

The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/3MHz for Peak, 1MHz/3MHz for Average

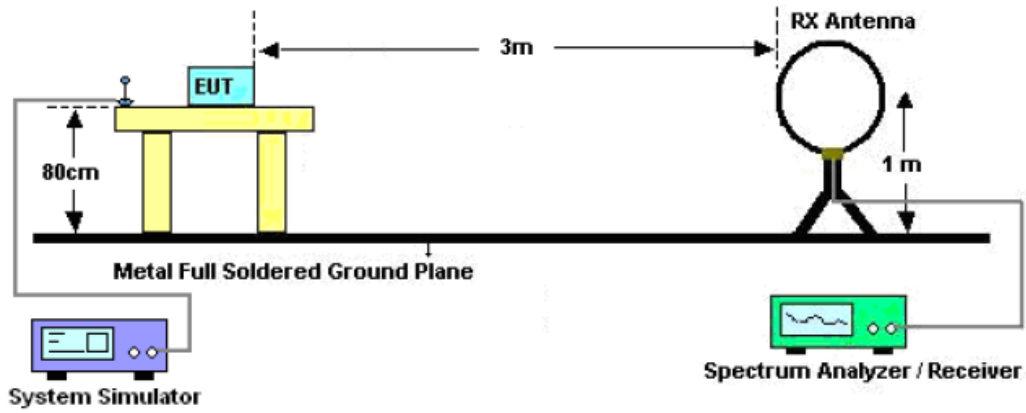
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

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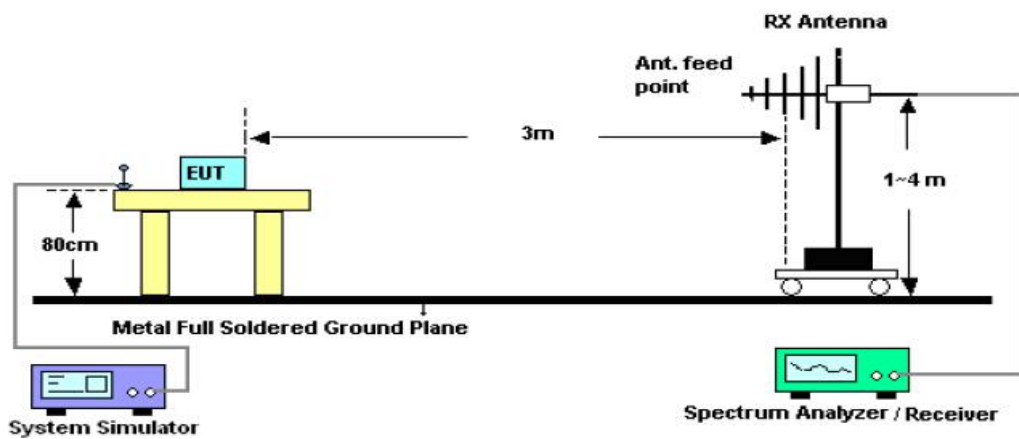


### 10.2. TEST SETUP

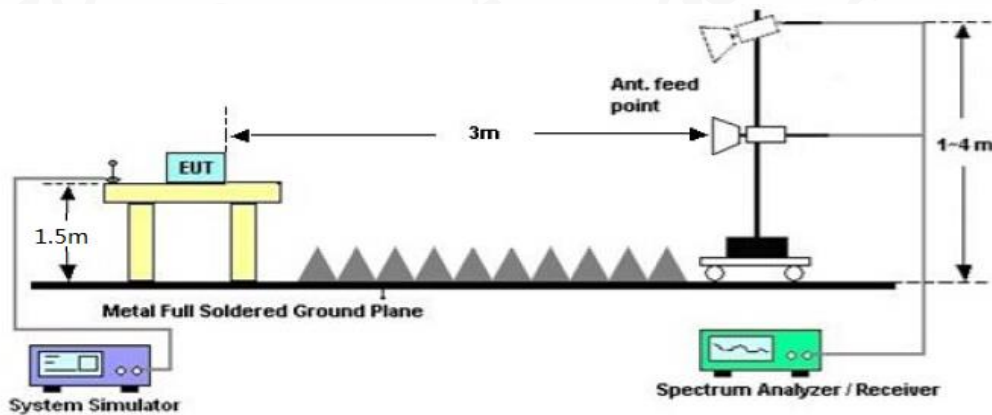
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



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### 10.3. LIMITS AND MEASUREMENT RESULT

15.209 Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (micorvolts/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

Note: All modes were tested For restricted band radiated emission, the test records reported below are the worst result compared to other modes.

### 10.4. TEST RESULT

#### RADIATED EMISSION BELOW 30MHZ

Emissions are attenuated more than 20 dB below the permissible value.

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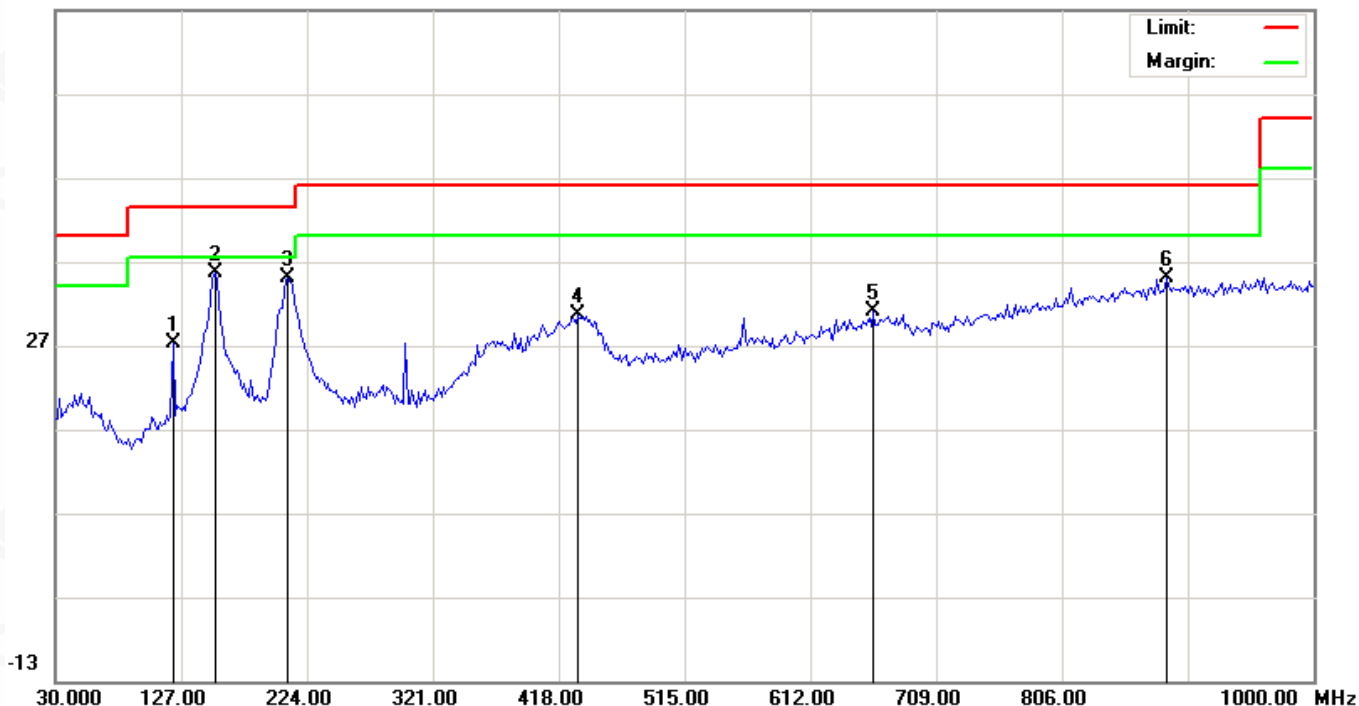
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**RADIATED EMISSION BELOW 1GHZ**

<b>EUT</b>	Bluetooth Headset	<b>Model Name</b>	BT2200
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 2	<b>Antenna</b>	Horizontal

66.9 dBuV/m



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1		120.5333	9.11	18.00	27.11	43.50	-16.39	peak
2	*	152.8667	16.39	19.20	35.59	43.50	-7.91	peak
3		209.4500	18.43	16.62	35.05	43.50	-8.45	peak
4		432.5500	7.06	23.63	30.69	46.00	-15.31	peak
5		660.5000	3.30	27.68	30.98	46.00	-15.02	peak
6		886.8333	3.47	31.53	35.00	46.00	-11.00	peak

**RESULT: PASS**

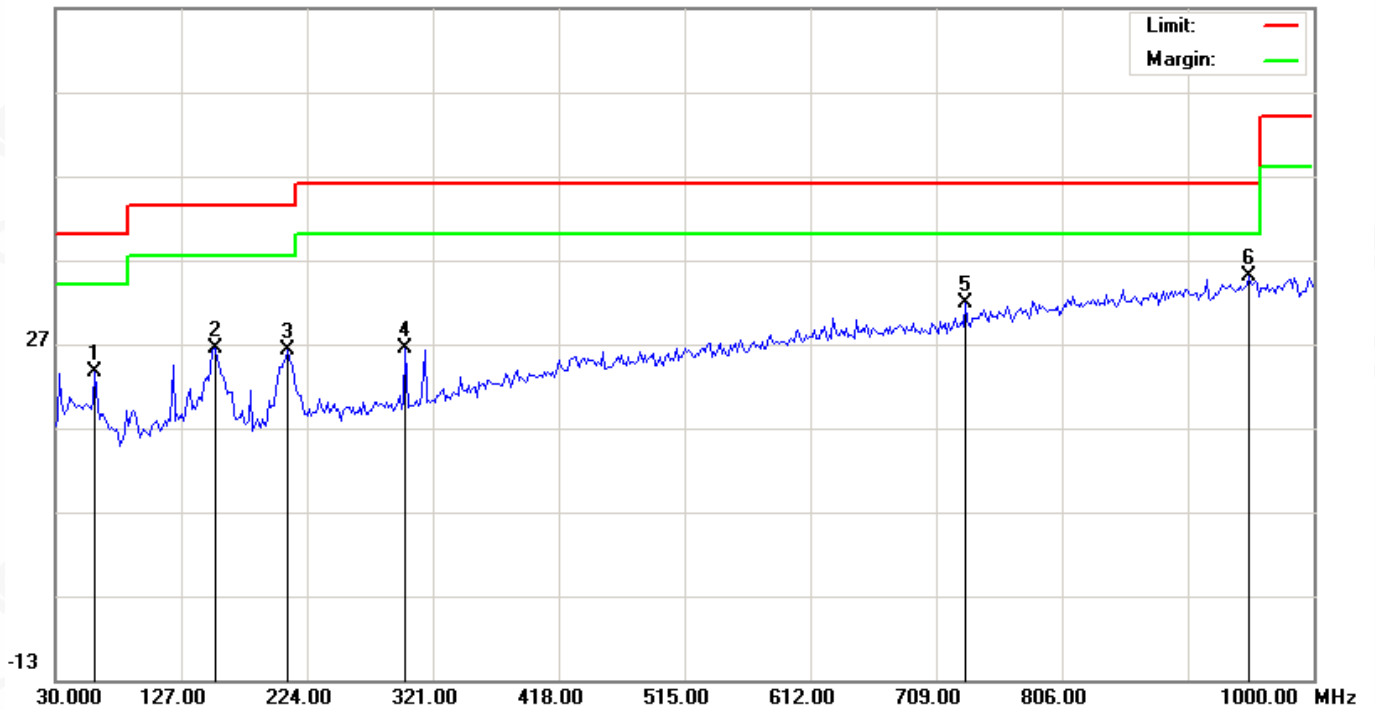
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EUT	Bluetooth Headset	Model Name	BT2200
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Vertical

66.9 dBuV/m



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1		60.7167	4.79	18.74	23.53	40.00	-16.47	peak
2		152.8667	7.23	19.20	26.43	43.50	-17.07	peak
3		209.4500	9.60	16.62	26.22	43.50	-17.28	peak
4		299.9833	7.00	19.47	26.47	46.00	-19.53	peak
5		731.6332	2.95	28.86	31.81	46.00	-14.19	peak
6	*	949.8833	2.84	32.13	34.97	46.00	-11.03	peak

**RESULT: PASS**

**Note:** 1. Factor=Antenna Factor+ Cable loss, Margin=Measurement-Limit.

2. All test modes had been pre-tested. The mode 2 is the worst case and recorded in the report.

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**RADIATED EMISSION ABOVE 1GHZ**

<b>EUT</b>	Bluetooth Headset	<b>Model Name</b>	BT2200
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 1	<b>Antenna</b>	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.000	45.65	0.08	45.73	74	-28.27	peak
4804.000	37.21	0.08	37.29	54	-16.71	AVG
7206.000	40.43	2.21	42.64	74	-31.36	peak
7206.000	32.69	2.21	34.9	54	-19.1	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

<b>EUT</b>	Bluetooth Headset	<b>Model Name</b>	BT2200
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 1	<b>Antenna</b>	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.000	45.21	0.08	45.29	74	-28.71	peak
4804.000	36.79	0.08	36.87	54	-17.13	AVG
7206.000	40.19	2.21	42.4	74	-31.6	peak
7206.000	32.79	2.21	35	54	-19	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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<b>EUT</b>	Bluetooth Headset	<b>Model Name</b>	BT2200
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 2	<b>Antenna</b>	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4882.000	45.19	0.14	45.33	74	-28.67	peak
4882.000	37.89	0.14	38.03	54	-15.97	AVG
7323.000	41.57	2.36	43.93	74	-30.07	peak
7323.000	32.47	2.36	34.83	54	-19.17	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

<b>EUT</b>	Bluetooth Headset	<b>Model Name</b>	BT2200
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 2	<b>Antenna</b>	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4882.000	46.24	0.14	46.38	74	-27.62	peak
4882.000	37.69	0.14	37.83	54	-16.17	AVG
7323.000	42.76	2.36	45.12	74	-28.88	peak
7323.000	33.27	2.36	35.63	54	-18.37	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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<b>EUT</b>	Bluetooth Headset	<b>Model Name</b>	BT2200
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 3	<b>Antenna</b>	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.000	46.79	0.22	47.01	74	-26.99	peak
4960.000	38.49	0.22	38.71	54	-15.29	AVG
7440.000	43.22	2.64	45.86	74	-28.14	peak
7440.000	34.09	2.64	36.73	54	-17.27	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

<b>EUT</b>	Bluetooth Headset	<b>Model Name</b>	BT2200
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.4%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 3	<b>Antenna</b>	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.000	47.45	0.22	47.67	74	-26.33	peak
4960.000	38.19	0.22	38.41	54	-15.59	AVG
7440.000	44.55	2.64	47.19	74	-26.81	peak
7440.000	34.69	2.64	37.33	54	-16.67	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

## RESULT: PASS

**Note:** Other emissions are attenuated more than 20 dB below the permissible value.

Factor=Antenna Factor+ Cable loss-Amplifier gain, Over=Measure-Limit.

The “Factor” value can be calculated automatically by software of measurement system.

All test modes had been tested. The GFSK modulation is the worst case and recorded in the report.

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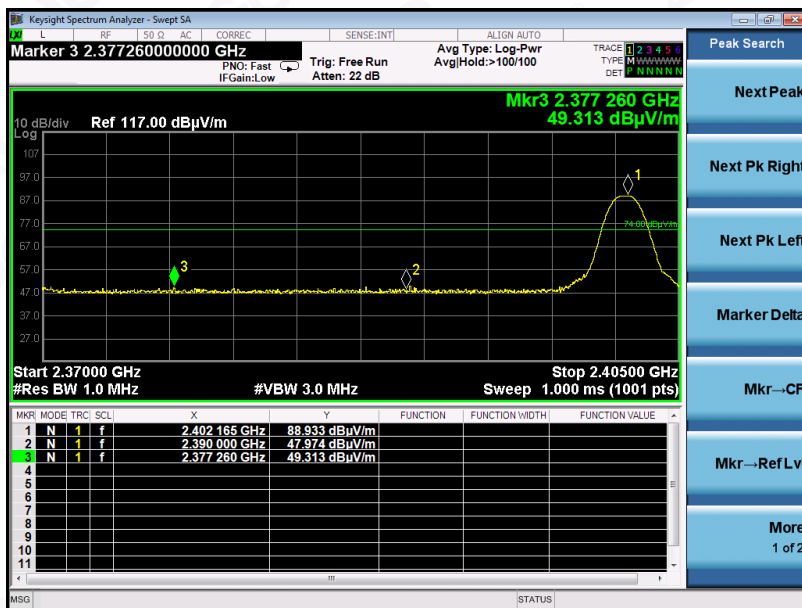




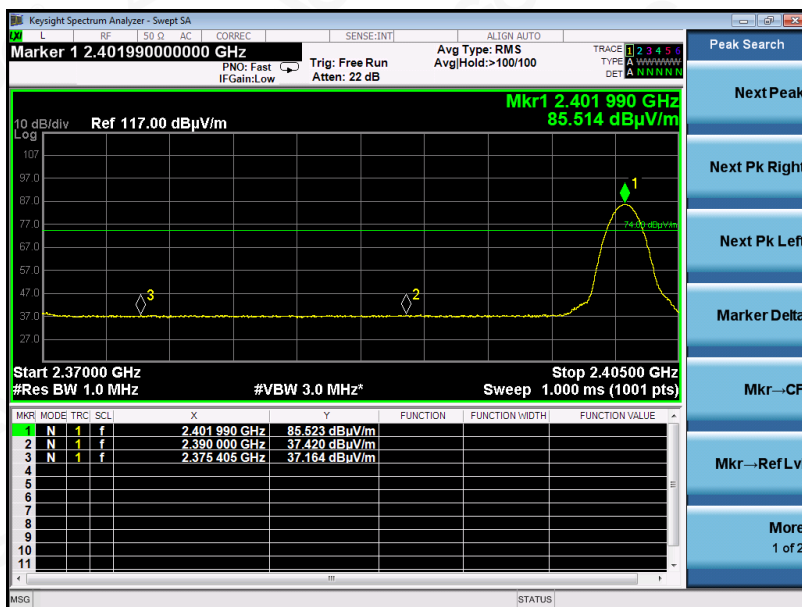
**TEST RESULT FOR RESTRICTED BANDS REQUIREMENTS**

EUT	Bluetooth Headset	Model Name	BT2200
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

PK



AV



**RESULT: PASS**

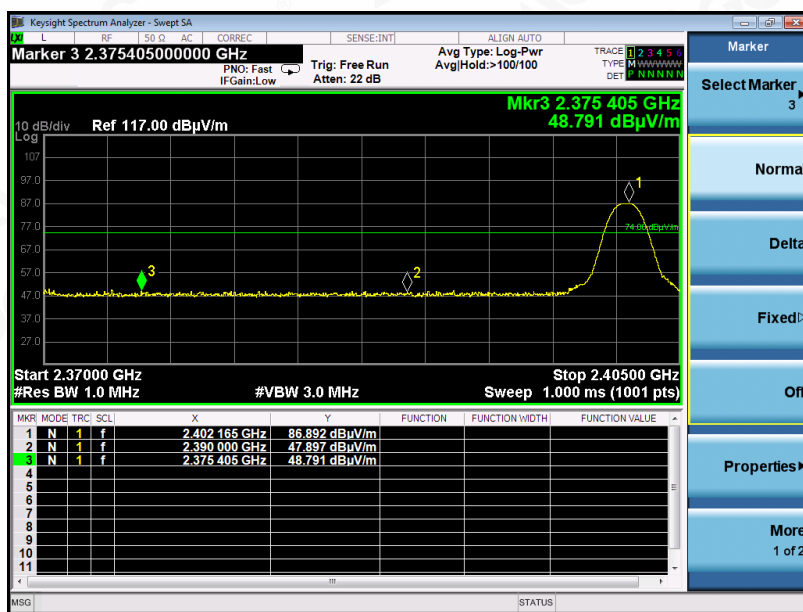
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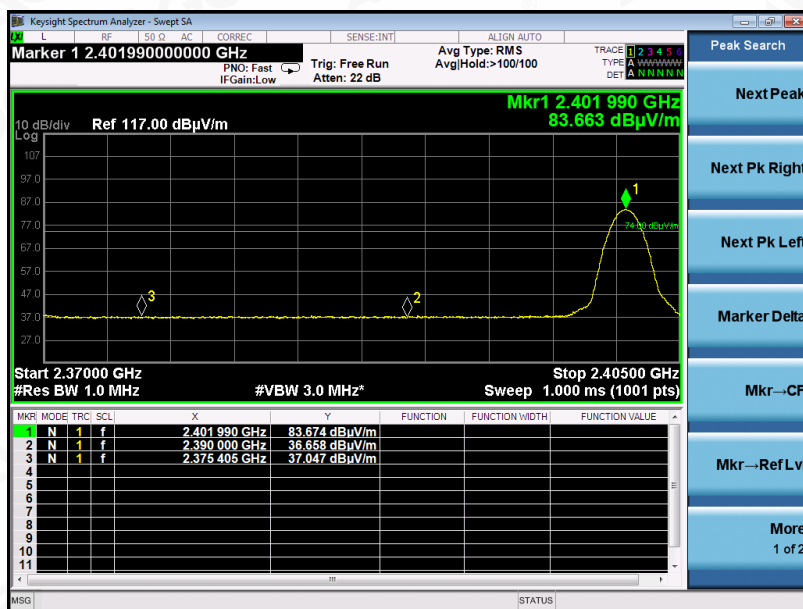


EUT	Bluetooth Headset	Model Name	BT2200
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

PK



AV



RESULT: PASS

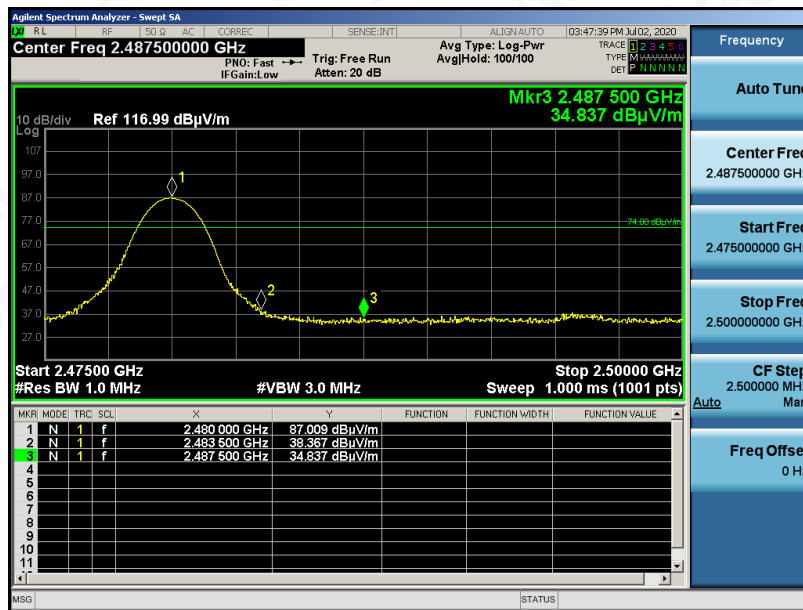
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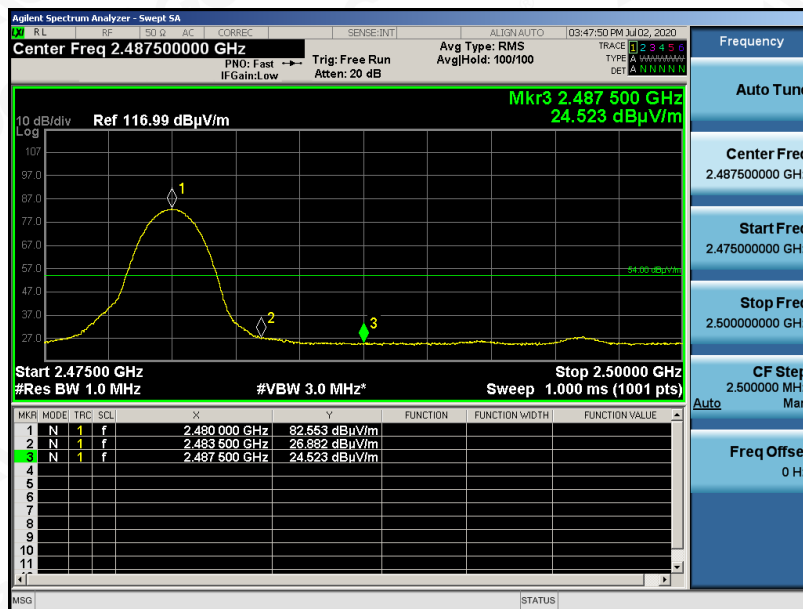


EUT	Bluetooth Headset	Model Name	BT2200
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal

PK



AV



RESULT: PASS

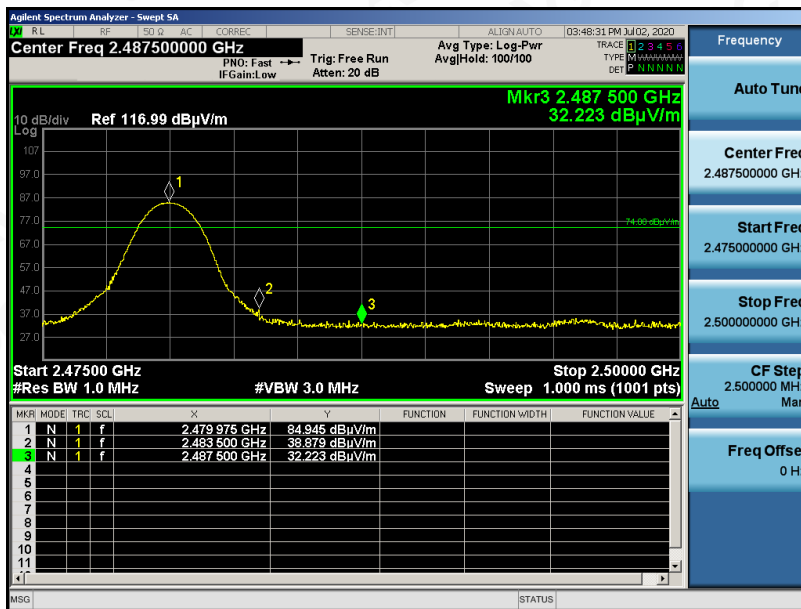
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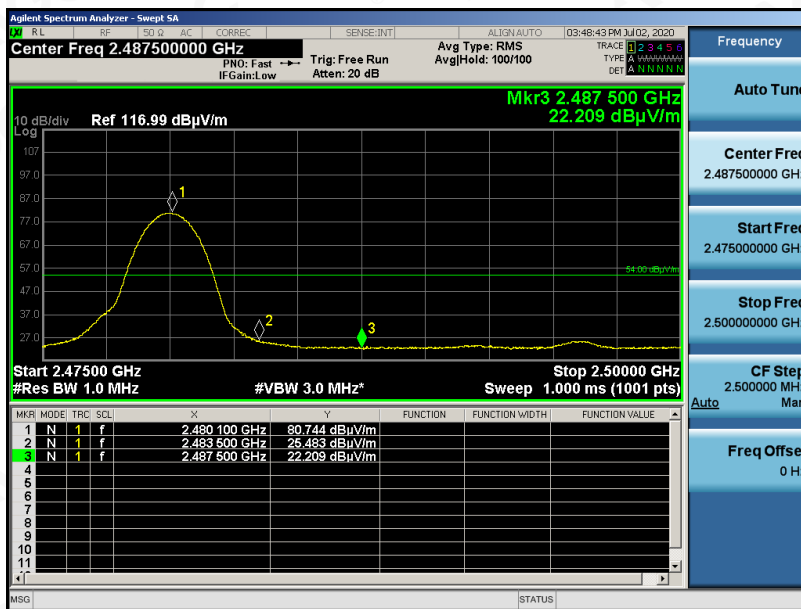


EUT	Bluetooth Headset	Model Name	BT2200
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical

PK



AV



**RESULT: PASS**

**Note:**The factor had been edited in the “Input Correction” of the Spectrum Analyzer. The GFSK modulation is the worst case and recorded in the report.

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## 11. NUMBER OF HOPPING FREQUENCY

### 11.1. MEASUREMENT PROCEDURE

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
2. RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
3. VBW  $\geq$  RBW. Sweep: Auto.Detector function: Peak. Trace: Max hold.
4. Allow the trace to stabilize.

### 11.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 8.2

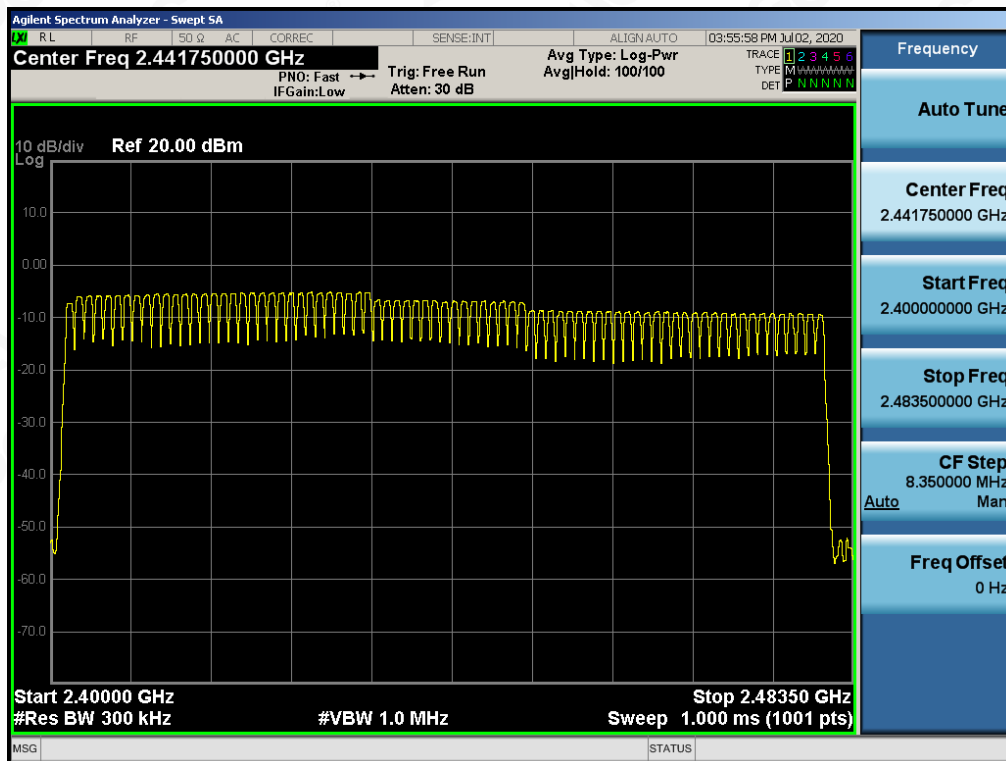
### 11.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

### 11.4. LIMITS AND MEASUREMENT RESULT

TOTAL NO. OF HOPPING CHANNEL	LIMIT (NO. OF CH)	MEASUREMENT (NO. OF CH)	RESULT
	$\geq 15$	79	PASS

TEST PLOT FOR NO. OF TOTAL CHANNELS



Note: The GFSK modulation is the worst case and recorded in the report.

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## 12. TIME OF OCCUPANCY (DWELL TIME)

### 12.1. MEASUREMENT PROCEDURE

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: Zero span, centered on a hopping channel.
2. RBW shall be  $\leq$  channel spacing and where possible RBW should be set  $\gg 1/T$ , where T is the expected dwell time per channel.
3. Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.
4. Detector function: Peak. Trace: Max hold.
5. Use the marker-delta function to determine the transmit time per hop.
6. Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation:

$$(\text{Number of hops in the period specified in the requirements}) = (\text{number of hops on spectrum analyzer}) \times (\text{period specified in the requirements} / \text{analyzer sweep time})$$

7. The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements.

### 12.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 8.2

### 12.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

### 12.4. LIMITS AND MEASUREMENT RESULT

Channel	Time of Pulse for DH5 (ms)	Number of hops in the period specified in the requirements	Dwell Time (ms)	Limit (ms)
Low	2.897	27*4	312.866	400
Middle	2.897	27*4	312.914	400
High	2.897	26*4	301.276	400

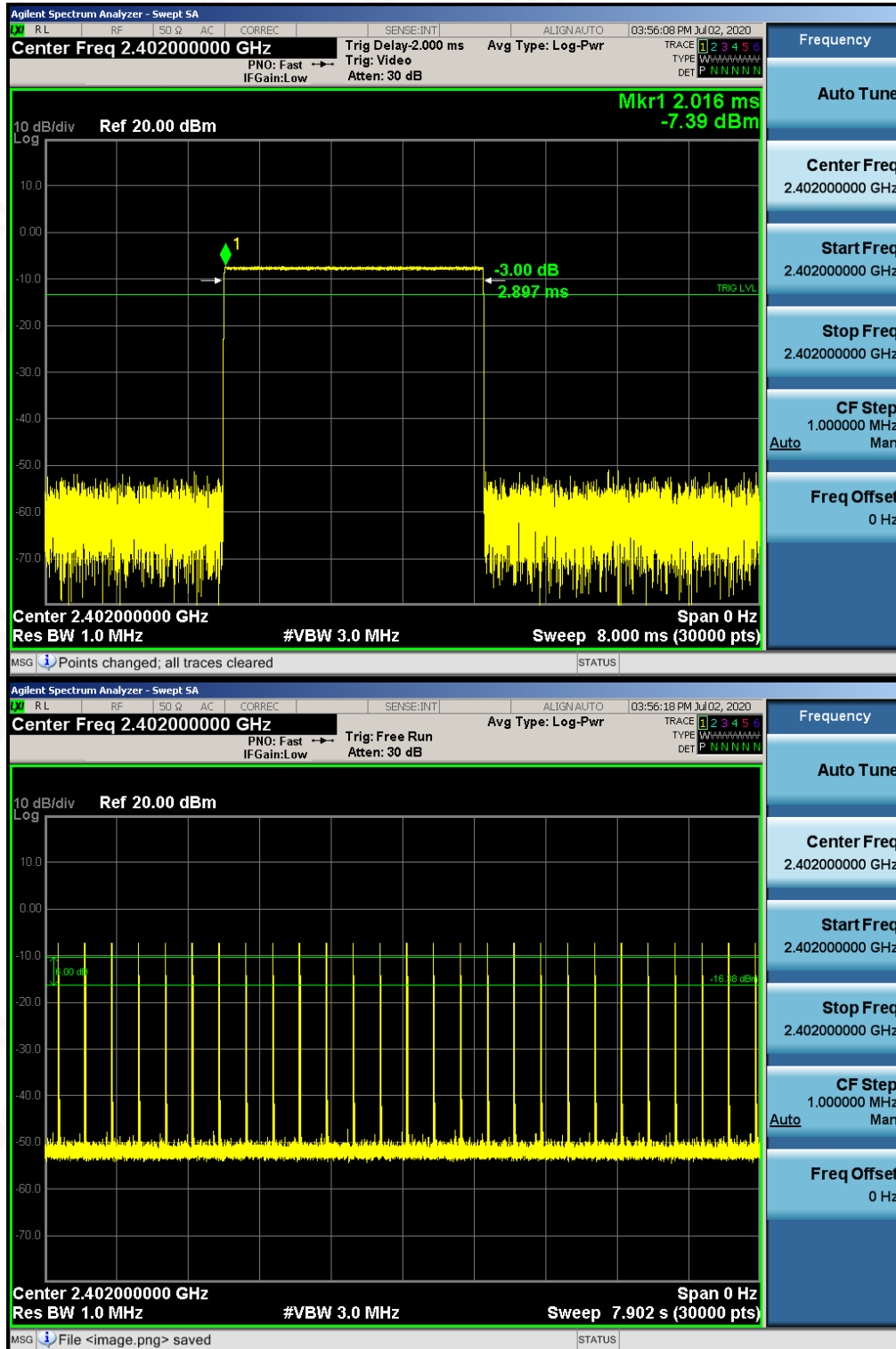
Note: The GFSK modulation is the worst case and recorded in the report.

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TEST PLOT OF LOW CHANNEL

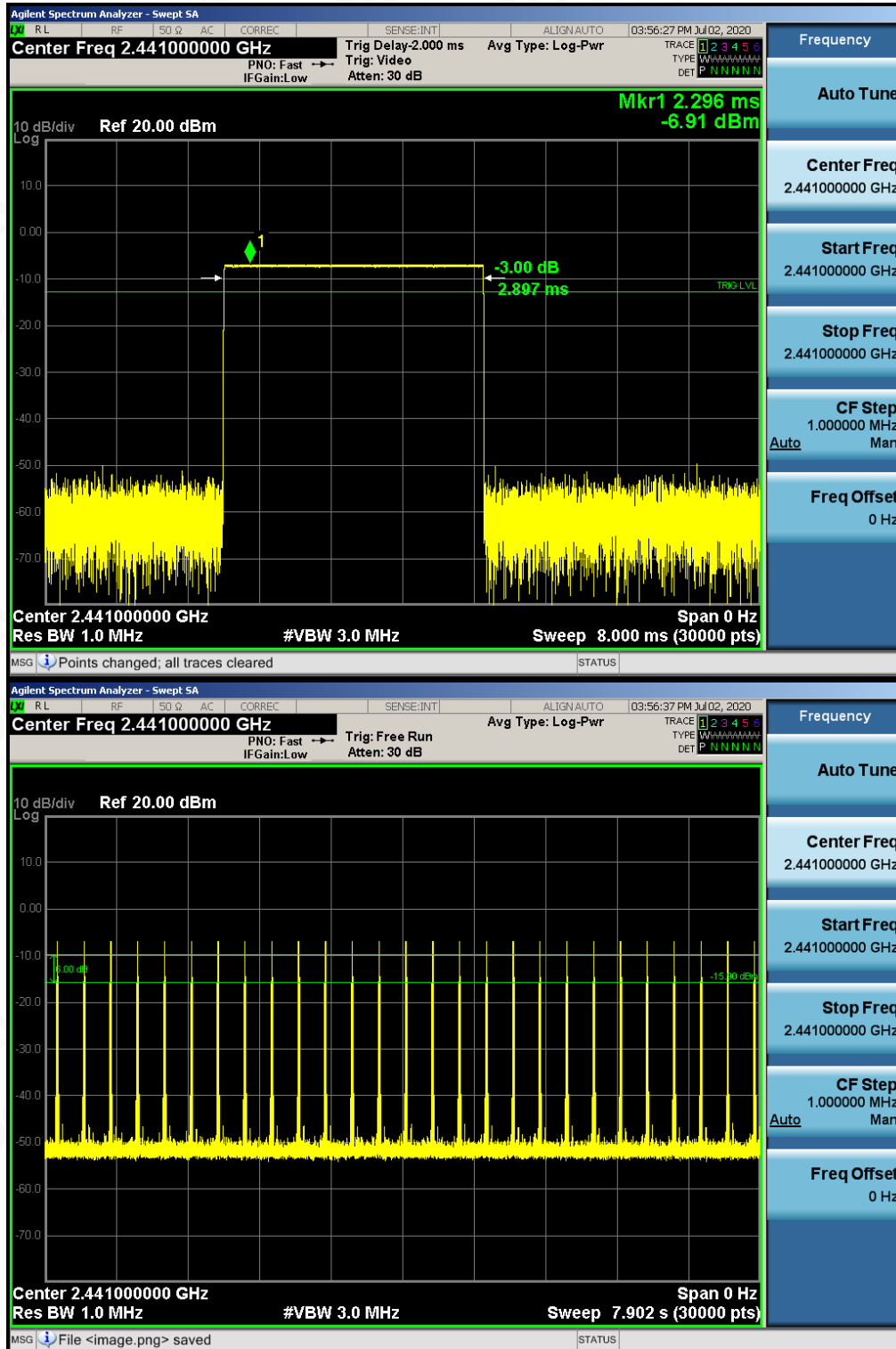


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TEST PLOT OF MIDDLE CHANNEL



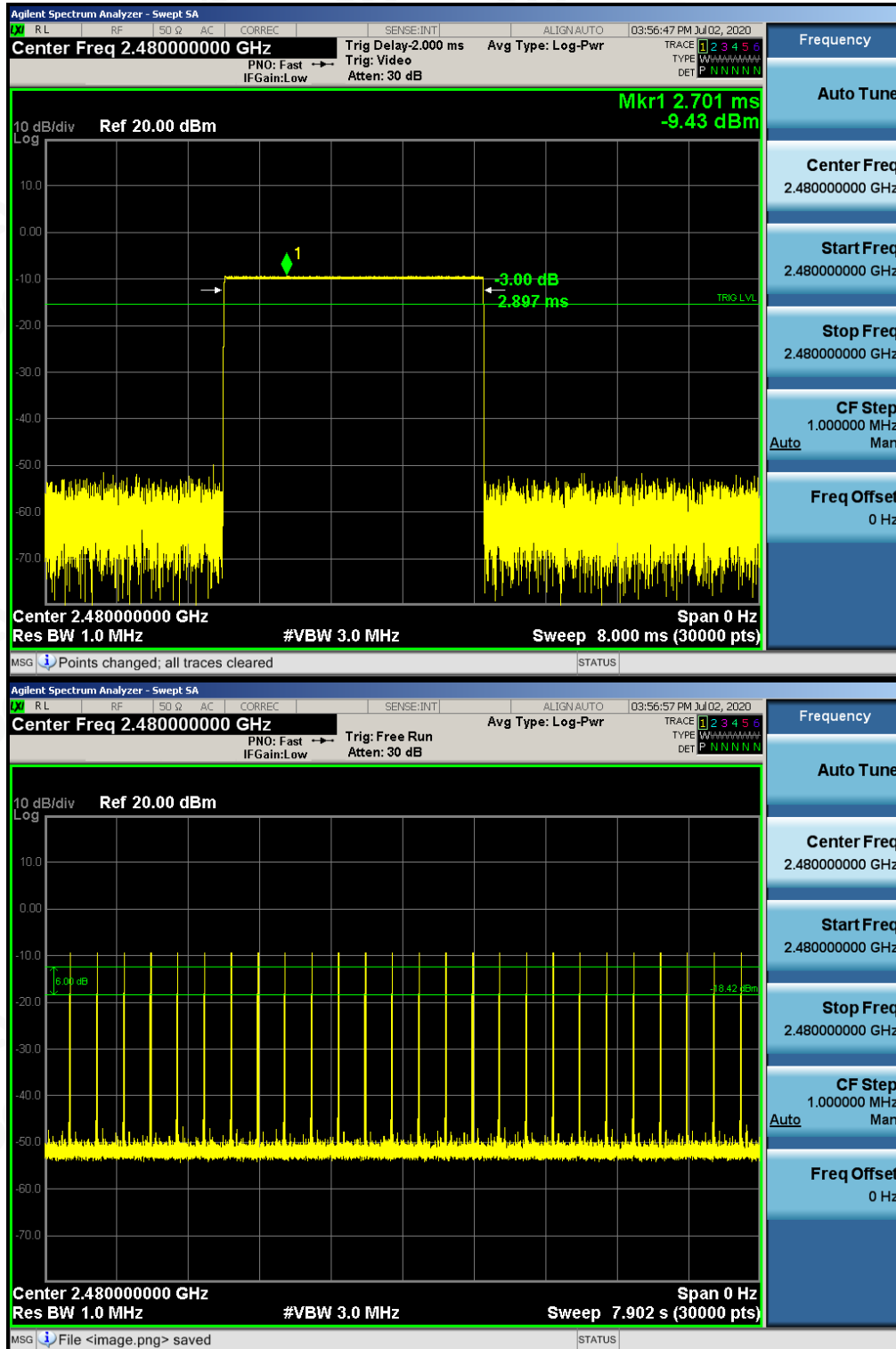
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TEST PLOT OF HIGH CHANNEL



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### 13. FREQUENCY SEPARATION

#### 13.1. MEASUREMENT PROCEDURE

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: Wide enough to capture the peaks of two adjacent channels.
2. RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
3. Video (or average) bandwidth (VBW)  $\geq$  RBW.
4. Sweep: Auto. e) Detector function: Peak. f) Trace: Max hold. g) Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

#### 13.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 6.2

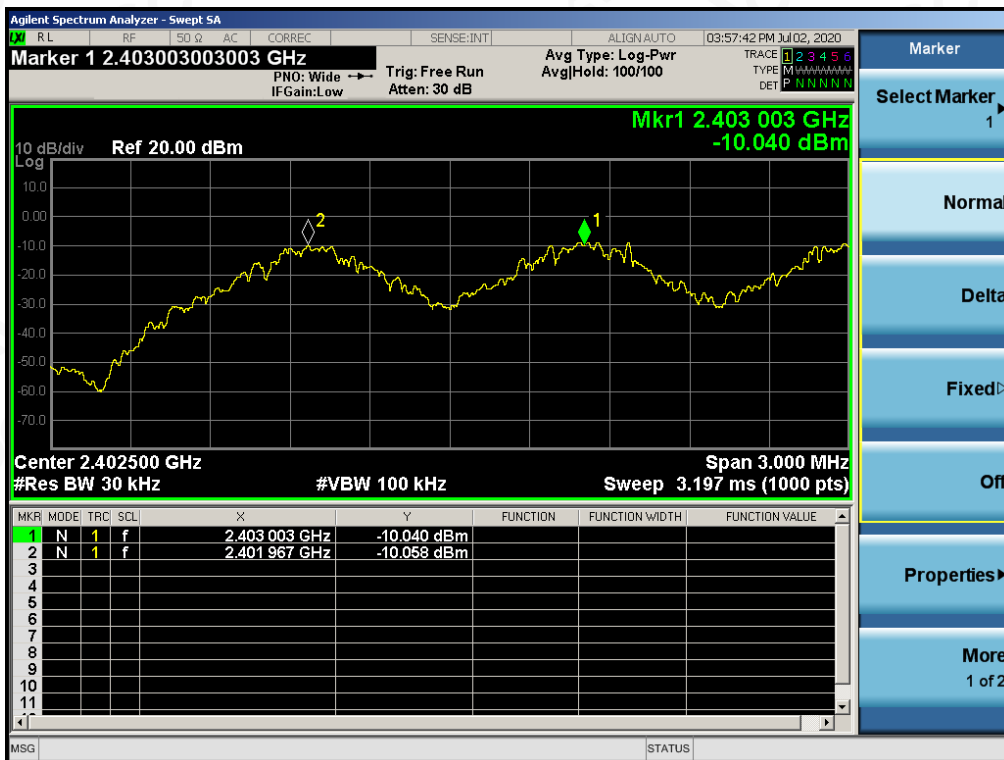
#### 13.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6.3

#### 13.4. LIMITS AND MEASUREMENT RESULT

CHANNEL	CHANNEL SEPARATION	LIMIT	RESULT
	MHz	KHz	
CH01-CH02	1.006	20 dB BW	Pass

TEST PLOT FOR FREQUENCY SEPARATION



Note: The GFSK modulation is the worst case and recorded in the report.

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## 14. FCC LINE CONDUCTED EMISSION TEST

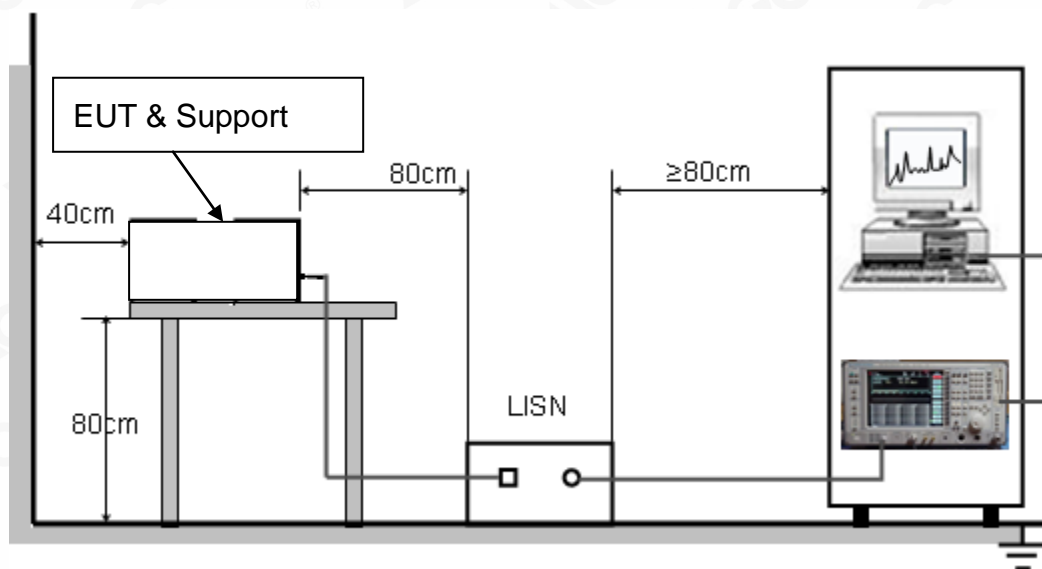
### 14.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.( dBuV)	Average( dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note: 1. The lower limit shall apply at the transition frequency.

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

### 14.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



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#### 14.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC charging voltage by adapter which received AC120V/60Hz power by a LISN.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

#### 14.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

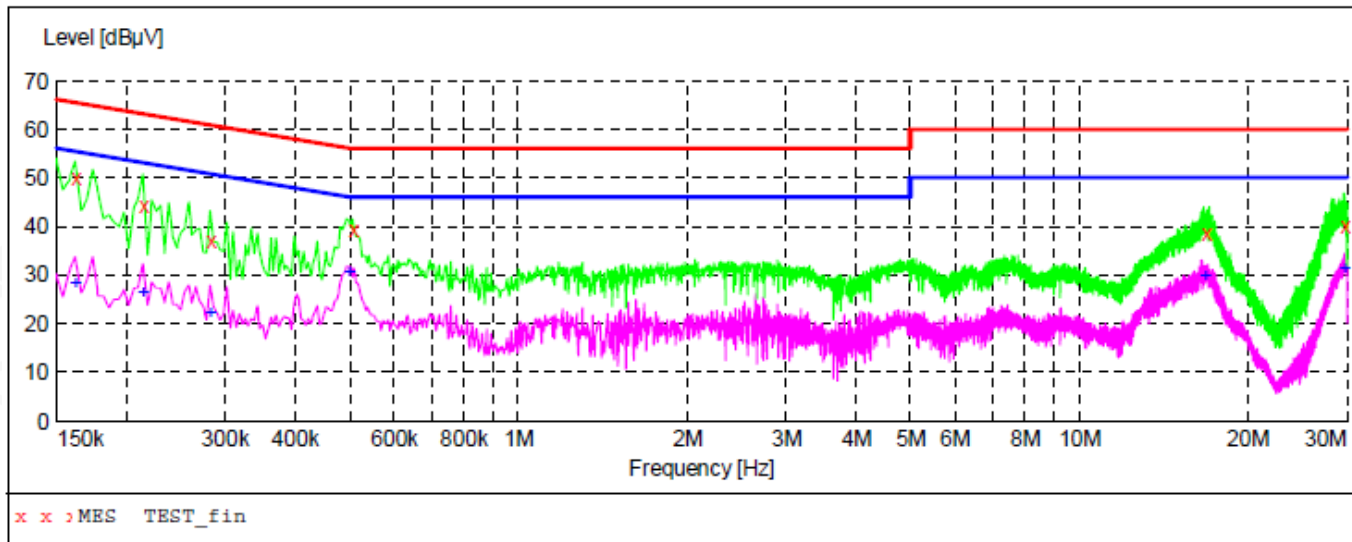
1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

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**14.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST**

Line Conducted Emission Test Line 1-L



**MEASUREMENT RESULT: "TEST\_fin"**

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.162000	49.90	10.3	65	15.5	QP	L1	FLO
0.214000	44.20	10.3	63	18.8	QP	L1	FLO
0.282000	37.00	10.2	61	23.8	QP	L1	FLO
0.506000	39.20	10.3	56	16.8	QP	L1	FLO
16.802000	38.40	10.9	60	21.6	QP	L1	FLO
29.654000	40.10	11.2	60	19.9	QP	L1	FLO

**MEASUREMENT RESULT: "TEST\_fin2"**

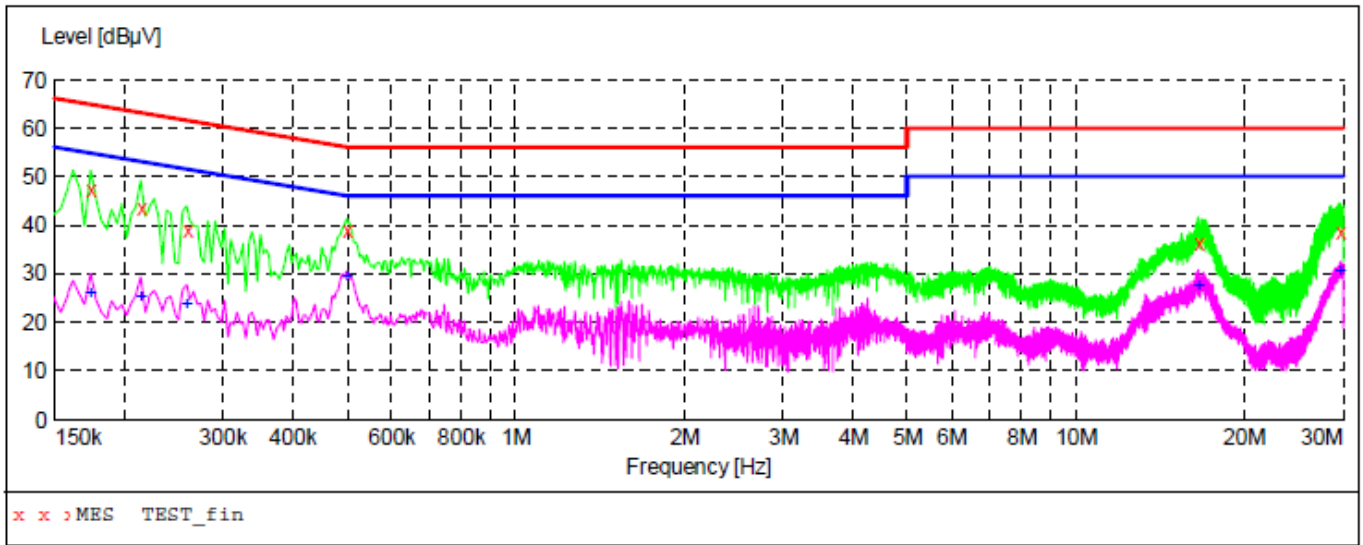
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.162000	28.30	10.3	55	27.1	AV	L1	FLO
0.214000	26.50	10.3	53	26.5	AV	L1	FLO
0.282000	22.40	10.2	51	28.4	AV	L1	FLO
0.498000	30.70	10.3	46	15.3	AV	L1	FLO
16.802000	29.80	10.9	50	20.2	AV	L1	FLO
29.654000	31.30	11.2	50	18.7	AV	L1	FLO

**RESULT: PASS**

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Line Conducted Emission Test Line 2-N



**MEASUREMENT RESULT: "TEST\_fin"**

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.174000	47.50	10.3	65	17.3	QP	N	FLO
0.214000	43.70	10.3	63	19.3	QP	N	FLO
0.258000	38.80	10.2	62	22.7	QP	N	FLO
0.498000	38.80	10.3	56	17.2	QP	N	FLO
16.578000	36.50	10.9	60	23.5	QP	N	FLO
29.634000	38.60	11.2	60	21.4	QP	N	FLO

**MEASUREMENT RESULT: "TEST\_fin2"**

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.174000	25.90	10.3	55	28.9	AV	N	FLO
0.214000	25.40	10.3	53	27.6	AV	N	FLO
0.258000	23.70	10.2	52	27.8	AV	N	FLO
0.498000	29.60	10.3	46	16.4	AV	N	FLO
16.578000	27.50	10.9	50	22.5	AV	N	FLO
29.634000	30.50	11.2	50	19.5	AV	N	FLO

**RESULT: PASS**

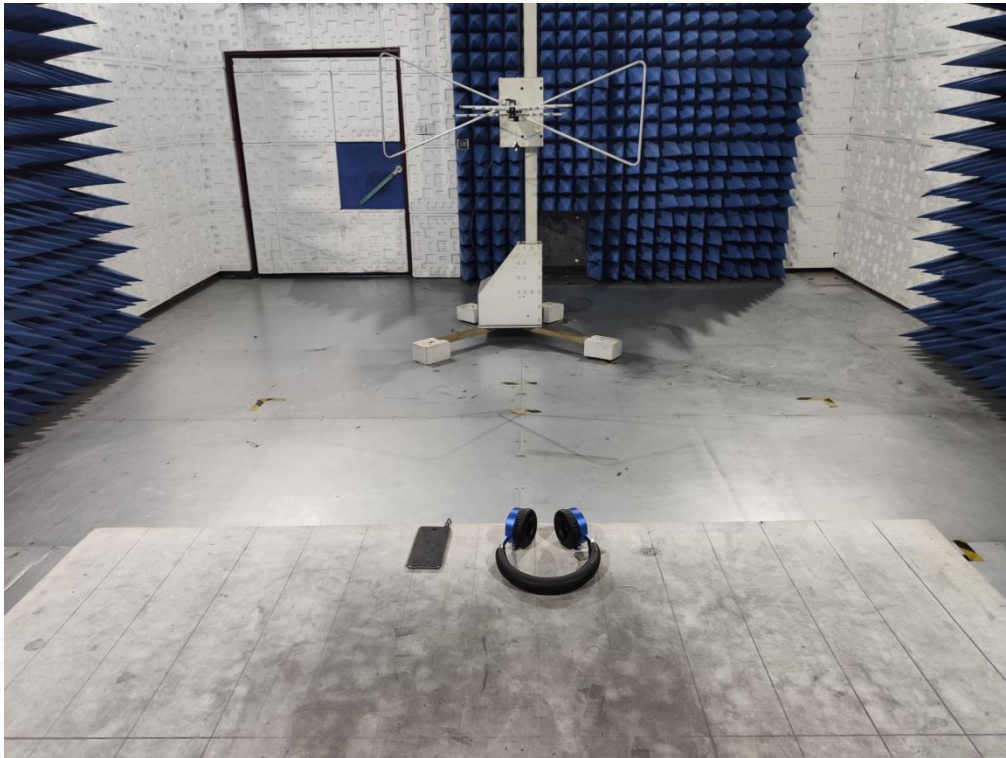
Note: All the test modes had been tested, the mode 1 was the worst case. Only the data of the worst case would be record in this test report.

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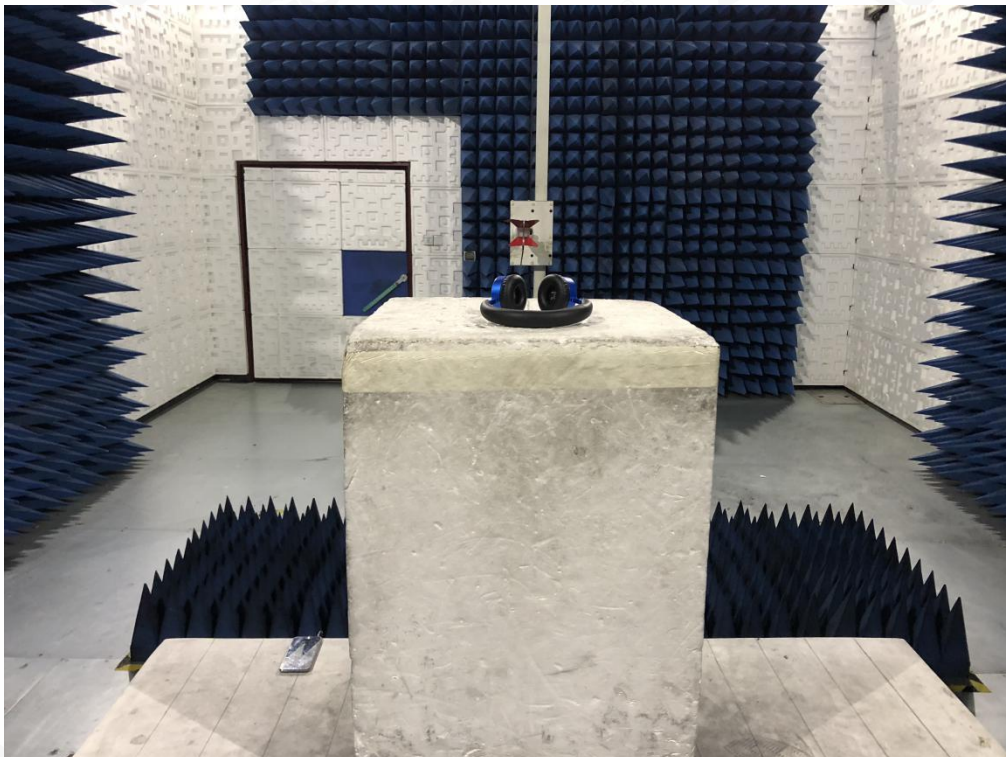


### APPENDIX A: PHOTOGRAPHS OF TEST SETUP

#### RADIATED EMISSION TEST SETUP BELOW 1GHZ



#### RADIATED EMISSION TEST SETUP ABOVE 1GHZ



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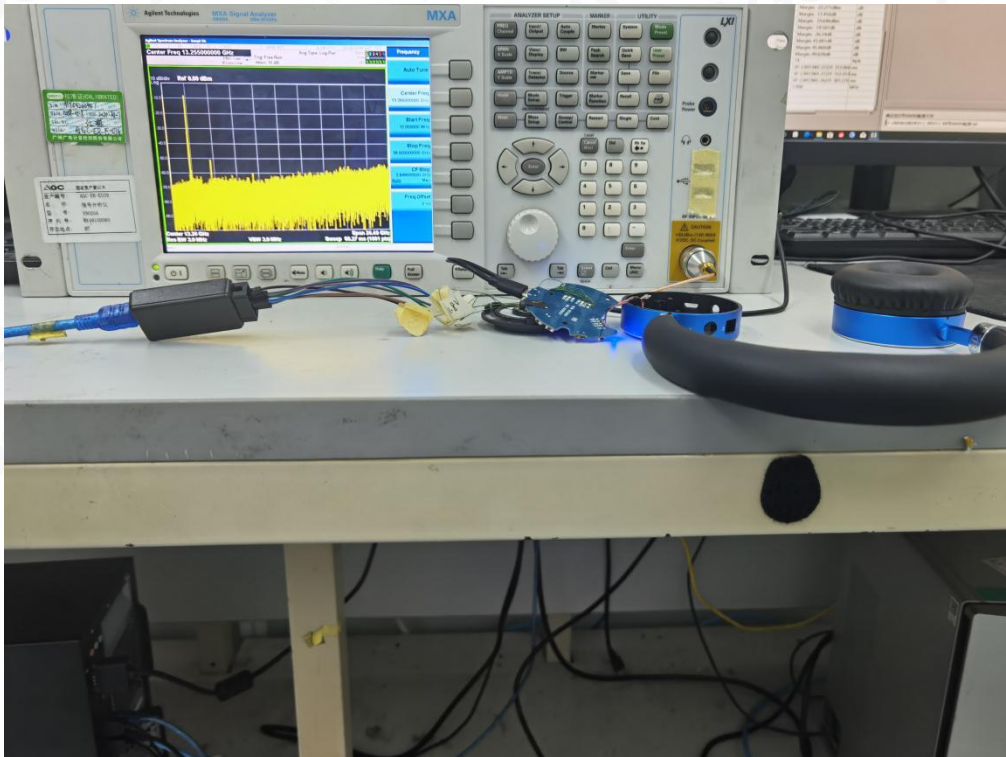
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CONDUCTED EMISSION TEST SETUP



CONDUCTED TEST SETUP



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**APPENDIX B: PHOTOGRAPHS OF EUT**  
ALL VIEW OF EUT



TOP VIEW OF EUT



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**BOTTOM VIEW OFEUT**



**FRONT VIEW OFEUT**



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BACK VIEW OF EUT



LEFT VIEW OF EUT



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RIGHT VIEW OF EUT



VIEW OF EUT(PORT)



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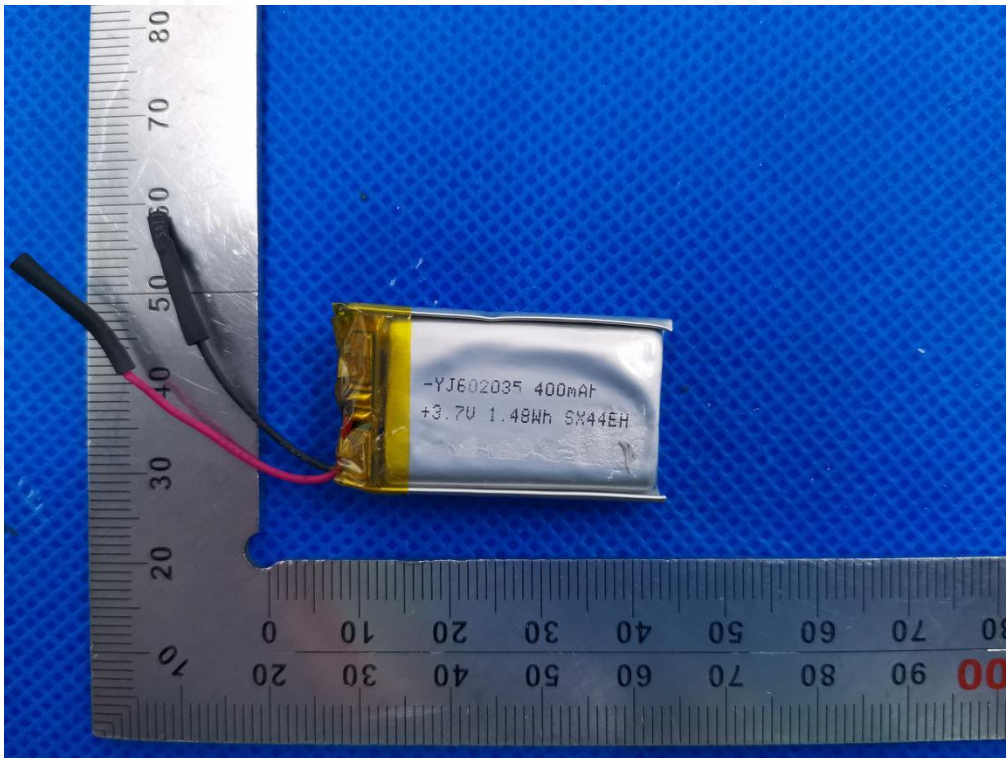
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OPEN VIEW OF EUT



VIEW OF BATTERY

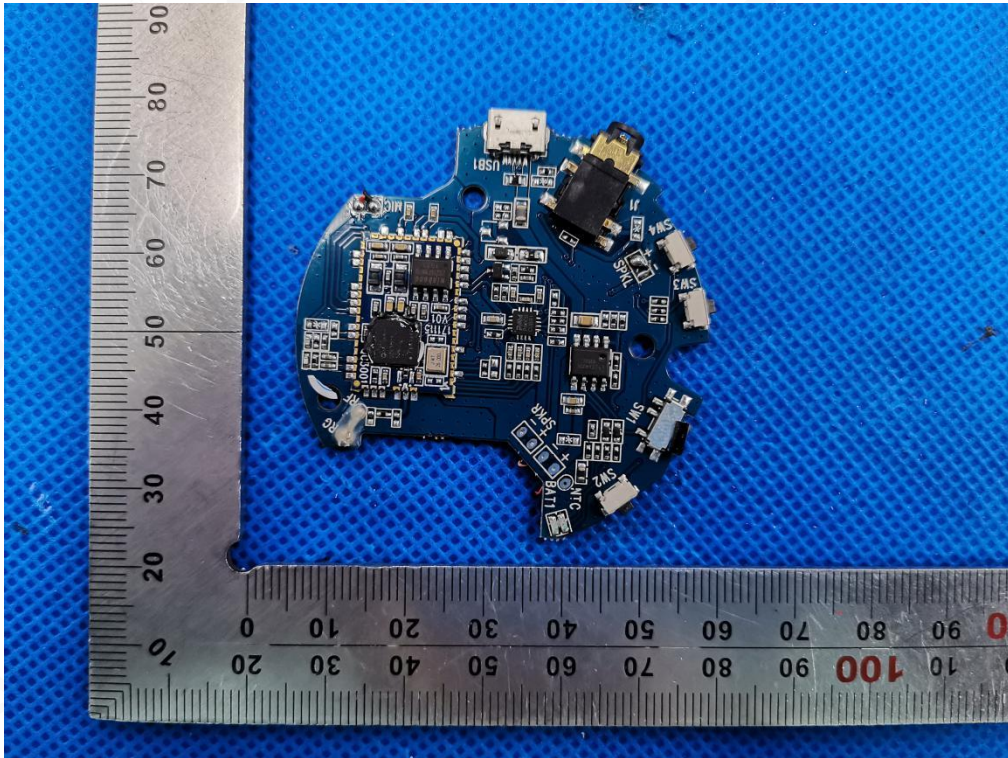


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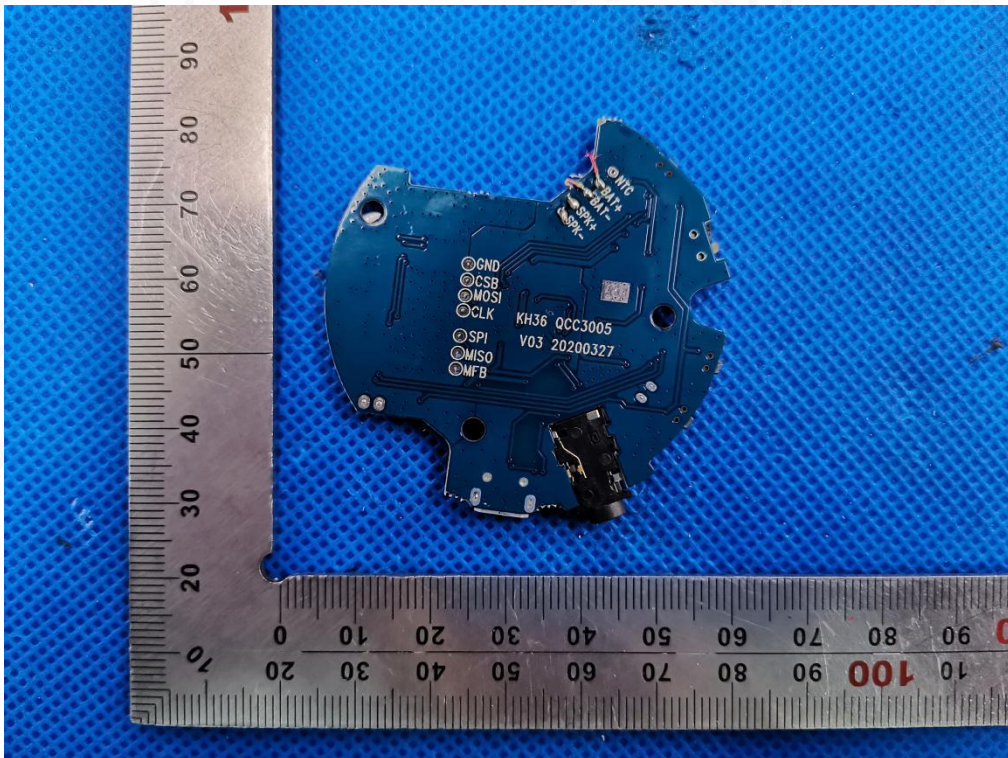
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INTERNAL VIEW-1 OF EUT



INTERNAL VIEW-2 OF EUT

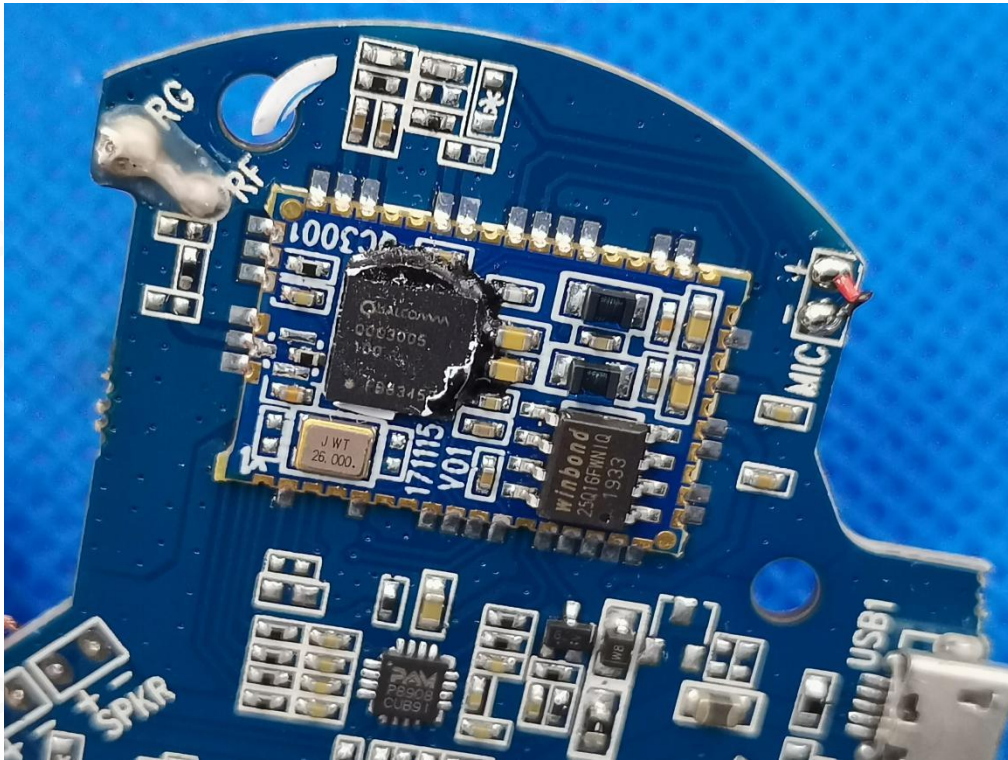


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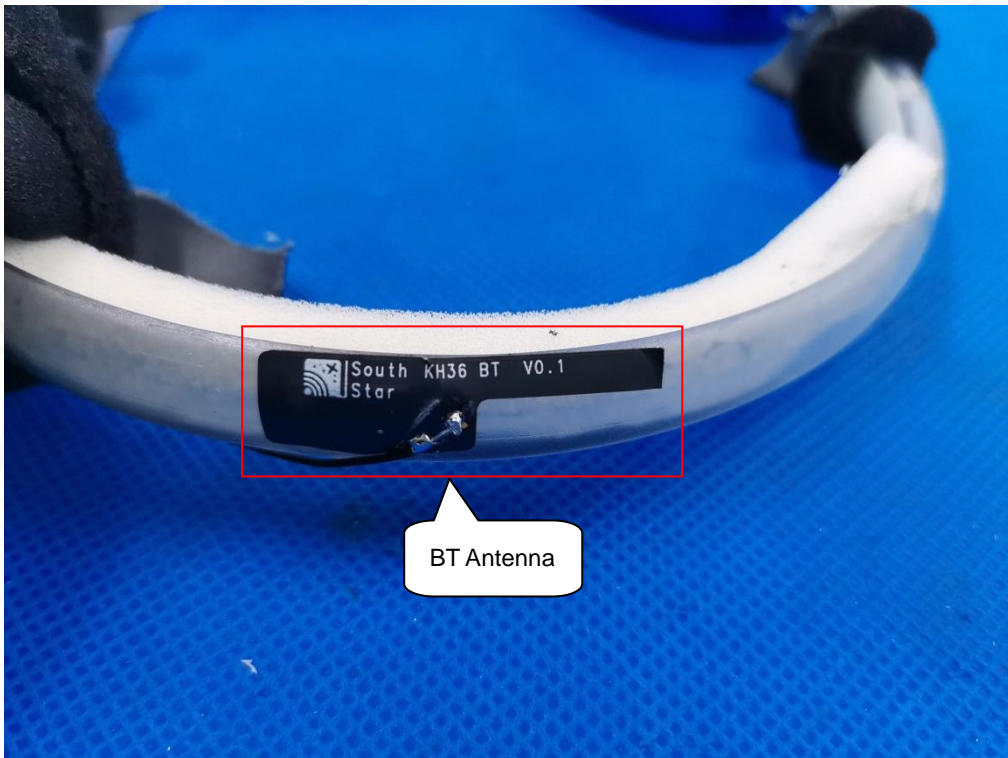
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INTERNAL VIEW-3 OF EUT



INTERNAL VIEW-4 OF EUT



----END OF REPORT----

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