

FCC Test Report

Product Name	PanaCast 50 Remote
Model No.	VRC020

Applicant	GN Audio A/S
Address	Lautrupbjerg 7, 2750 Ballerup, Denmark

Date of Receipt	Jan. 18, 2021
Issued Date	Mar. 05, 2021
Report No.	2110565R-E3032110101
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF or any agency of the government.

The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test Report

Issued Date: Mar. 05, 2021

Report No.: 2110565R-E3032110101



Product Name	PanaCast 50 Remote
Applicant	GN Audio A/S
Address	Lautrupbjerg 7, 2750 Ballerup, Denmark
Manufacturer	GN Audio A/S
Model No.	VRC020
EUT Rated Voltage	DC 3V (Power by Battery)
EUT Test Voltage	DC 3V (Power by Battery)
Trade Name	Jabra
Applicable Standard	FCC CFR Title 47 Part 15 Subpart B ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By : Jinn Chen

(Senior Adm. Specialist / Jinn Chen)

Tested By : Ivan Chuang

(Senior Engineer / Ivan Chuang)

Approved By : 

(Director/ Vincent Lin)

TABLE OF CONTENTS

Description	Page
1. GENERAL INFORMATION	5
1.1. EUT Description	5
1.2. Test System Details	7
1.3. Configuration of Test System	7
1.4. EUT Exercise Software.....	7
1.5. Test Facility.....	8
1.6. List of Test Item and Equipment.....	9
1.7. Uncertainty.....	10
2. Conducted Emission	11
2.1. Test Setup.....	11
2.2. Limits	11
2.3. Test Procedure.....	12
2.4. Test Result of Conducted Emission	13
3. Radiated Emission	14
3.1. Test Setup.....	14
3.2. Limits	15
3.3. Test Procedure.....	16
3.4. Test Result of Radiated Emission	17
4. EMI Reduction Method During Compliance Testing.....	21
Attachment 1: EUT Test Photographs	
Attachment 2: EUT Detailed Photographs	

Revision History

Report No.	Version	Description	Issued Date
2110565R-E3032110101	V1.0	Initial issue of report.	Mar. 05, 2021

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	PanaCast 50 Remote
Trade Name	Jabra
Model No.	VRC020
Frequency Range	2402 – 2480MHz
Number of Channels	V5.1: 40CH
Type of Modulation	V5.1: GFSK(1Mbps)
Antenna Type	PCB antenna
Antenna Gain	Refer to the table “Antenna List”
Channel Control	Auto

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	GN Audio A/S	PanaCast 50 Remote	PCB antenna	2.2dBi for 2.4 GHz

Note: The antenna of EUT is conform to FCC 15.203.

Center Frequency of Each Channel (V5.1):

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00:	2402 MHz	Channel 01:	2404 MHz	Channel 02:	2406 MHz	Channel 03:	2408 MHz
Channel 04:	2410 MHz	Channel 05:	2412 MHz	Channel 06:	2414 MHz	Channel 07:	2416 MHz
Channel 08:	2418 MHz	Channel 09:	2420 MHz	Channel 10:	2422 MHz	Channel 11:	2424 MHz
Channel 12:	2426 MHz	Channel 13:	2428 MHz	Channel 14:	2430 MHz	Channel 15:	2432 MHz
Channel 16:	2434 MHz	Channel 17:	2436 MHz	Channel 18:	2438 MHz	Channel 19:	2440 MHz
Channel 20:	2442 MHz	Channel 21:	2444 MHz	Channel 22:	2446 MHz	Channel 23:	2448 MHz
Channel 24:	2450 MHz	Channel 25:	2452 MHz	Channel 26:	2454 MHz	Channel 27:	2456 MHz
Channel 28:	2458 MHz	Channel 29:	2460 MHz	Channel 30:	2462 MHz	Channel 31:	2464 MHz
Channel 32:	2466 MHz	Channel 33:	2468 MHz	Channel 34:	2470 MHz	Channel 35:	2472 MHz
Channel 36:	2474 MHz	Channel 37:	2476 MHz	Channel 38:	2478 MHz	Channel 39:	2480 MHz

Note:

1. The EUT is a PanaCast 50 Remote with a built-in Bluetooth V5.1 transceiver.
2. This device is a composite device in accordance with Part 15 regulations. The function for the transmitting was measured and made a test report that the report number is 2110565R-E3032110108 certified under FCC ID: BCE-VRC020.

Test Mode	Mode 1: Receive -BLE 1Mbps
-----------	----------------------------

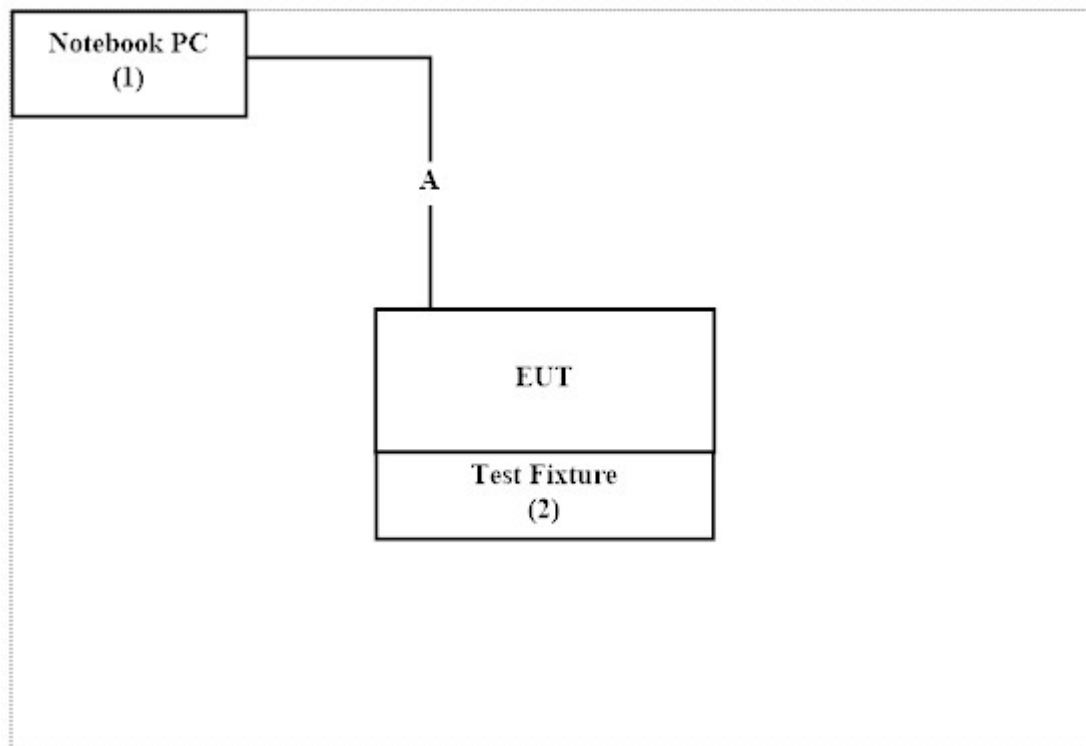
1.2. Test System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 Notebook PC	Lenovo	TP00067C	PF-0EW26J	N/A
2 Test Fixture	GN Audio A/S	Fixture	N/A	N/A

Signal Cable Type	Signal cable Description
A USB Cable	Shielded, 0.9m

1.3. Configuration of Test System



1.4. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.3.
- (2) Execute software "Smart Snippets Toolbox V5.0.12.2786" on the Notebook PC.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Press "OK" to start the continuous Transmit.
- (5) Verify that the EUT works properly.

1.5. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
Radiated Emission	Temperature (°C)	10~40 °C	17.5 °C
	Humidity (%RH)	10~90 %	58.2 %

USA : FCC Registration Number: TW1014

Canada : IC Registration Number: 25880

Site Description : Accredited by TAF
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd
Address : No.159, Sec. 2, Wenhua 1st Rd., Linkou Dist.,
New Taipei City 24457, Taiwan, R.O.C.
Phone number : 886-2-2602-7968
Fax number : 866-2-2602-3286
Email address : info.tw@dekra.com
Website : <http://www.dekra.com.tw>

1.6. List of Test Item and Equipment

For Conduction measurements /ASR1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
	EMI Test Receiver	R&S	ESR7	101601	2020.05.28	2021.05.27
	Two-Line V-Network	R&S	ENV216	101306	2020.03.25	2021.03.24
	Two-Line V-Network	R&S	ENV216	101307	2020.04.17	2021.04.16
	Coaxial Cable	DEKRA	RG400_BNC	RF001	2020.05.24	2021.05.23

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : DEKRA Testing System V2.0

For Radiated measurements /ACB1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
	Loop Antenna	AMETEK	HLA6121	49611	2020.03.16	2021.03.15
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-675	2020.07.20	2021.07.19
X	Horn Antenna	ETS-Lindgren	3117	00201366	2020.09.21	2021.09.20
X	Horn Antenna	Com-Power	AH-840	101087	2020.06.08	2021.06.07
X	Pre-Amplifier	EMCI	EMC001330	980301	2020.06.04	2021.06.03
X	Pre-Amplifier	EMCI	EMC051835SE	980313	2020.11.25	2021.11.24
X	Pre-Amplifier	EMCI	EMC05820SE	980310	2020.06.24	2021.06.23
X	Pre-Amplifier	EMCI	EMC184045SE	980314	2020.06.10	2021.06.09
	Filter	MICRO TRONICS	BRM50702	G251	2020.09.17	2021.09.16
	Filter	MICRO TRONICS	BRM50716	G188	2020.09.17	2021.09.16
X	EMI Test Receiver	R&S	ESR7	101601	2020.05.28	2021.05.27
X	Spectrum Analyzer	R&S	FSV40	101148	2020.03.16	2021.03.15
X	Coaxial Cable	SUHNER	SUCOFLEX 106	RF002	2020.07.03	2021.07.02
X	Mircoflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3381/2	2020.06.10	2021.06.09

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : DEKRA Testing System V2.0

1.7. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document, and is described in each test chapter of this report.

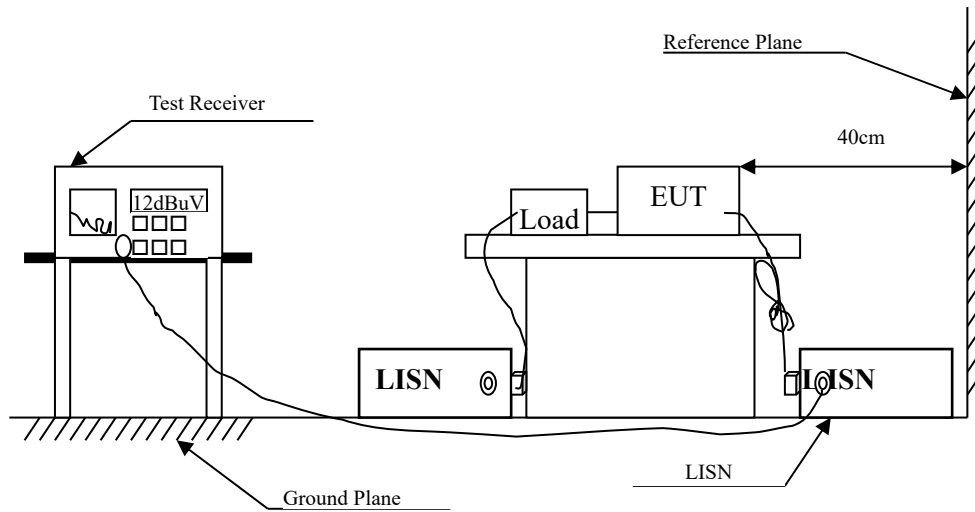
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test item	Uncertainty	
Conducted Emission	± 3.42 dB	
Radiated Emission	Under 1GHz ± 4.06 dB	Above 1GHz ± 3.73 dB

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart B Paragraph 15.107 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.3. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

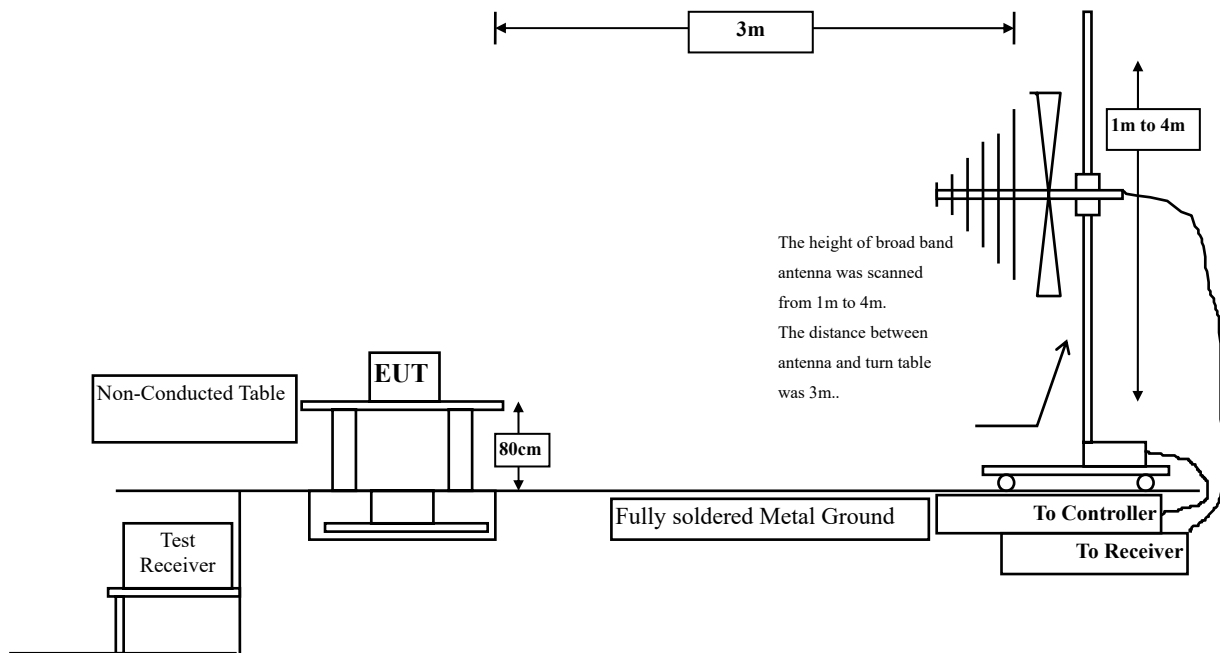
2.4. Test Result of Conducted Emission

Owing to the battery operation of EUT, this test item is not performed.

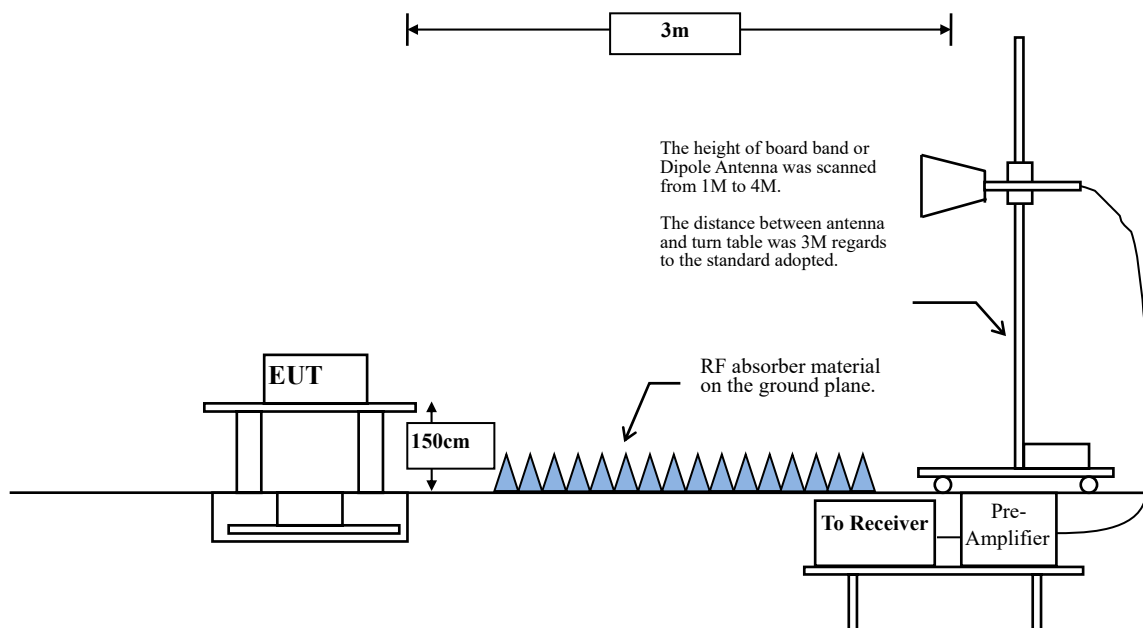
3. Radiated Emission

3.1. Test Setup

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



3.2. Limits

FCC Part 15 Subpart B Paragraph 15.109 Limits		
Frequency MHz	uV/m @3m	dBuV /m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

- Remarks :
1. RF Voltage (dBuV) = $20 \log$ RF Voltage (uV)
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.3. Test Procedure

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table can rotate 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz. Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

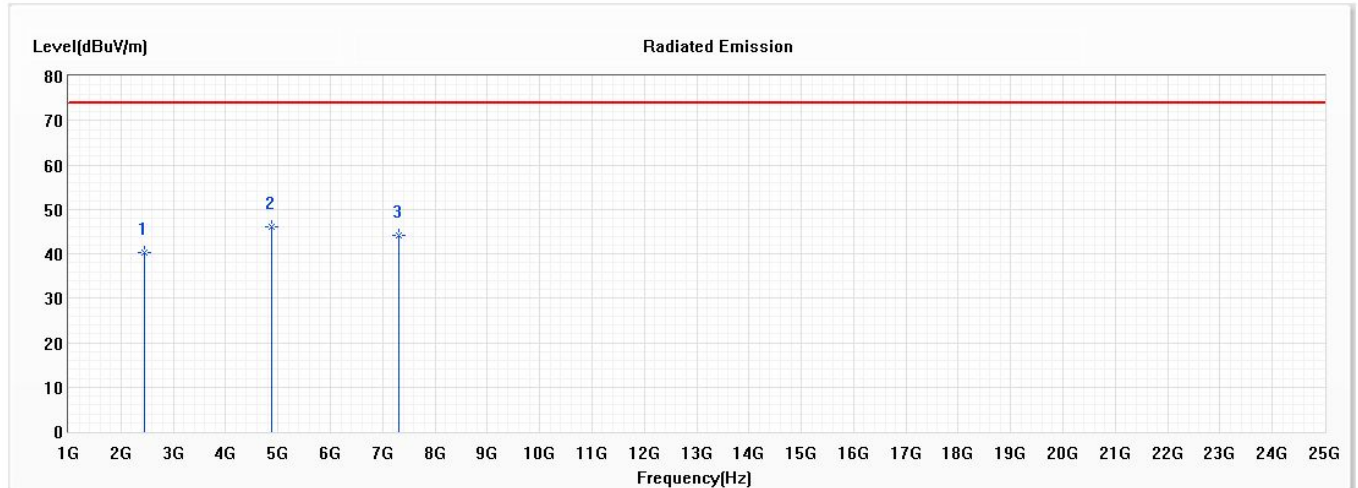
The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The measurement frequency range from 30MHz - 10th Harmonic of fundamental was investigated.

3.4. Test Result of Radiated Emission

Product : PanaCast 50 Remote
 Test Item : Harmonic Radiated Emission
 Test Mode : Mode 1: Receive -BLE 1Mbps (2440MHz)
 Test Date : 2021/02/23

Horizontal



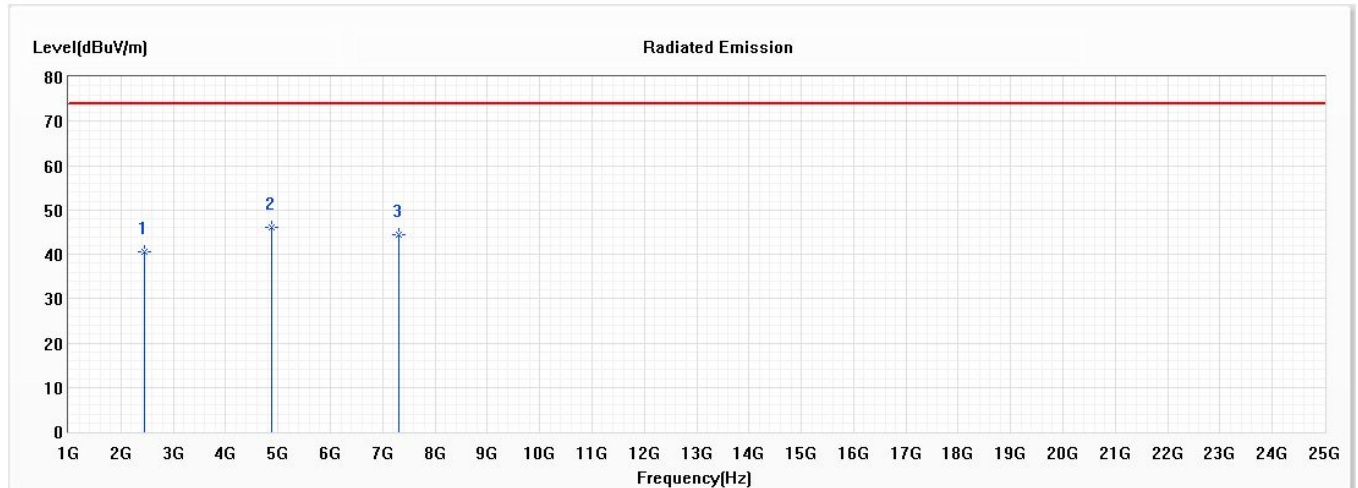
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2440.000	40.37	74.00	-33.63	56.17	-15.80	PK
* 2	4880.000	46.10	74.00	-27.90	59.12	-13.02	PK
3	7320.000	44.27	74.00	-29.73	56.22	-11.95	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Measurement Level = Reading Level + Correct Factor.
4. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
5. The average measurement was not performed when the peak measured data under the limit of average detection.
6. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : PanaCast 50 Remote
 Test Item : Harmonic Radiated Emission
 Test Mode : Mode 1: Receive -BLE 1Mbps (2440MHz)
 Test Date : 2021/02/23

Vertical



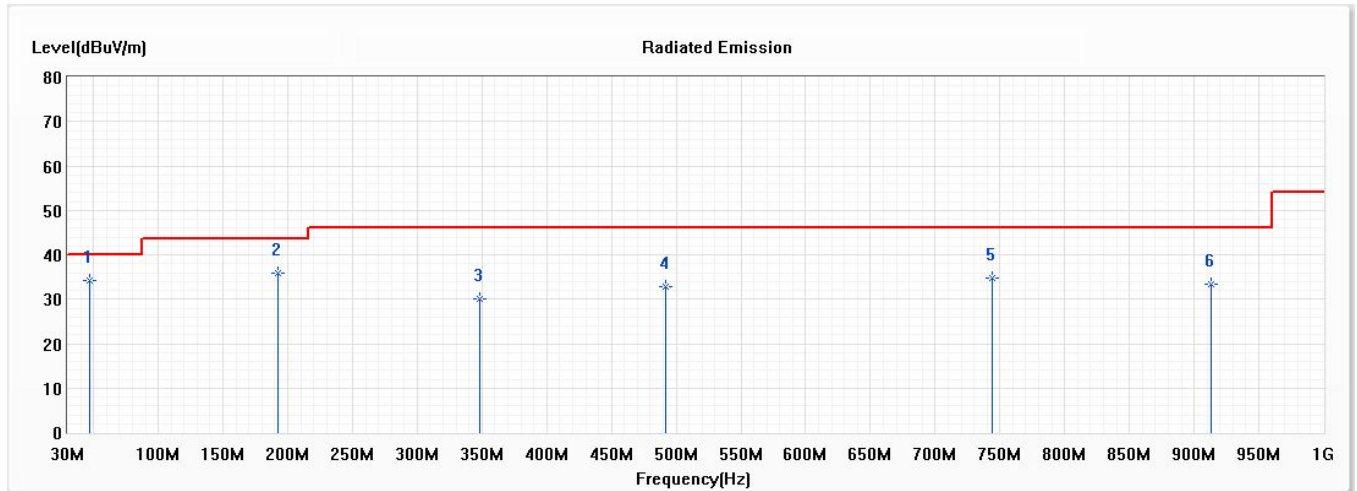
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2440.000	40.59	74.00	-33.41	56.39	-15.80	PK
* 2	4880.000	46.16	74.00	-27.84	59.18	-13.02	PK
3	7320.000	44.29	74.00	-29.71	56.24	-11.95	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Measurement Level = Reading Level + Correct Factor.
4. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
5. The average measurement was not performed when the peak measured data under the limit of average detection.
6. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : PanaCast 50 Remote
 Test Item : General Radiated Emission
 Test Mode : Mode 1: Receive -BLE 1Mbps (2440MHz)
 Test Date : 2021/02/23

Horizontal



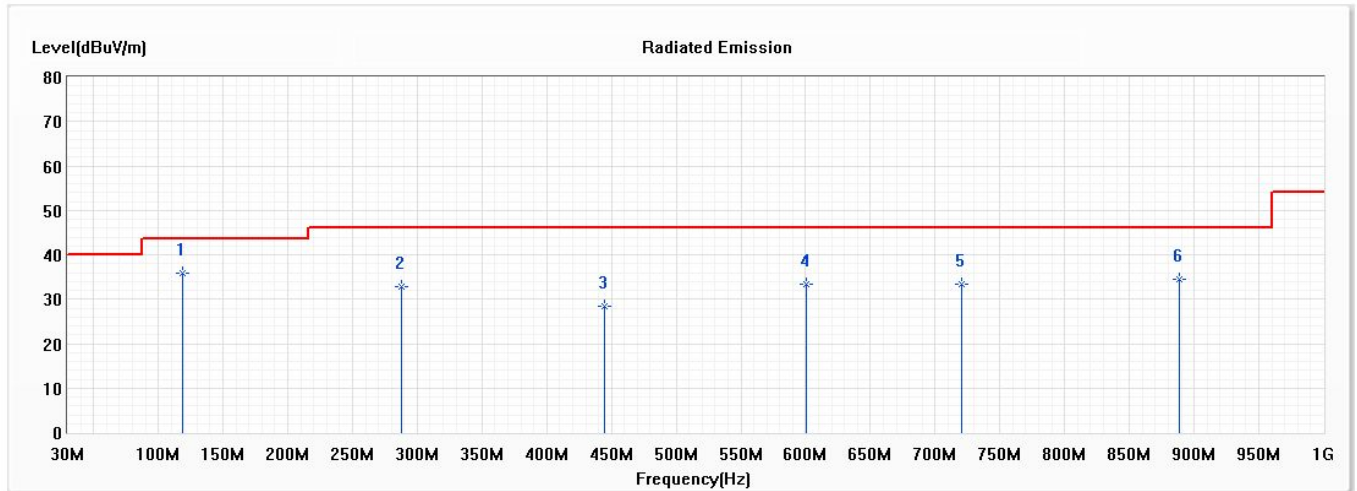
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	47.460	34.16	40.00	-5.84	44.80	-10.64	QP
2	191.990	35.79	43.50	-7.71	48.79	-13.00	QP
3	348.160	29.98	46.00	-16.02	38.65	-8.67	QP
4	491.720	32.88	46.00	-13.12	38.40	-5.52	QP
5	743.920	34.70	46.00	-11.30	36.05	-1.35	QP
6	912.700	33.40	46.00	-12.60	32.64	0.76	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product : PanaCast 50 Remote
 Test Item : General Radiated Emission
 Test Mode : Mode 1: Receive -BLE 1Mbps (2440MHz)
 Test Date : 2021/02/23

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	119.240	35.79	43.50	-7.71	49.08	-13.29	QP
2	288.020	32.83	46.00	-13.17	43.01	-10.18	QP
3	444.190	28.54	46.00	-17.46	34.96	-6.42	QP
4	600.360	33.42	46.00	-12.58	36.68	-3.26	QP
5	720.640	33.41	46.00	-12.59	35.08	-1.67	QP
6	888.450	34.51	46.00	-11.49	34.10	0.41	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

4. EMI Reduction Method During Compliance Testing

No modification was made during testing.