

TEST REPORT

Product Name: True wireless headphones

Trade Mark:



or PHILIPS

Model No./HVIN: T1

Add. Model No.: T1JH, T1xx/yy (xx=AA-ZZ or blank denoted different color; yy=00-99 denoted different country destination)

Report Number: 210712015RFC-2

Test Standards: FCC 47 CFR Part 15 Subpart C
RSS-247 Issue 2
RSS-Gen Issue 5

FCC ID: 2AR2ST1

IC: 24589-T1

Test Result: PASS

Date of Issue: October 14, 2021

Prepared for:

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UTTR-RF-RSS247-V1.1

Version

Version No.	Date	Description
V1.0	October 14, 2021	Original

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	MMD Hong Kong Holding Limited
Address of Applicant:	Unit 1006, 10th Floor, C-Bons International Center 108 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong, China
Manufacturer:	MMD Hong Kong Holding Limited
Address of Manufacturer:	Unit 1006, 10th Floor, C-Bons International Center 108 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong, China

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	True wireless headphones	
Model No. /HVIN:	T1	
Add. Model No. :	T1JH, T1xx/yy (xx=AA-ZZ or blank denoted different color; yy=00-99 denoted different country destination)	
Trade Mark:	 or PHILIPS	
DUT Stage:	Identical Prototype	
Software Version:	V0.1	
Hardware Version:	V06	
EUT Supports Function:	2.4 GHz ISM Band:	Bluetooth 5.2
Sample Received Date:	July 12, 2021	
Sample Tested Date:	August 6, 2021 to September 3, 2021	
Note: The additional model T1JH, T1xx/yy (xx=AA-ZZ or blank denoted different color; yy=00-99 denoted different country destination) is identical with the test model T1 except the model number for marketing purpose.		

1.2.2 Description of Accessories

Battery (Charging Case)	
Model No.:	102429
Battery Type:	Lithium-ion Rechargeable Battery
Rated Voltage:	3.7 Vdc
Limited Charge Voltage:	4.2 Vdc
Rated Capacity:	650 mAh
Manufacturer:	Dongguan Perfect Amperex Technology Limited

Battery(earbuds)	
Model No.:	1254A
Battery Type:	Lithium-ion Rechargeable Battery
Rated Voltage:	3.7 Vdc
Limited Charge Voltage:	4.2 Vdc
Rated Capacity:	60 mAh
Manufacturer:	Dongguan Perfect Amperex Technology Limited

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Frequency Band:	2400 MHz to 2483.5 MHz		
Frequency Range:	2402 MHz to 2480 MHz		
Bluetooth Version:	Bluetooth LE		
Type of Modulation:	GFSK		
Number of Channels:	40		
Channel Separation:	2 MHz		
Antenna Type:	FPC Antenna		
Antenna Gain:	Left Earbud	-2.8 dBi	
	Right Earbud	-2.4 dBi	
Maximum Peak Power:	Left Earbud	LE	10.08 dBm
		2LE	10.11 dBm
	Right Earbud	LE	9.00 dBm
		2LE	9.01 dBm
Normal Test Voltage:	3.7 Vdc		

1.4 OTHER INFORMATION

Operation Frequency Each of Channel	
$f = 2402 + 2k \text{ MHz, } k = 0, \dots, 39$	
Note:	
f	is the operating frequency (MHz);
k	is the operating channel.

1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
Notebook	DELL	Latitude 3400	14061305558	UnionTrust
Mouse	DELL	MS111	CN-011D3V-738	UnionTrust

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	Antenna Cable	SMA	0.15 Meter	UnionTurst
2	Antenna Cable	SMA	0.15 Meter	UnionTurst
3	USB extension cable	USB	1 Meter Unshielded without ferrite	UnionTurst
4	USB extension cable	USB	1 Meter Shielded without ferrite	UnionTurst

1.6 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

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1.7 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED Wireless Device Testing Laboratories

CAB identifier: CN0032

FCC Accredited Lab.

Designation Number: CN1194

Test Firm Registration Number: 259480

1.8 DEVIATION FROM STANDARDS

None.

1.9 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.10 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.11 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Measurement Uncertainty
1	Conducted emission 9kHz-150kHz	±3.2 dB
2	Conducted emission 150kHz-30MHz	±2.7 dB
3	Radiated emission 9kHz-30MHz	± 4.7 dB
4	Radiated emission 30MHz-1GHz	± 4.6 dB
5	Radiated emission 1GHz-18GHz	± 4.4 dB
6	Radiated emission 18GHz-26GHz	± 4.6 dB
7	Radiated emission 26GHz-40GHz	± 4.6 dB
8	RF Power, Conducted	± 0.9 dB
9	Transmission Time	± 0.19 %
10	Occupied Bandwidth	± 1.86 %
11	Power Spectral Density, conducted	± 0.6 dB
12	Radio Frequency	± 6.5 × 10 ⁻⁸
13	Conducted out of band emission	± 2.7 dB

2. TEST SUMMARY

Test Cases			
Test Item	Test Requirement	Test Method	Result
Antenna Requirement	FCC 47 CFR Part 15 Subpart C Section 15.203/15.247 (c) RSS-Gen Issue 5, Section 6.8	N/A	PASS
AC Power Line Conducted Emission	FCC 47 CFR Part 15 Subpart C Section 15.207 RSS-Gen Issue 5, Section 8.8	ANSI C63.10-2013 Clause 6.2	N/A NOTE 2
Conducted Peak Output Power	FCC 47 CFR Part 15 Subpart C Section 15.247 (b)(3) RSS-247 Issue 2, Section 5.4(d)	ANSI C63.10-2013 Clause 11.9.1.3	PASS
6dB Bandwidth	FCC 47 CFR Part 15 Subpart C Section 15.247 (a)(2) RSS-247 Issue 2, Section 5.2(a)	ANSI C63.10-2013 Clause 11.8.1	PASS
Occupied Bandwidth	RSS-Gen Issue 5, Section 6.7	RSS-Gen Issue 5, Section 6.7	PASS
Power Spectral Density	FCC 47 CFR Part 15 Subpart C Section 15.247 (e) RSS-247 Issue 2, Section 5.2(b)	ANSI C63.10-2013 Clause 11.10.2	PASS
Conducted Out of Band Emission	FCC 47 CFR Part 15 Subpart C Section 15.247(d) RSS-247 Issue 2, Section 5.5	ANSI C63.10-2013 Clause 11.11	PASS
Radiated Spurious Emissions	FCC 47 CFR Part 15 Subpart C Section 15.205/15.209 RSS-Gen Issue 5, Section 6.13/8.9/8.10	ANSI C63.10-2013 Clause 11.11 & Clause 11.12	PASS
Band Edge Measurements (Radiated)	FCC 47 CFR Part 15 Subpart C Section 15.205/15.209 RSS-247 Issue 2, Section 5.5	ANSI C63.10-2013 Clause 11.13	PASS
Note: 1) N/A: In this whole report not applicable. 2) Place earbuds into the charging case, they will turn off automatically, and the Bluetooth does not work.			

3. EQUIPMENT LIST

Radiated Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
☒	3m SAC	ETS-LINDGREN	3M	Euroshiedpn-C T001270-1317	Jan. 22, 2021	Jan. 21, 2024
☒	Loop Antenna	ETS-Lindgren	6502	00202525	Nov. 14, 2020	Nov. 13, 2021
☒	Receiver	R&S	ESIB26	100114	Nov. 18, 2020	Nov. 17, 2021
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Nov. 14, 2020	Nov. 13, 2021
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	Nov. 14, 2020	Nov.13, 2021
☒	Preamplifier	HP	8447F	2805A02960	Nov. 10, 2020	Nov. 9, 2021
☒	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201541	Apr. 30, 2021	Apr. 29, 2022
☒	Pre-amplifier	ETS-Lindgren	00118385	00201874	Nov. 10, 2020	Nov. 9, 2021
☒	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	Nov. 14, 2020	Nov. 13, 2021
☒	Pre-amplifier	ETS-Lindgren	00118384	00202652	Nov. 14, 2020	Nov. 13, 2022
☒	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☒	Test Software	Audix	e3	Software Version: 9.160323		

Conducted RF test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
☒	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Nov. 10, 2020	Nov. 9, 2021
☒	EXA Spectrum Analyzer	KEYSIGHT	N9020A	MY51286807	Nov. 10, 2020	Nov. 9, 2021
☒	Spectrum analyzer	R&S	FSV40-N	101653	Apr. 22, 2021	Apr. 21, 2022
☒	USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55430035	Nov. 10, 2020	Nov. 9, 2021
☒	USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55430023	Nov. 10, 2020	Nov. 9, 2021
☒	Test Software	AutomationTestSystem	ECIT	Software Version: 9.20151119i		

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

4.1.1 Normal or Extreme Test Conditions

Environment Parameter	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (V)	Relative Humidity (%)
NT/NV	+15 to +35	3.7	20 to 75
Remark: 1) NV: Normal Voltage; NT: Normal Temperature			

4.1.2 Record of Normal Environment

Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (kPa)	Tested by
Conducted Peak Output Power	25.1	51	100.1	Rocky Li
6dB Bandwidth & Occupied Bandwidth	25.1	51	100.1	Rocky Li
Power Spectral Density	25.1	51	100.1	Rocky Li
Conducted Out of Band Emission	25.1	51	100.1	Rocky Li
Radiated Spurious Emissions	26.1	49	99.97	Fire Huo
Band Edge Measurements (Radiated)	26.1	49	99.97	Fire Huo

4.2 TEST CHANNELS

Type of Modulation	Tx/Rx Frequency	Test RF Channel Lists		
GFSK	2402 MHz to 2480 MHz	Lowest(L)	Middle(M)	Highest(H)
		Channel 0	Channel 19	Channel 39
		2402 MHz	2440 MHz	2480 MHz

4.3 EUT TEST STATUS

Type of Modulation	Tx Function	Description
GFSK	1Tx	1. Keep the EUT in continuously transmitting with modulation test single.

Power Setting
Power Setting: 63

Test Software
Test software name: AB1565/68 Lab Test Tool-2.3.10

4.4 TEST SETUP

4.4.1 For Radiated Emissions test setup

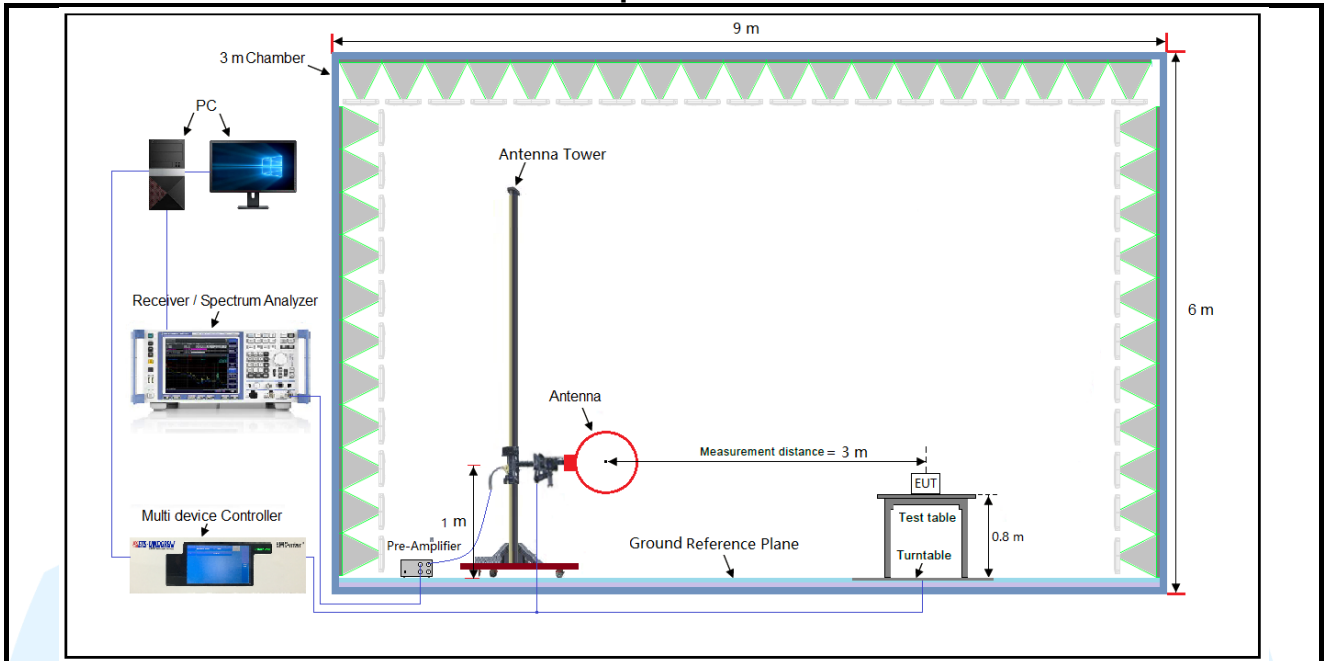


Figure 1. Below 30MHz

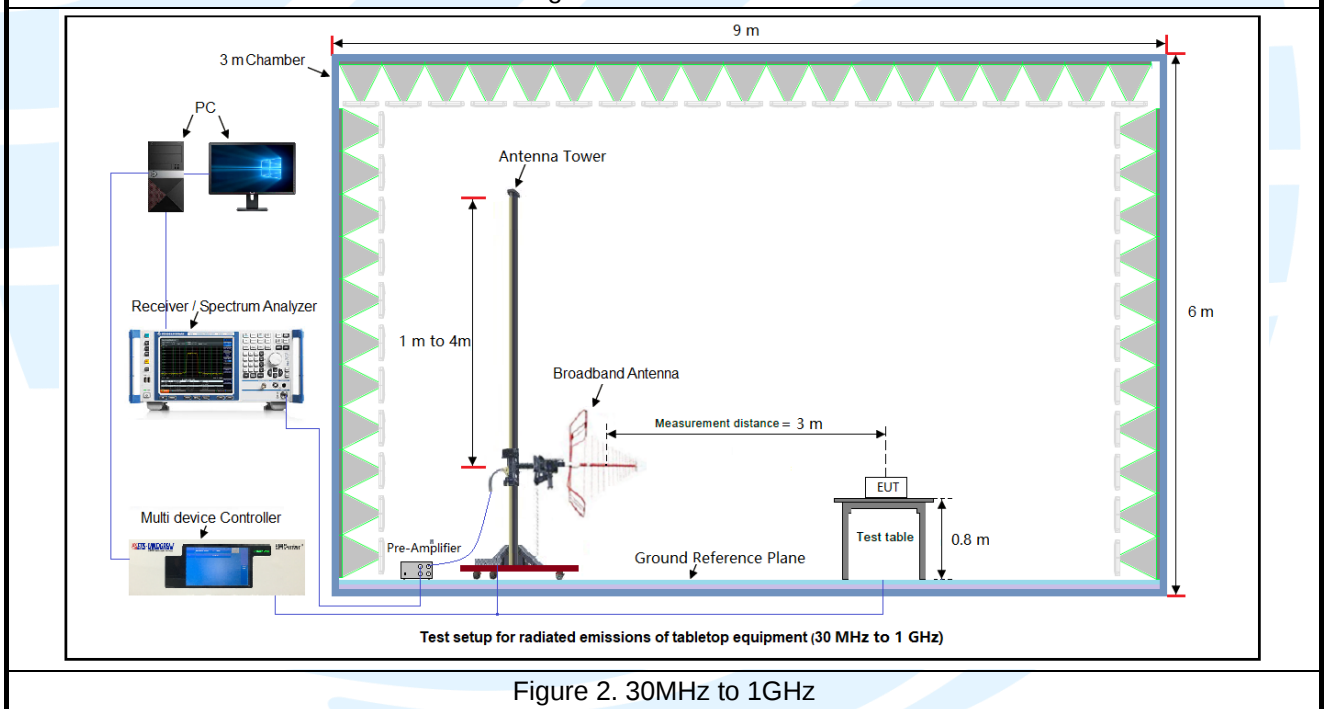
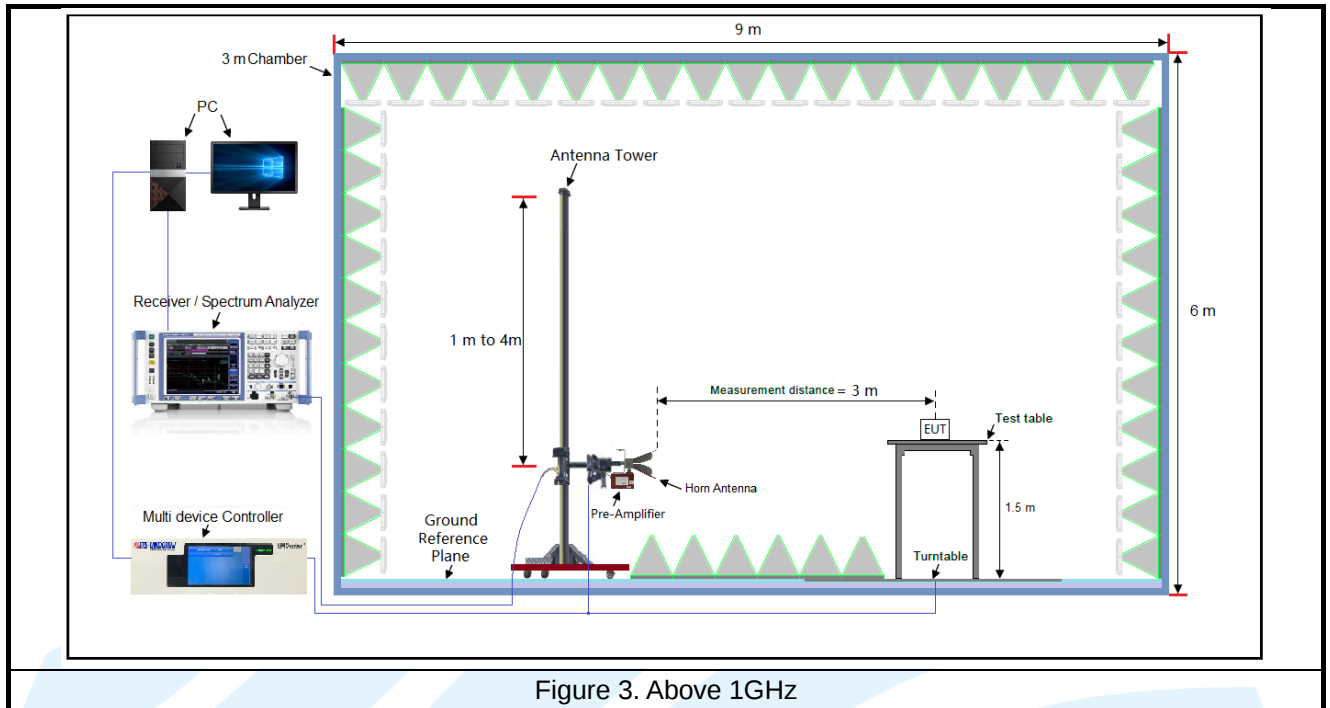
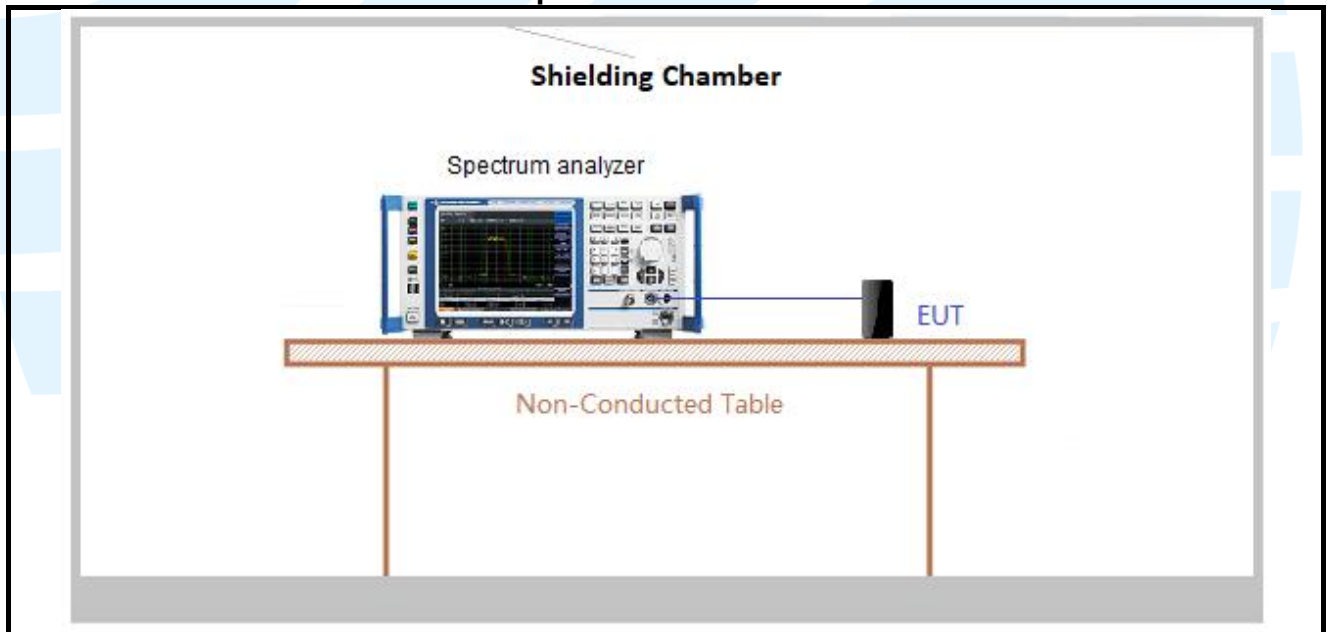


Figure 2. 30MHz to 1GHz



4.4.2 For Conducted RF test setup



4.5 SYSTEM TEST CONFIGURATION

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. It was powered by a 3.7V battery. Only the worst case data were recorded in this test report.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. Therefore, all final radiated testing was performed with the EUT in (see table below) orientation.

Frequency	Mode	Antenna Port	Worst-case axis positioning
Above 1GHz	1TX	Chain 0	Z axis

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

4.6 DUTY CYCLE

Test Procedure: ANSI C63.10-2013 Clause 11.6.

Test Results

Left Earbud

LE

Type of Modulation	On Time (msec)	Period (msec)	Duty Cycle (linear)	Duty Cycle (%)	Duty Cycle Factor (dB)	1/ T Minimum VBW (kHz)	Average Factor (dB)
GFSK	0.3700	0.6300	0.59	58.73	2.31	2.70	-4.62

2LE

Type of Modulation	On Time (msec)	Period (msec)	Duty Cycle (linear)	Duty Cycle (%)	Duty Cycle Factor (dB)	1/ T Minimum VBW (kHz)	Average Factor (dB)
GFSK	0.1800	0.6200	0.29	29.03	5.37	5.56	-10.74

Right Earbud

LE

Type of Modulation	On Time (msec)	Period (msec)	Duty Cycle (linear)	Duty Cycle (%)	Duty Cycle Factor (dB)	1/ T Minimum VBW (kHz)	Average Factor (dB)
GFSK	0.3600	0.6200	0.58	58.06	2.36	2.78	-4.72

2LE

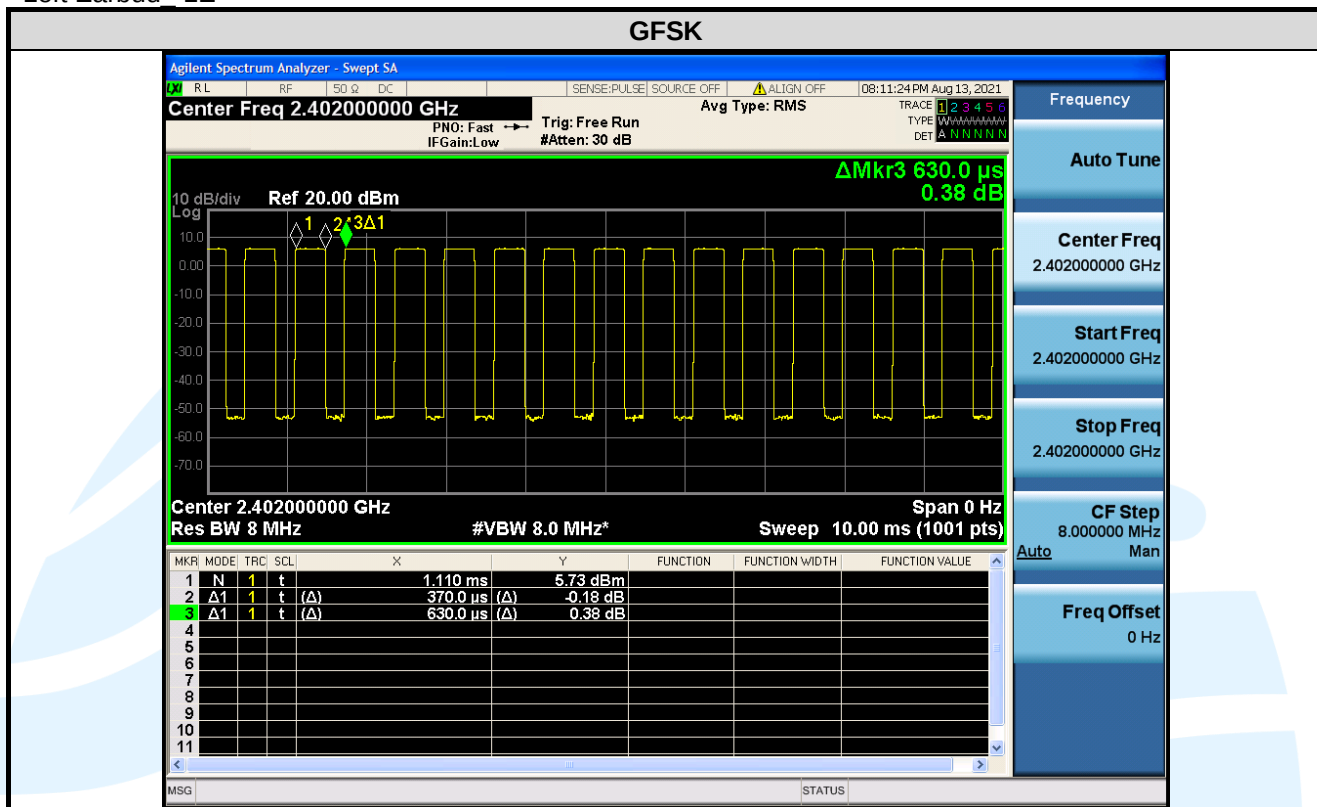
Type of Modulation	On Time (msec)	Period (msec)	Duty Cycle (linear)	Duty Cycle (%)	Duty Cycle Factor (dB)	1/ T Minimum VBW (kHz)	Average Factor (dB)
GFSK	0.1800	0.6300	0.29	28.57	5.44	5.56	-10.88

Remark:

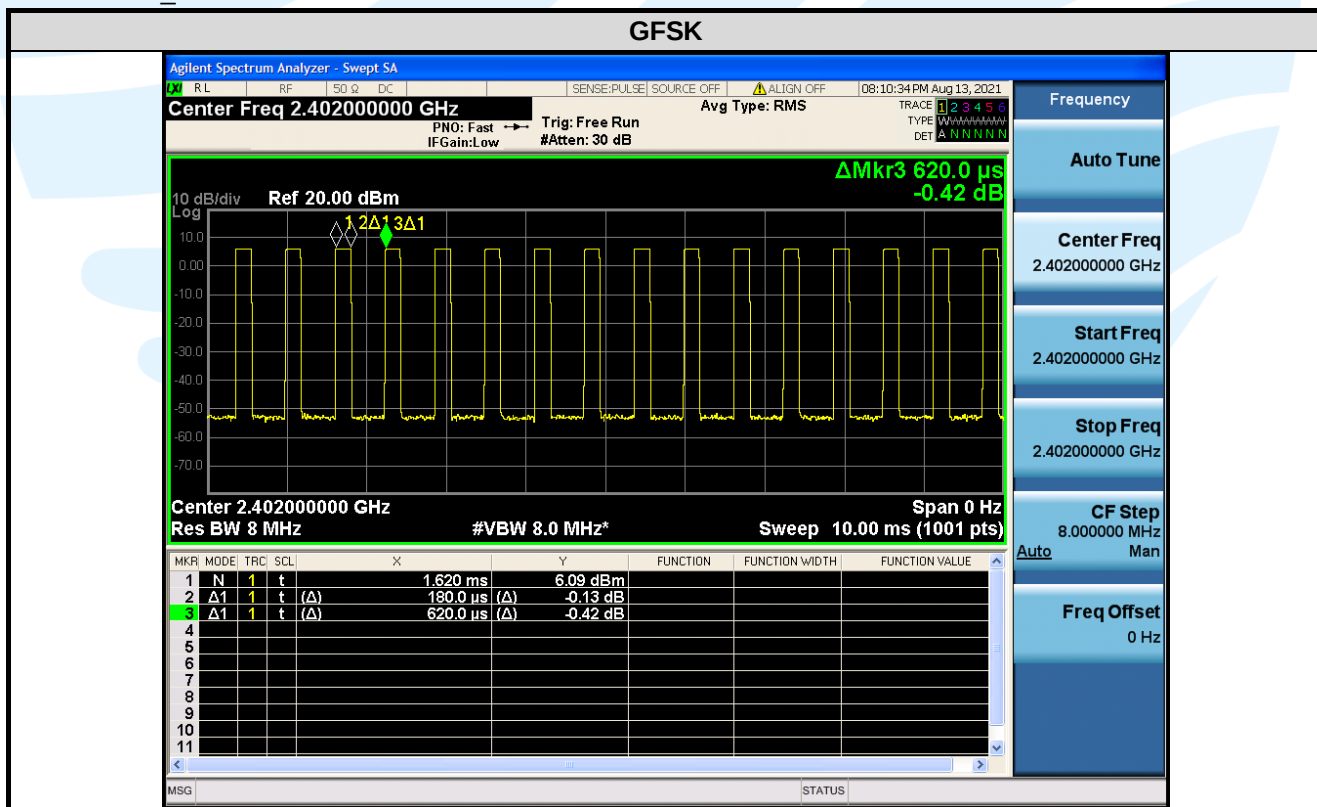
- 1) Duty cycle= On Time/ Period;
- 2) Duty Cycle factor = $10 * \log(1/ \text{Duty cycle})$;
- 3) Average factor = $20 \log_{10} \text{Duty Cycle}$.

The test plot as follows

Left Earbud LE



Left Earbud_2LE



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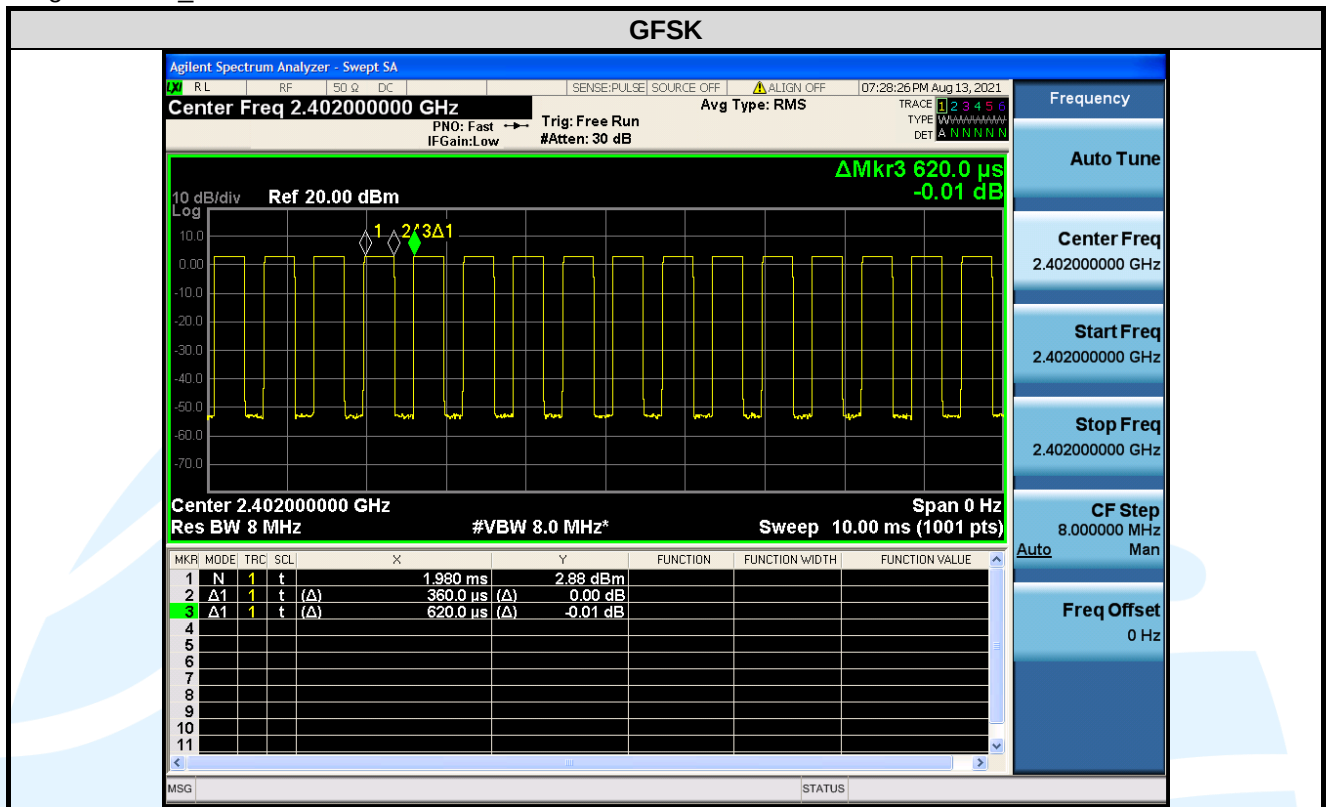
Fax: +86-755-28230886

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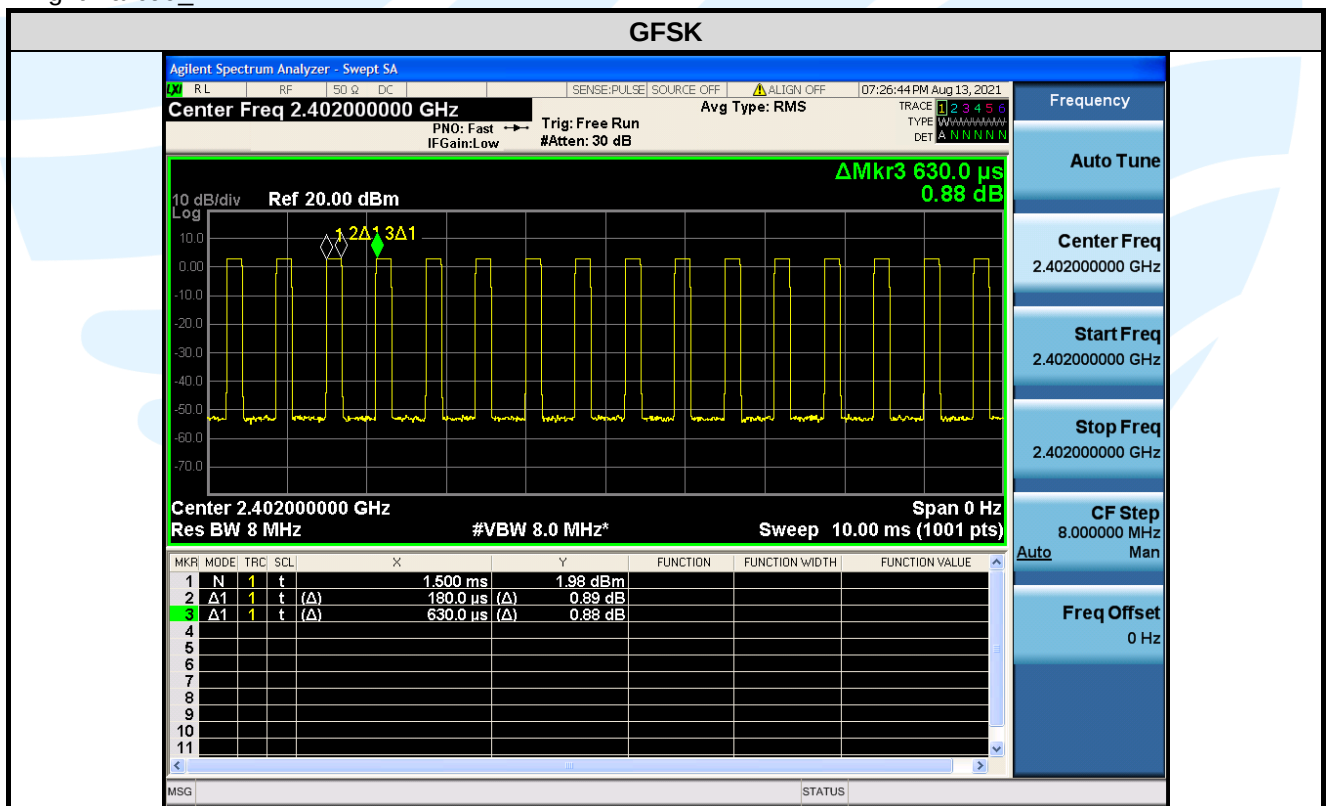
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Right Earbud_LE



Right Earbud_2LE


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5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION

5.1 REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
2	FCC 47 CFR Part 15	Radio Frequency Devices
3	RSS-247 Issue 2	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
4	RSS-Gen Issue 5	General Requirements for Compliance of Radio Apparatus
5	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices
6	KDB 558074 D01 15.247 Meas Guidance v05r02	Guidance for compliance measurements on Digital Transmission Systems, Frequency Hopping Spread Spectrum system, and Hybrid system devices operating under Section 15.247 of the FCC rules

5.2 ANTENNA REQUIREMENT

Standard Requirement
15.203 requirement: 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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(b) (4) requirement: The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi. RSS-Gen Issue 5, Section 6.8 requirement: According to RSS-Gen Issue 5, Section 6.8, a transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. EUT Antenna: Antenna in the interior of the equipment and no consideration of replacement. The max gain of the antenna is -2.4 dBi.

5.3 CONDUCTED PEAK OUTPUT POWER

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.247 (b)(3)
RSS-247 Issue 2, Section 5.4(d)

Test Method: ANSI C63.10-2013 Clause 11.9.1.3

Limit: For DTSs employing digital modulation techniques operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W.

Test Procedure:

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.
2. Measure out each test modes' peak or average output power, record the power level.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.4.3 for details.

Instruments Used: Refer to section 3 for details

Test Results: Pass

Left Earbud LE

Type of Modulation	Channel	Frequency (MHz)	Maximum Conducted Peak Power (dBm)	Maximum Conducted Peak Power (mW)
GFSK	0	2402	9.85	9.66
	19	2440	10.05	10.12
	39	2480	10.08	10.19

2LE

Type of Modulation	Channel	Frequency (MHz)	Maximum Conducted Peak Power (dBm)	Maximum Conducted Peak Power (mW)
GFSK	0	2402	9.88	9.73
	19	2440	10.07	10.16
	39	2480	10.11	10.26

Right Earbud LE

Type of Modulation	Channel	Frequency (MHz)	Maximum Conducted Peak Power (dBm)	Maximum Conducted Peak Power (mW)
GFSK	0	2402	8.17	6.56
	19	2440	8.61	7.26
	39	2480	9.00	7.94

2LE

Type of Modulation	Channel	Frequency (MHz)	Maximum Conducted Peak Power (dBm)	Maximum Conducted Peak Power (mW)
GFSK	0	2402	8.24	6.67
	19	2440	8.63	7.29
	39	2480	9.01	7.96

Note: The antenna gain of -2.4 dBi less than 6dBi maximum permission antenna gain value based on 1 watt peak output power limit.

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5.46 DB BANDWIDTH & OCCUPIED BANDWIDTH

	FCC 47 CFR Part 15 Subpart C Section 15.247 (a)(2)
Test Requirement:	RSS-247 Issue 2, Section 5.2(a) RSS-Gen Issue 5, Section 6.7
Test Method:	ANSI C63.10-2013 Clause 11.8.1 RSS-Gen Issue 5, Section 6.7
Limit:	For digital transmission systems, the minimum 6 dB bandwidth shall be 500 kHz.
Test Procedure:	Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer. Use the following spectrum analyzer settings:

6dB Bandwidth

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- 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.

Occupied Bandwidth

- Set RBW = 1% to 5% of the occupied bandwidth
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup:	Refer to section 4.4.3 for details.
Instruments Used:	Refer to section 3 for details
Test Results:	Pass

Left Earbud_ LE

Type of Modulation	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Occupied Bandwidth (MHz)	6 dB Bandwidth Limit	Pass / Fail
GFSK	0	2402	0.7188	1.0428	> 500 kHz	Pass
	19	2440	0.7150	1.0427	> 500 kHz	Pass
	39	2480	0.7188	1.0432	> 500 kHz	Pass

Left Earbud_ 2LE

Type of Modulation	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Occupied Bandwidth (MHz)	6 dB Bandwidth Limit	Pass / Fail
GFSK	0	2402	1.267	2.0792	> 500 kHz	Pass
	19	2440	1.261	2.0797	> 500 kHz	Pass
	39	2480	1.260	2.0787	> 500 kHz	Pass

Right Earbud_ LE

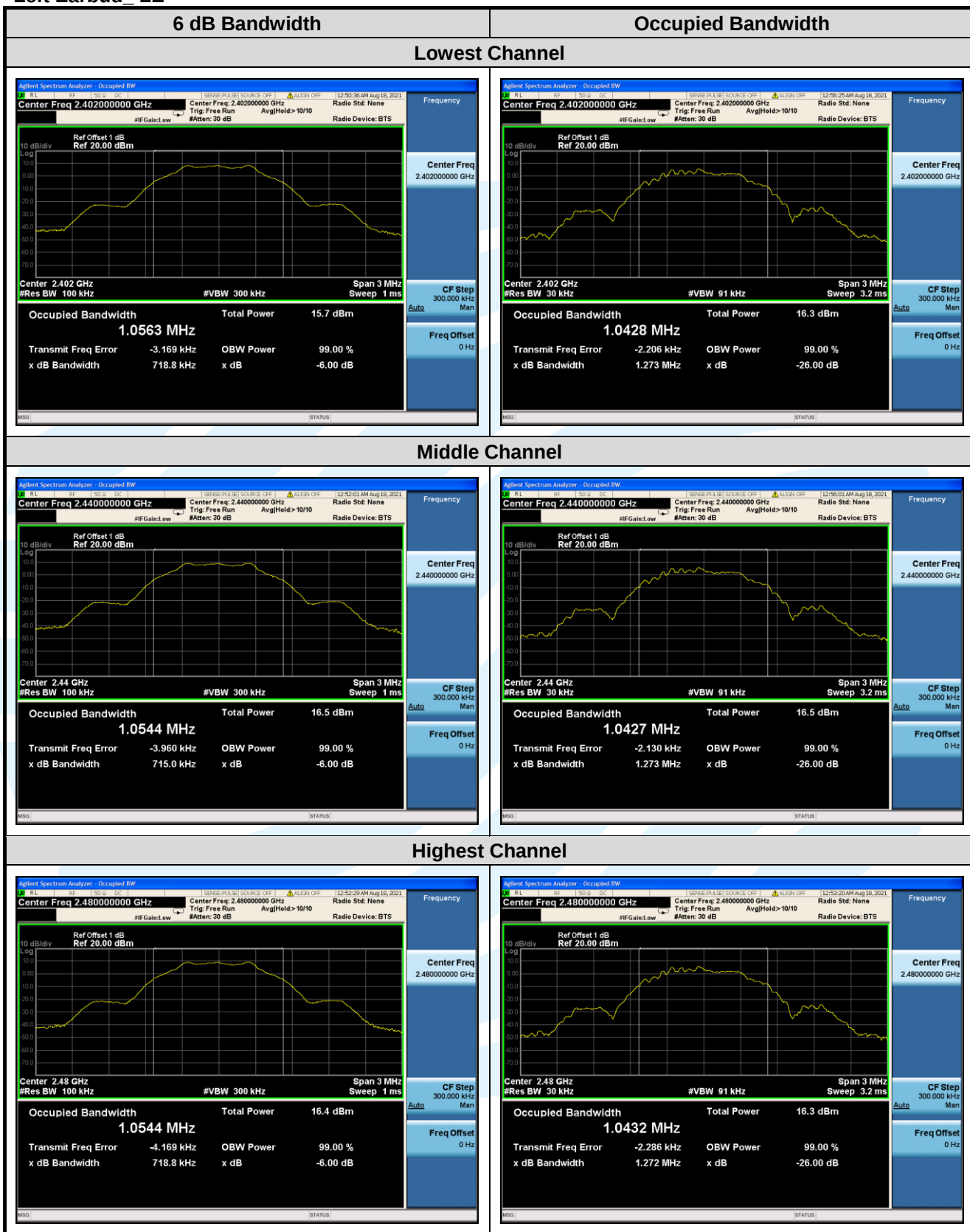
Type of Modulation	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Occupied Bandwidth (MHz)	6 dB Bandwidth Limit	Pass / Fail
GFSK	0	2402	0.7187	1.0404	> 500 kHz	Pass
	19	2440	0.7184	1.0433	> 500 kHz	Pass
	39	2480	0.7075	1.0451	> 500 kHz	Pass

Right Earbud_ 2LE

Type of Modulation	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Occupied Bandwidth (MHz)	6 dB Bandwidth Limit	Pass / Fail
GFSK	0	2402	1.265	2.0778	> 500 kHz	Pass
	19	2440	1.250	2.0816	> 500 kHz	Pass
	39	2480	1.267	2.0821	> 500 kHz	Pass

The test plots as follows:

Left Earbud_ LE



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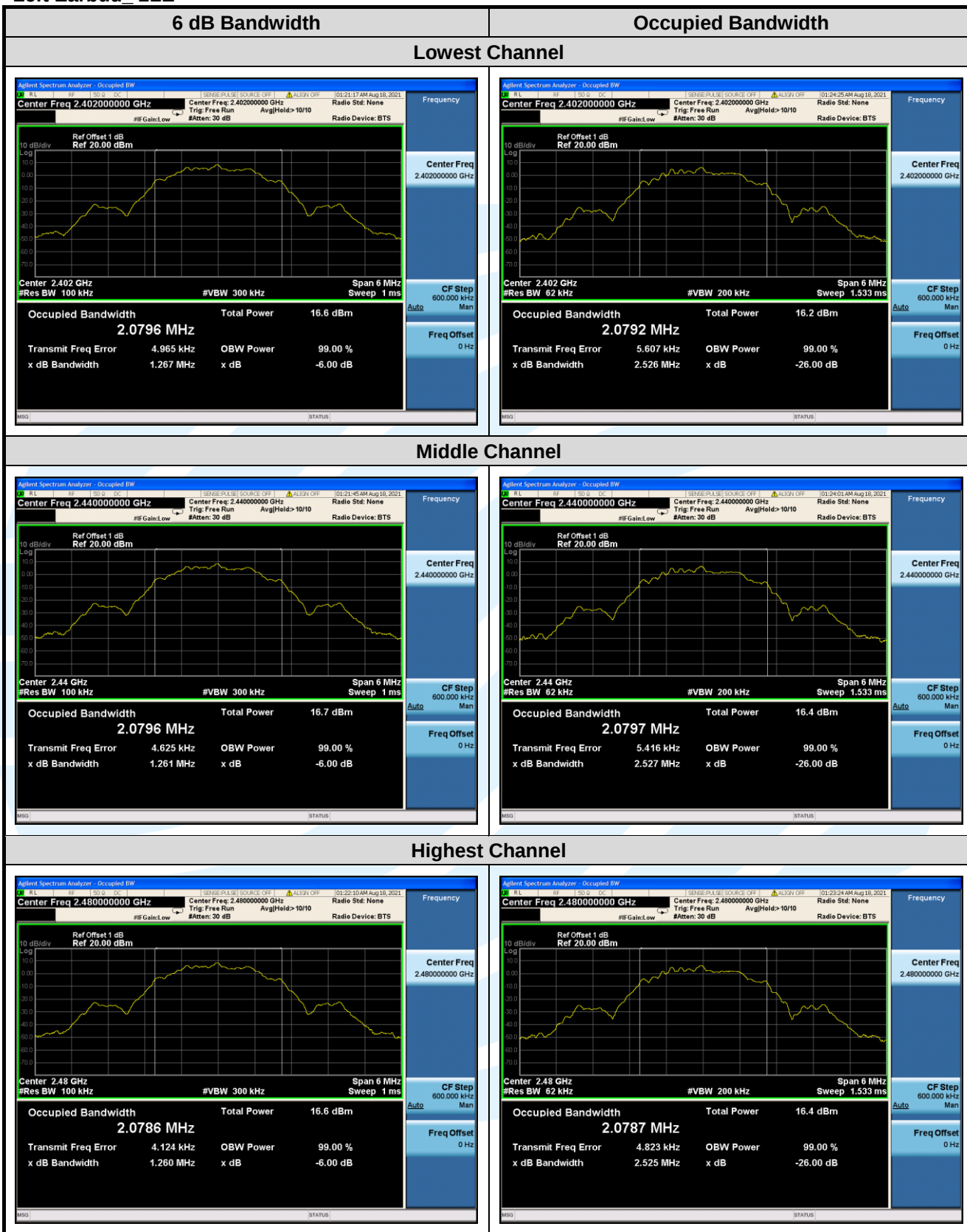
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Left Earbud_2LE



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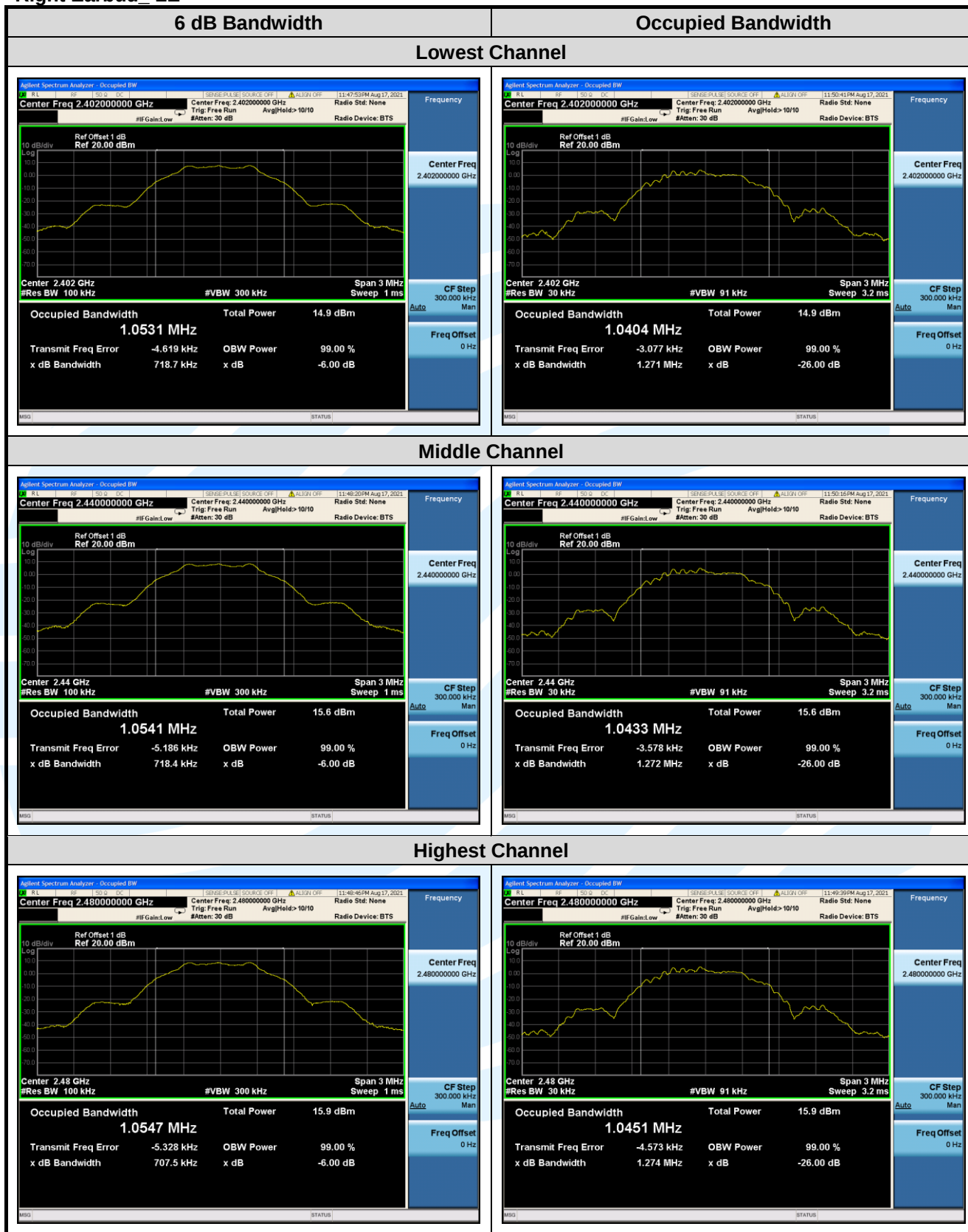
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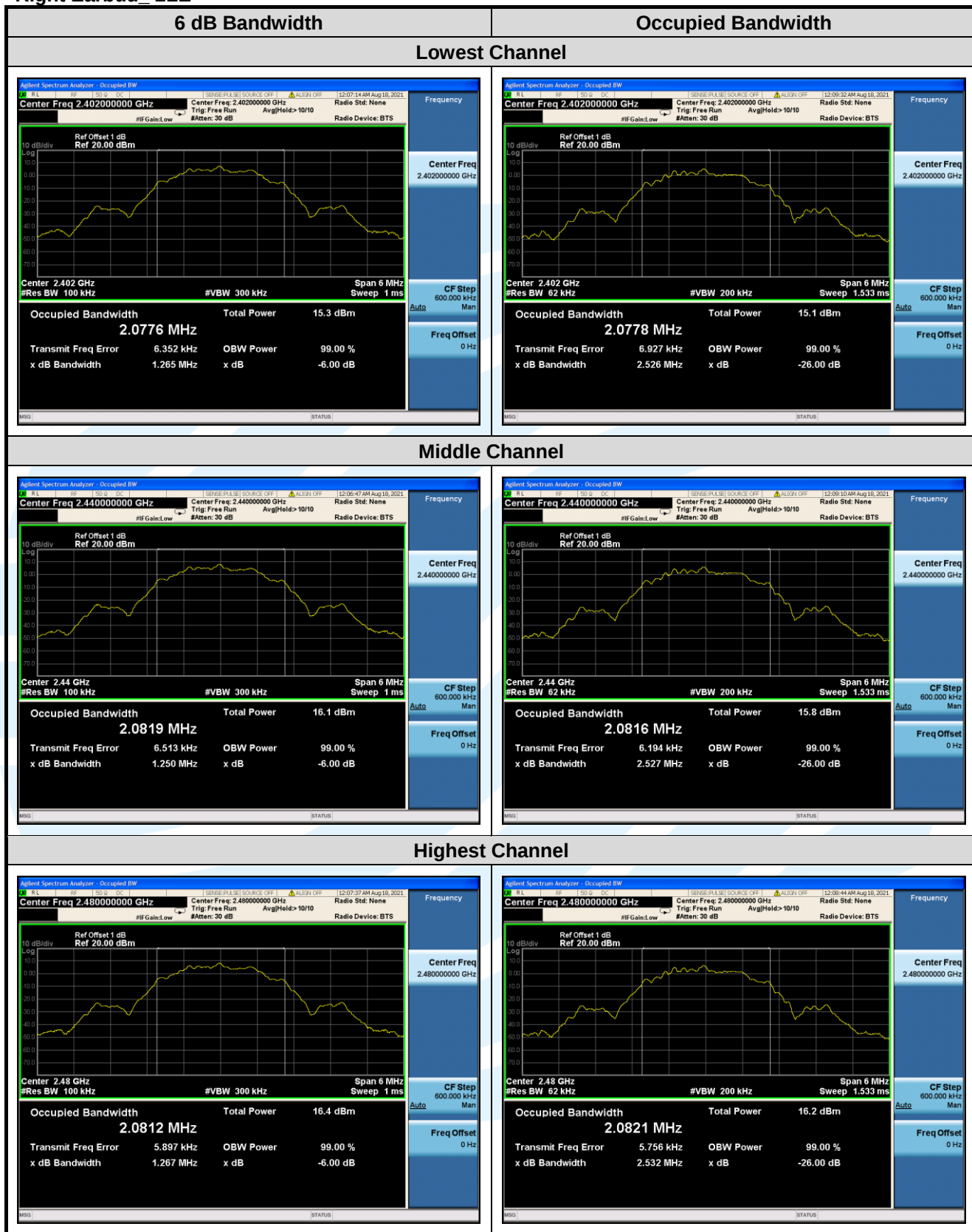
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5.5 POWER SPECTRAL DENSITY

Test Requirement:	FCC 47 CFR Part 15 Subpart C Section 15.247 (e) RSS-247 Issue 2, Section 5.2(b)
Test Method:	ANSI C63.10-2013 Clause 11.10.2
Limit:	For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.
Test Procedure:	Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer. Use the following spectrum analyzer settings: a) Set analyzer center frequency to DTS channel center frequency. b) Set the span to 1.5 times the DTS bandwidth. c) Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$. d) Set the VBW $\geq 3 \times \text{RBW}$. e) Detector = peak. f) Sweep time = auto couple. g) Trace mode = max hold. h) Allow trace to fully stabilize. i) Use the peak marker function to determine the maximum amplitude level within the RBW. j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat. Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.
Test Setup:	Refer to section 4.4.3 for details.
Instruments Used:	Refer to section 3 for details
Test Results:	Pass

Left Earbud_ LE

Type of Modulation	Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result (Pass / Fail)
GFSK	0	2402	-5.414	8	Pass
	19	2440	-5.265	8	Pass
	39	2480	-5.326	8	Pass

Left Earbud_ 2LE

Type of Modulation	Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result (Pass / Fail)
GFSK	0	2402	-7.979	8	Pass
	19	2440	-7.830	8	Pass
	39	2480	-7.825	8	Pass

Right Earbud_ LE

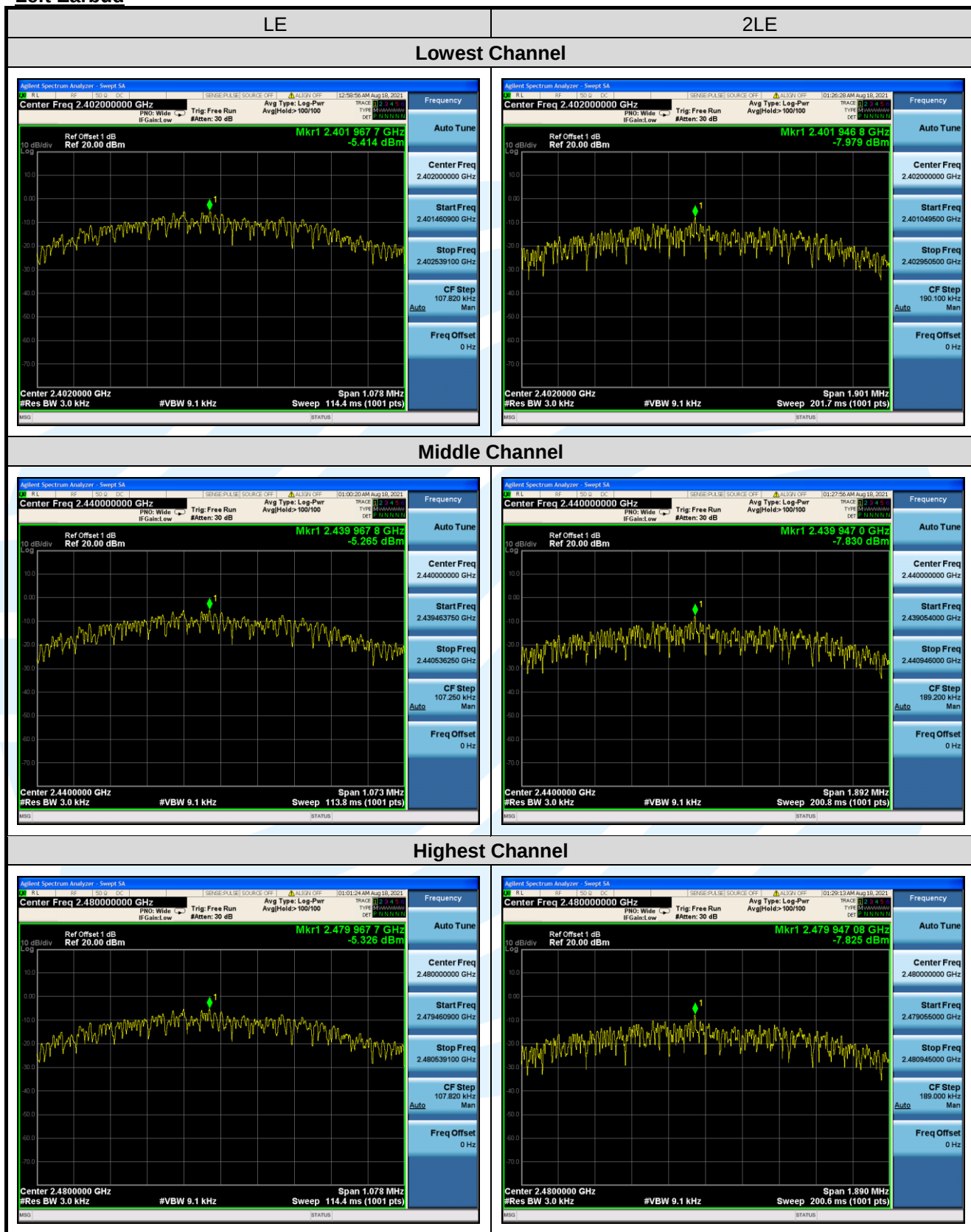
Type of Modulation	Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result (Pass / Fail)
GFSK	0	2402	-6.902	8	Pass
	19	2440	-6.216	8	Pass
	39	2480	-5.895	8	Pass

Right Earbud_ 2LE

Type of Modulation	Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result (Pass / Fail)
GFSK	0	2402	-9.152	8	Pass
	19	2440	-8.373	8	Pass
	39	2480	-8.106	8	Pass

The test plots as follows:

Left Earbud



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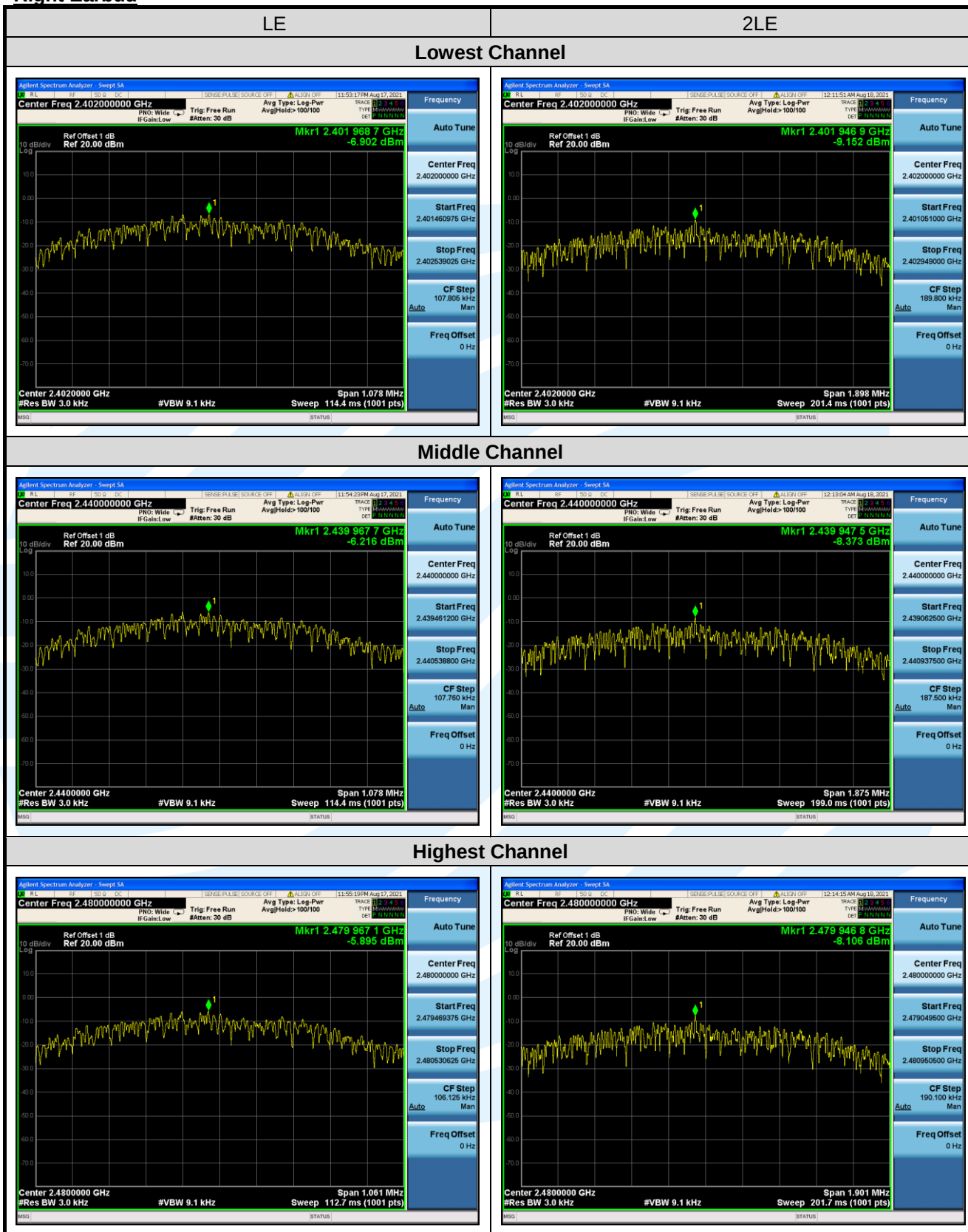
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Right Earbud



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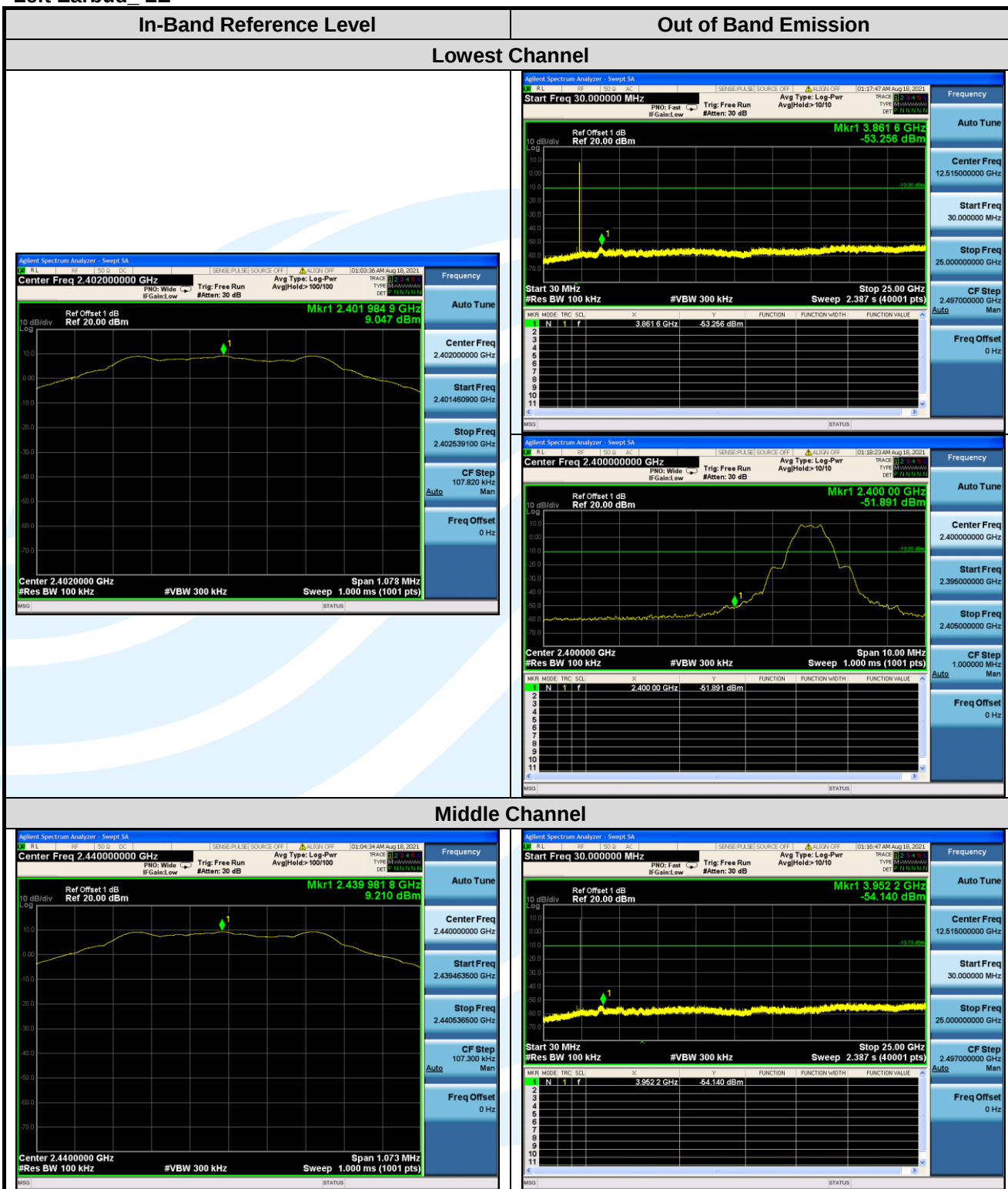
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5.6 CONDUCTED OUT OF BAND EMISSION

Test Requirement:	FCC 47 CFR Part 15 Subpart C Section 15.247(d) RSS-247 Issue 2, Section 5.5
Test Method:	ANSI C63.10-2013 Clause 11.11
Limit:	In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.
Test Procedure:	Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer. Use the following spectrum analyzer settings: Step 1: Reference level measurement a) Set instrument center frequency to DTS channel center frequency. b) Set the span to ≥ 1.5 times the DTS bandwidth. c) Set the RBW = 100 kHz. d) Set the VBW $\geq 3 \times$ RBW. e) Detector = peak. f) Sweep time = auto couple. g) Trace mode = max hold. h) Allow trace to fully stabilize. i) Use the peak marker function to determine the maximum PSD level. Note that the channel found to contain the maximum PSD level can be used to establish the reference level. Step 2: Emission level measurement a) Set RBW = 100 kHz. b) Set VBW ≥ 300 kHz. c) Detector = peak. d) Sweep = auto couple. e) Trace Mode = max hold. f) Allow trace to fully stabilize. g) Use the peak marker function to determine the maximum amplitude level. Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.
Test Setup:	Refer to section 4.4.3 for details.
Instruments Used:	Refer to section 3 for details
Test Results:	Pass

The test plot as follows:

Left Earbud_ LE



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