard

According to FCC §15.247(a) (2),

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

7.2 Test Procedure

According to ANSI C63.10-2013, the steps for the first option are as follows:

- (1) Set RBW = 100 kHz. (2) Set the VBW $\geq [3 \times \text{RBW}]$. (3) Detector = peak. (4) Trace mode = max hold.
- (5) Sweep = auto couple. (6) Allow the trace to stabilize. (7) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

7.3 Test Equipment List and Details

Description	Manufacture	Model	Serial No.	Cal. Date.	Cal. Due.
Conducted Room(TH-02)					
EXA Signal Analyzer	Agilent	N9010A	US47140126	2020/04/30	2021/04/29
Cable	MTJ	MT40S	620620-MT40S-100	Each Use	/

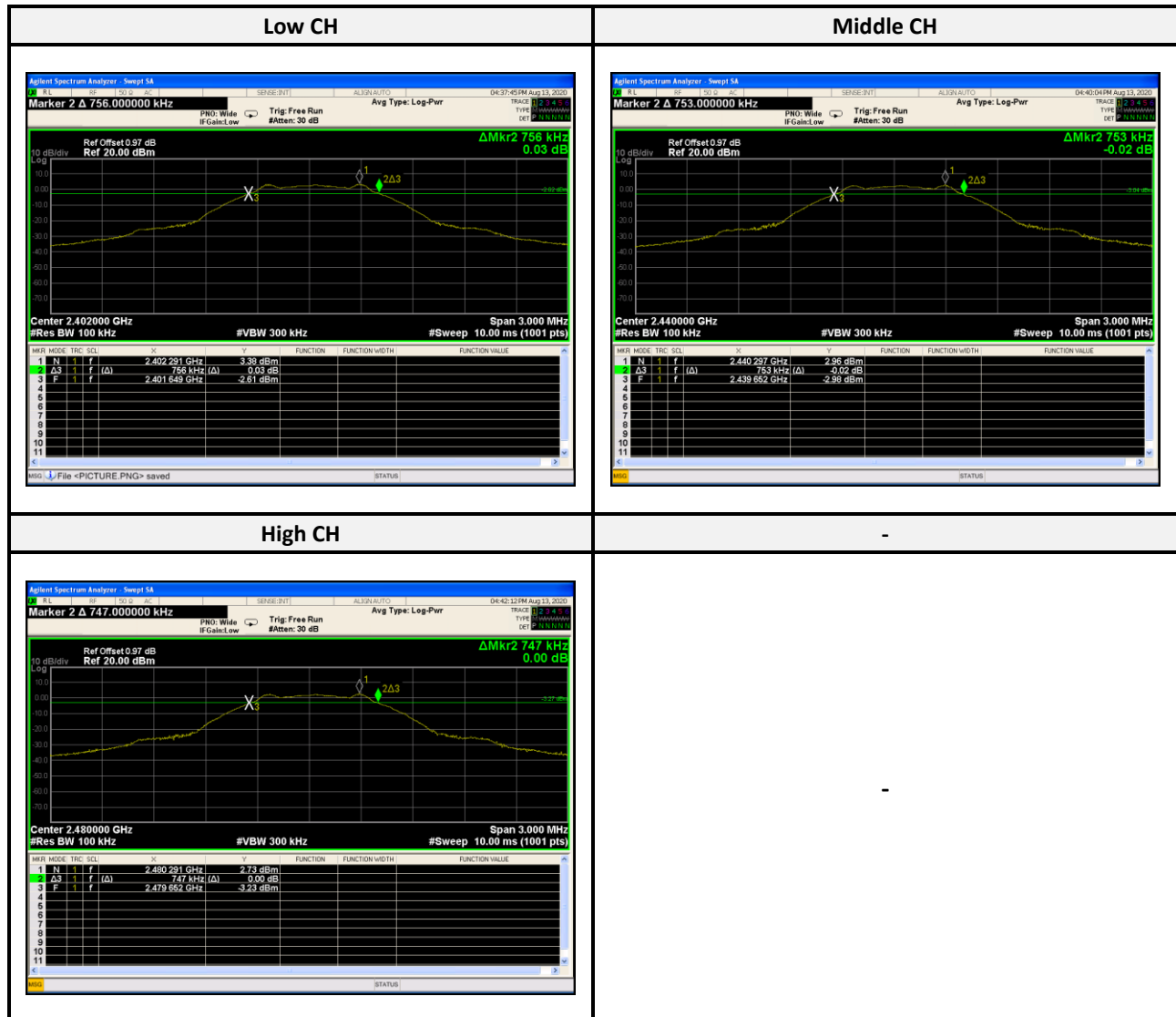
***Statement of Traceability:** The testing equipment's listed above have finished the calibration by Electronics Testing Center, Taiwan (ETC) or other laboratories which were accredited by TAF or equivalent organizations. The calibration result could be traceable to the International System of Units (SI).

7.4 Test Results

Configuration	Channel	Frequency (MHz)	6 dB BW (MHz)	6dB Limit (MHz)	Result
2.4G SRD	Low	2405	0.67	> 0.5	Compliance
	Middle	2442	0.62	> 0.5	Compliance
	High	2474	0.62	> 0.5	Compliance



Configuration	Channel	Frequency (MHz)	6 dB BW (MHz)	6dB Limit (MHz)	Result
BLE-1Mbps	Low	2402	0.76	> 0.5	Compliance
	Middle	2440	0.75	> 0.5	Compliance
	High	2480	0.75	> 0.5	Compliance



8 FCC §15.247(b) (3) – Maximum Output Power

8.1 Applicable Standard

According to FCC §15.247(b) (3),

Systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

8.2 Test Procedure

- (1) Place the EUT on a bench and set it in transmitting mode.
- (2) Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to measuring equipment.
- (3). Add a correction factor to the display.

8.3 Test Equipment List and Details

Description	Manufacture	Model	Serial No.	Cal. Date.	Cal. Due.
Conducted Room(TH-02)					
USB Wideband Power Sensor	Agilent	U2021XA	MY56120026	2019/09/06	2020/09/05
Cable	MTJ	MT40S	620620-MT40S-100	Each Use	/

***Statement of Traceability:** The testing equipment's listed above have finished the calibration by Electronics Testing Center, Taiwan (ETC) or other laboratories which were accredited by TAF or equivalent organizations. The calibration result could be traceable to the International System of Units (SI).

8.4 Test Results

Configuration	Channel	Frequency (MHz)	Maximum Peak Output Power		Limit (dBm)	Result
			(dBm)	(W)		
2.4G SRD	Low	2405	3.50	0.0022	30	Compliance
	Middle	2442	3.84	0.0024	30	Compliance
	High	2474	3.26	0.0021	30	Compliance
BLE-1Mbps	Low	2402	4.14	0.0026	30	Compliance
	Middle	2440	3.89	0.0024	30	Compliance
	High	2480	3.60	0.0023	30	Compliance

9 FCC §15.247(d) – 100 kHz Bandwidth of Frequency Band Edge

9.1 Applicable Standard

According to FCC §15.247(d),

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

9.2 Test Procedure

- (1) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- (2) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- (3) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- (4) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.

9.3 Test Equipment List and Details

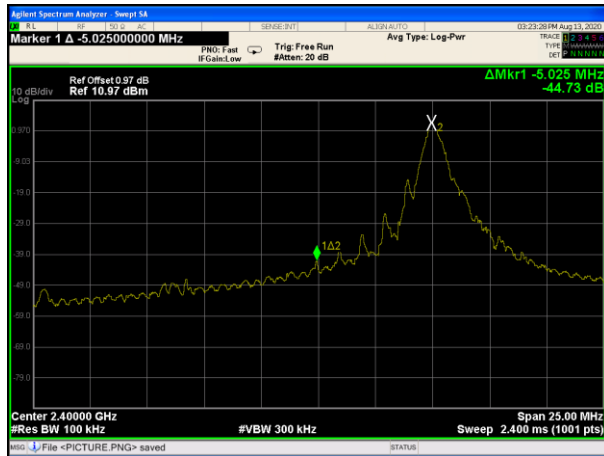
Description	Manufacture	Model	Serial No.	Cal. Date.	Cal. Due.
Conducted Room(TH-02)					
EXA Signal Analyzer	Agilent	N9010A	US47140126	2020/04/30	2021/04/29
Cable	MTJ	MT40S	620620-MT40S-100	Each Use	/

***Statement of Traceability:** The testing equipment's listed above have finished the calibration by Electronics Testing Center, Taiwan (ETC) or other laboratories which were accredited by TAF or equivalent organizations. The calibration result could be traceable to the International System of Units (SI).

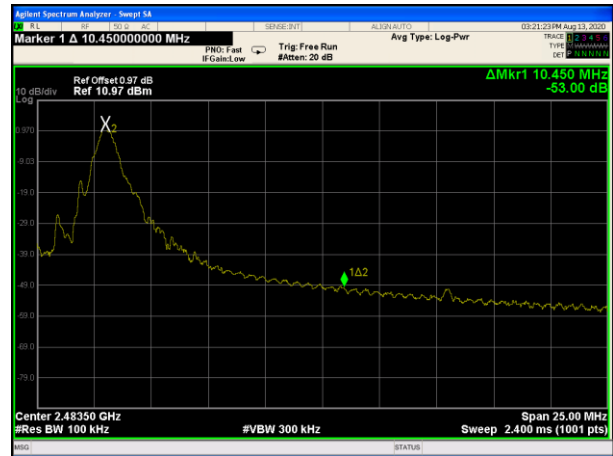
9.4 Test Results

Configuration	Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
2.4G SRD	Low	2405	44.73	≥ 20	Compliance
	High	2474	53.00	≥ 20	Compliance
BLE-1Mbps	Low	2402	44.69	≥ 20	Compliance
	High	2480	51.90	≥ 20	Compliance

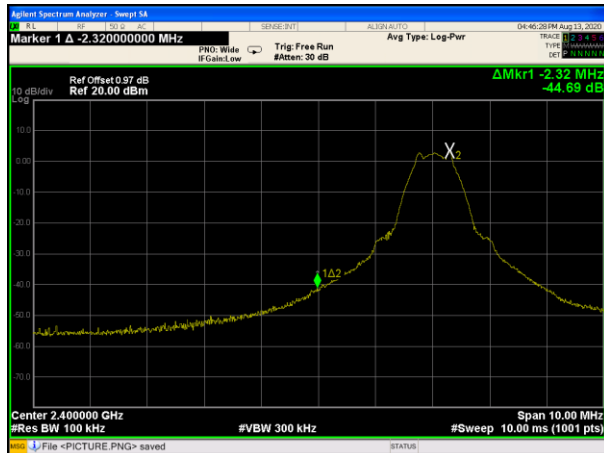
2.4G SRD Low CH



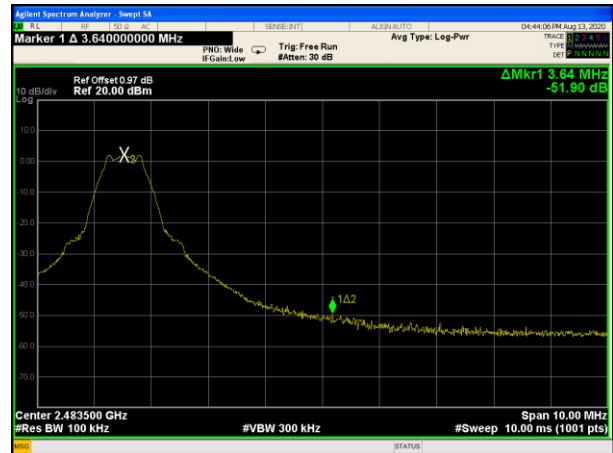
2.4G SRD High CH



BLE Low CH



BLE High CH



10 FCC §15.247(e) – Power Spectral Density

10.1 Applicable Standard

According to FCC §15.247(e),

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

10.2 Test Procedure

According to ANSI C63.10-2013,

- (1) Set analyzer center frequency to DTS channel center frequency.
- (2) Set the span to 1.5 times the DTS bandwidth. (3) Set the RBW to $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- (4) Set the VBW $\geq [3 \times \text{RBW}]$. (5) Detector = peak. (6) Sweep time = auto couple.
- (7) Trace mode = max hold. (8) Allow trace to fully stabilize.
- (9) Use the peak marker function to determine the maximum amplitude level within the RBW.
- (10) If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

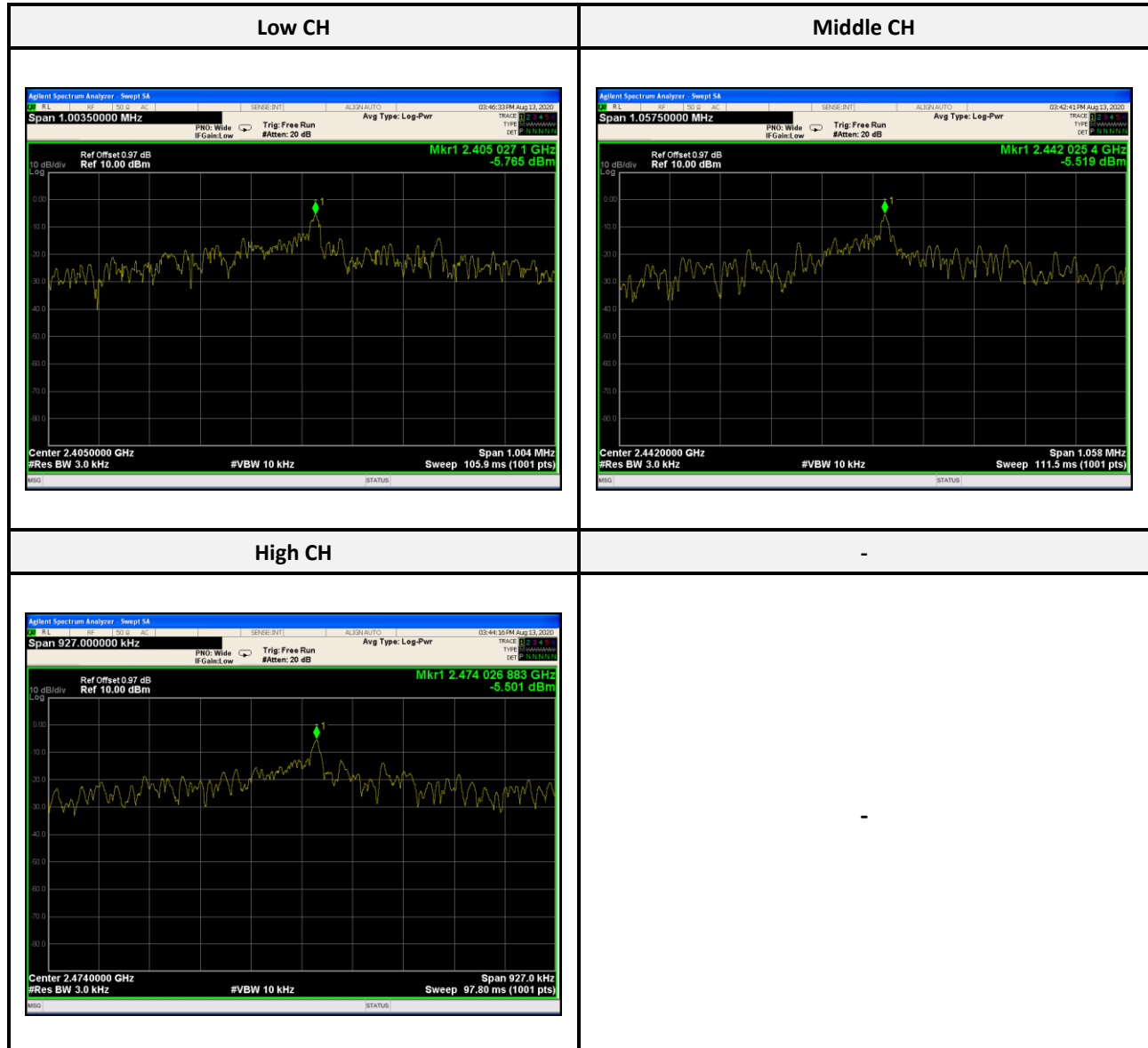
10.3 Test Equipment List and Details

Description	Manufacture	Model	Serial No.	Cal. Date.	Cal. Due.
Conducted Room(TH-02)					
EXA Signal Analyzer	Agilent	N9010A	US47140126	2020/04/30	2021/04/29
Cable	MTJ	MT40S	620620-MT40S-100	Each Use	/

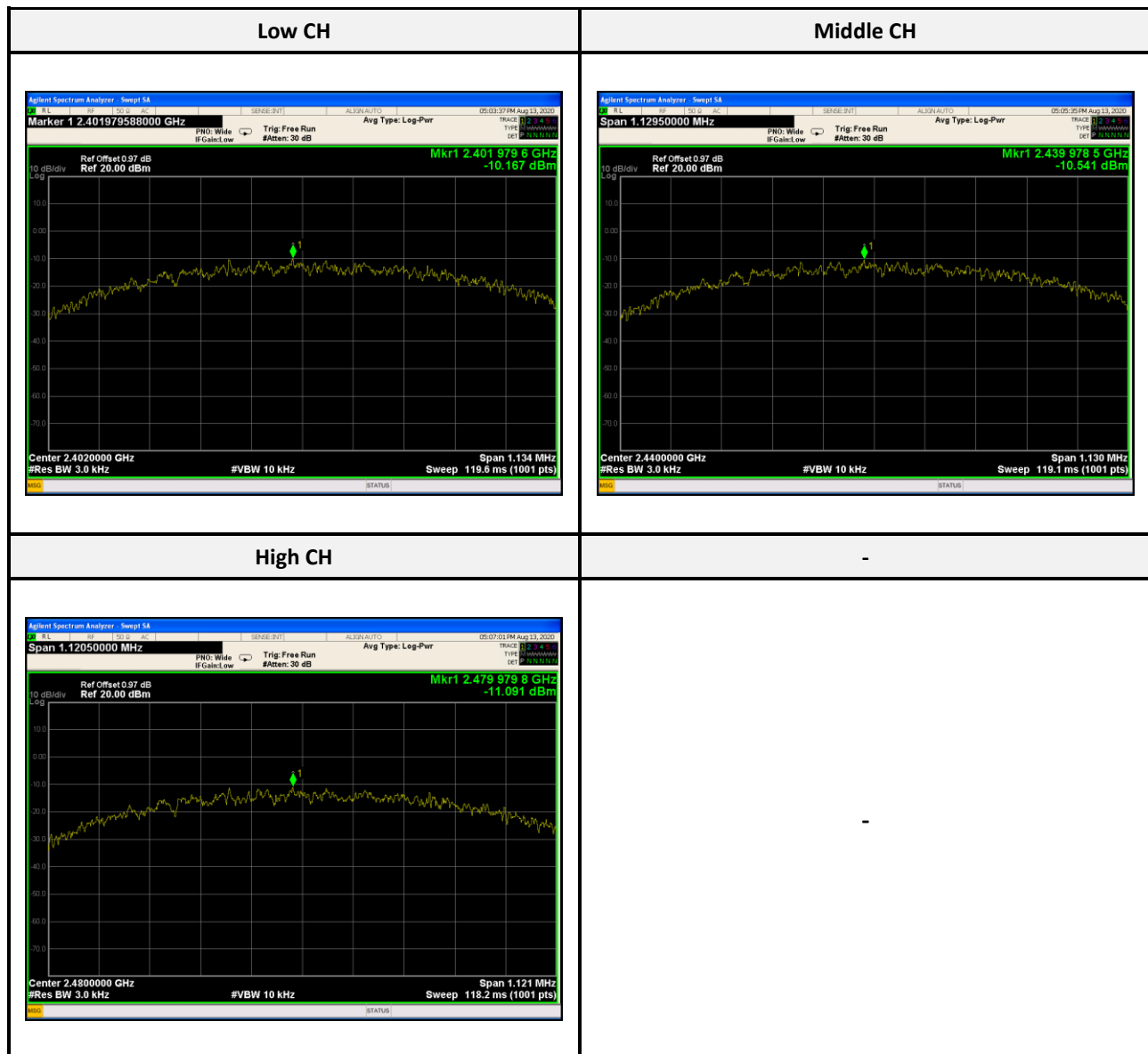
***Statement of Traceability:** The testing equipment's listed above have finished the calibration by Electronics Testing Center, Taiwan (ETC) or other laboratories which were accredited by TAF or equivalent organizations. The calibration result could be traceable to the International System of Units (SI).

10.4 Test Results

Configuration	Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Result
2.4G SRD	Low	2405	-5.76	8	Compliance
	Middle	2442	-5.52	8	Compliance
	High	2474	-5.50	8	Compliance



Configuration	Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Result
BLE-1Mbps	Low	2402	-10.17	8	Compliance
	Middle	2440	-10.54	8	Compliance
	High	2480	-11.09	8	Compliance



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