

FCC Test Report

Product Name	Bluetooth Headset
Model No.	HSC040Wa

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

Date of Receipt	Mar. 18, 2022
Issued Date	Apr. 13, 2022
Report No.	2230636R-RFUSOTHV01-A
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.

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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

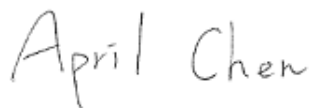
Issued Date: Apr. 13, 2022

Report No.: 2230636R-RFUSOTHV01-A



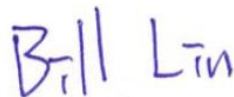
Product Name	Bluetooth Headset
Applicant	GN Audio A/S
Address	Lautrupbjerg 7, 2750 Ballerup, Denmark
Manufacturer	GN Audio A/S
Model No.	HSC040Wa
FCC ID.	BCE-HSC040WA
EUT Rated Voltage	DC 5V by USB or DC 3.7V by Battery
EUT Test Voltage	DC 5V by USB
Trade Name	Jabra
Applicable Standard	FCC CFR Title 47 Part 15 Subpart B ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By :



(Senior Project Specialist / April Chen)

Tested By :



(Senior Engineer / Bill Lin)

Approved By :



(Senior Engineer / Alan Chen)

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Revision History

Report No.	Version	Description	Issued Date
2230636R-RFUSOTHV01-A	V1.0	Initial issue of report.	Apr. 13, 2022

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Bluetooth Headset
Trade Name	Jabra
Model No.	HSC040Wa
FCC ID.	BCE-HSC040WA
Frequency Range	2402 – 2480MHz
Number of Channels	V3.0, V2.1+EDR: 79CH, V5.2: 40CH
Data Speed	1-3Mbps
Type of Modulation	V3.0, V2.1+EDR: GFSK(1Mbps) / π /4DQPSK(2Mbps) / 8DPSK(3Mbps), V5.2: GFSK(1Mbps) (2Mbps)
Antenna Type	PCB Antenna
Antenna Gain	Refer to the table “Antenna List”
Channel Control	Auto
USB dongle	MFR: GN Audio A/S, M/N: END060W
Micro USB B male to USB A male cable	Shielded, 1.5m

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	GN Audio A/S	HSC040Wa	PCB Antenna	2.44dBi for 2.4GHz

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

Center Frequency of Each Channel (Bluetooth V3.0+HS, V2.1+EDR):

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00:	2402 MHz	Channel 20:	2422 MHz	Channel 40:	2442 MHz	Channel 60:	2462 MHz
Channel 01:	2403 MHz	Channel 21:	2423 MHz	Channel 41:	2443 MHz	Channel 61:	2463 MHz
Channel 02:	2404 MHz	Channel 22:	2424 MHz	Channel 42:	2444 MHz	Channel 62:	2464 MHz
Channel 03:	2405 MHz	Channel 23:	2425 MHz	Channel 43:	2445 MHz	Channel 63:	2465 MHz
Channel 04:	2406 MHz	Channel 24:	2426 MHz	Channel 44:	2446 MHz	Channel 64:	2466 MHz
Channel 05:	2407 MHz	Channel 25:	2427 MHz	Channel 45:	2447 MHz	Channel 65:	2467 MHz
Channel 06:	2408 MHz	Channel 26:	2428 MHz	Channel 46:	2448 MHz	Channel 66:	2468 MHz
Channel 07:	2409 MHz	Channel 27:	2429 MHz	Channel 47:	2449 MHz	Channel 67:	2469 MHz
Channel 08:	2410 MHz	Channel 28:	2430 MHz	Channel 48:	2450 MHz	Channel 68:	2470 MHz
Channel 09:	2411 MHz	Channel 29:	2431 MHz	Channel 49:	2451 MHz	Channel 69:	2471 MHz
Channel 10:	2412 MHz	Channel 30:	2432 MHz	Channel 50:	2452 MHz	Channel 70:	2472 MHz
Channel 11:	2413 MHz	Channel 31:	2433 MHz	Channel 51:	2453 MHz	Channel 71:	2473 MHz
Channel 12:	2414 MHz	Channel 32:	2434 MHz	Channel 52:	2454 MHz	Channel 72:	2474 MHz
Channel 13:	2415 MHz	Channel 33:	2435 MHz	Channel 53:	2455 MHz	Channel 73:	2475 MHz
Channel 14:	2416 MHz	Channel 34:	2436 MHz	Channel 54:	2456 MHz	Channel 74:	2476 MHz
Channel 15:	2417 MHz	Channel 35:	2437 MHz	Channel 55:	2457 MHz	Channel 75:	2477 MHz
Channel 16:	2418 MHz	Channel 36:	2438 MHz	Channel 56:	2458 MHz	Channel 76:	2478 MHz
Channel 17:	2419 MHz	Channel 37:	2439 MHz	Channel 57:	2459 MHz	Channel 77:	2479 MHz
Channel 18:	2420 MHz	Channel 38:	2440 MHz	Channel 58:	2460 MHz	Channel 78:	2480 MHz
Channel 19:	2421 MHz	Channel 39:	2441 MHz	Channel 59:	2461 MHz		

Center Frequency of Each Channel (Bluetooth V5.2):

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 Bluetooth Headset with a built-in Bluetooth V5.2 、 V3.0+HS,V2.1+EDR transceiver.
2. Regarding to the operation frequency band, the lowest, middle, and highest frequency are selected to perform the test.
3. Mono and Stereo headsets are different in the amount of the speaker only. Their Bluetooth chip and antenna is completely the same, while the duo left-hand side only holds additional beads, protection-diodes, and another speaker.
4. DEKRA has evaluated each test mode. Only the worst case is shown in the report.
5. 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 2230636R-RFUSBLEV01-A, 2230636R-RFUSBT2V01-A, certified under FCC ID: BCE-HSC040WA.

Test Mode	Mode 1: Receive - Bluetooth - 3Mbps
	Mode 2: Receive - BLE- 2Mbps

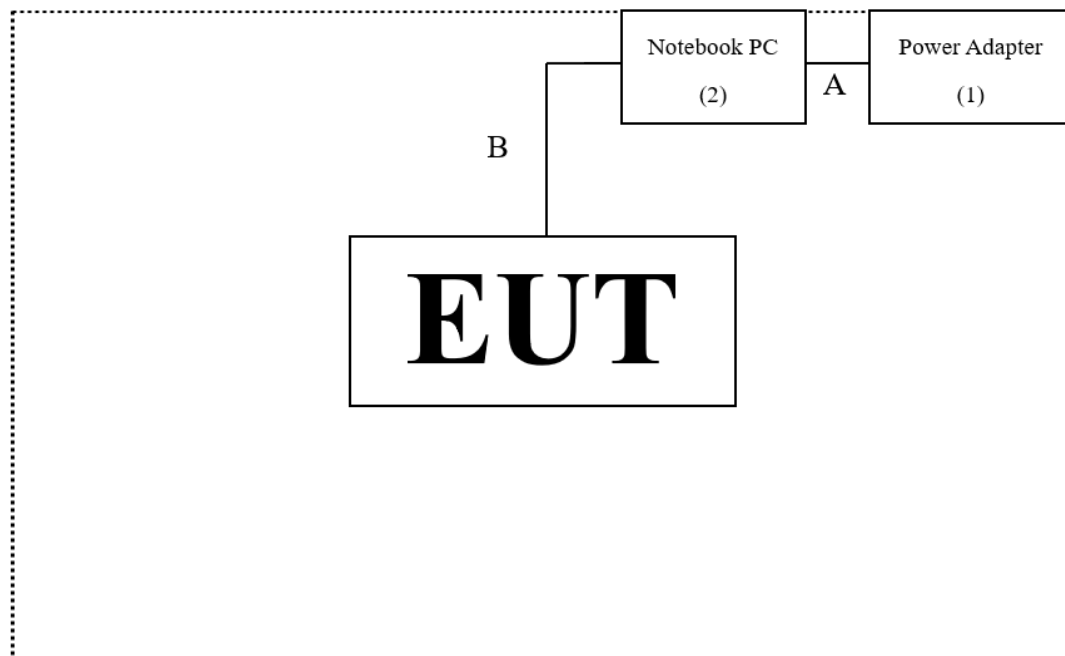
1.2. Test System Details

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 Power Adapter	LITEON	LA90PM130	N/A	N/A
2 Notebook PC	DELL	Latitude E5440	74BTK32	N/A

Signal Cable Type	Signal cable Description
A Power Cable	Non-shielded, 1.8m
B Micro USB B male to USB A male cable	Shielded, 1.5m

1.3. Configuration of Test System



1.4. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.3.
- (2) Execute software "BlueTest3 Version 3.3.6" on the EUT.
- (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
Conducted Emission	Temperature (°C)	10~40 °C	20.4 °C
	Humidity (%RH)	10~90 %	61.4 %
Radiated Emission	Temperature (°C)	10~40 °C	23.0 °C
	Humidity (%RH)	10~90 %	63.0 %

USA : FCC Registration Number: TW0033

Canada : CAB Identifier Number: TW3023 / Company Number: 26930

Site Description : Accredited by TAF
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd
Address : No. 5-22, Ruishukeng Linkou District, New Taipei City,
24451, Taiwan

Performed Location : No. 26, Huaya 1st Rd., Guishan Dist., Taoyuan City
333411, Taiwan, R.O.C.

Phone number : +886-3-275-7255
Fax number : +866-3-327-8031
Email address : info.tw@dekra.com
Website : <http://www.dekra.com.tw>

1.6. List of Test Item and Equipment

For Conduction measurements /SH1

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
X	EMI Test Receiver	R&S	ESR7	101601	2021.06.19	2022.06.18
X	Two-Line V-Network	R&S	ENV216	101306	2021.04.08	2022.04.07
X	Two-Line V-Network	R&S	ENV216	101307	2021.05.04	2022.05.03
X	Coaxial Cable	SUHNER	RG400 BNC	RF001	2021.05.24	2022.05.23

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 : AUDIX e3 V9.

For Conducted measurements /SH2

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
	Spectrum Analyzer	R&S	FSV30	103466	2021.12.27	2022.12.26
	Spectrum Analyzer	Keysight	N9030B	MY56320509	2021.08.06	2022.08.05
	Peak Power Analyzer	KEYSIGHT	8900B	MY51000539	2021.06.07	2022.06.06
	Power Sensor	KEYSIGHT	N1923A	MY59240002	2021.05.17	2022.05.16
	Power Sensor	KEYSIGHT	N1923A	MY59240003	2021.05.17	2022.05.16

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 Conduction Test System V9.0.5

For Radiated measurements / 966-1

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
X	Loop Antenna	AMETEK	HLA6121	56736	2021.04.14	2022.04.13
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-675	2021.08.10	2022.08.09
X	Horn Antenna	ETS-Lindgren	3117	00201259	2021.11.09	2022.11.08
X	Horn Antenna	Com-Power	AH-840	101101	2021.11.30	2022.11.29
X	Pre-Amplifier	SGH	SGH0301	20211007-7	2022.02.22	2023.02.21
X	Pre-Amplifier	EMCI	EMC051835SE	980312	2022.02.22	2023.02.21
X	Pre-Amplifier	EMCI	EMC05820SE	980362	2021.08.24	2022.08.23
X	Pre-Amplifier	EMCI	EMC184045SE	980369	2021.04.27	2022.04.26
	Coaxial Cable	EMCI	EMC102-KM-KM-600	1160314		
	Coaxial Cable	EMCI	EMC102-KM-KM-7000	170242		
X	Filter	MICRO TRONICS	BRM50702	G251	2021.09.16	2022.09.15
	Filter	MICRO TRONICS	BRM50716	G188	2021.09.16	2022.09.15
X	EMI Test Receiver	R&S	ESR	102792	2021.12.15	2022.12.14
X	Spectrum Analyzer	R&S	FSV3044	101113	2022.01.25	2023.02.24
X	Coaxial Cable	SUHNER	SUCOFLEX 106	25450/6	2022.03.05	2023.03.04
	Coaxial Cable	SGH	HA800	GD20110222-8		
	Coaxial Cable	SGH	SGH18	2021003-8		
	Coaxial Cable	EMCI	EMC106	151113		

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 : AUDIX e3 V9.

1.7. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document.

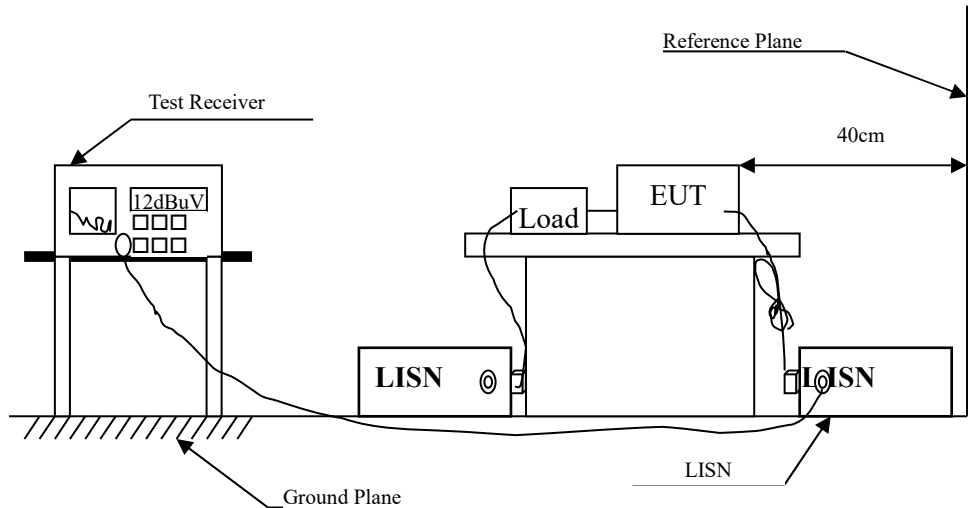
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

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 invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

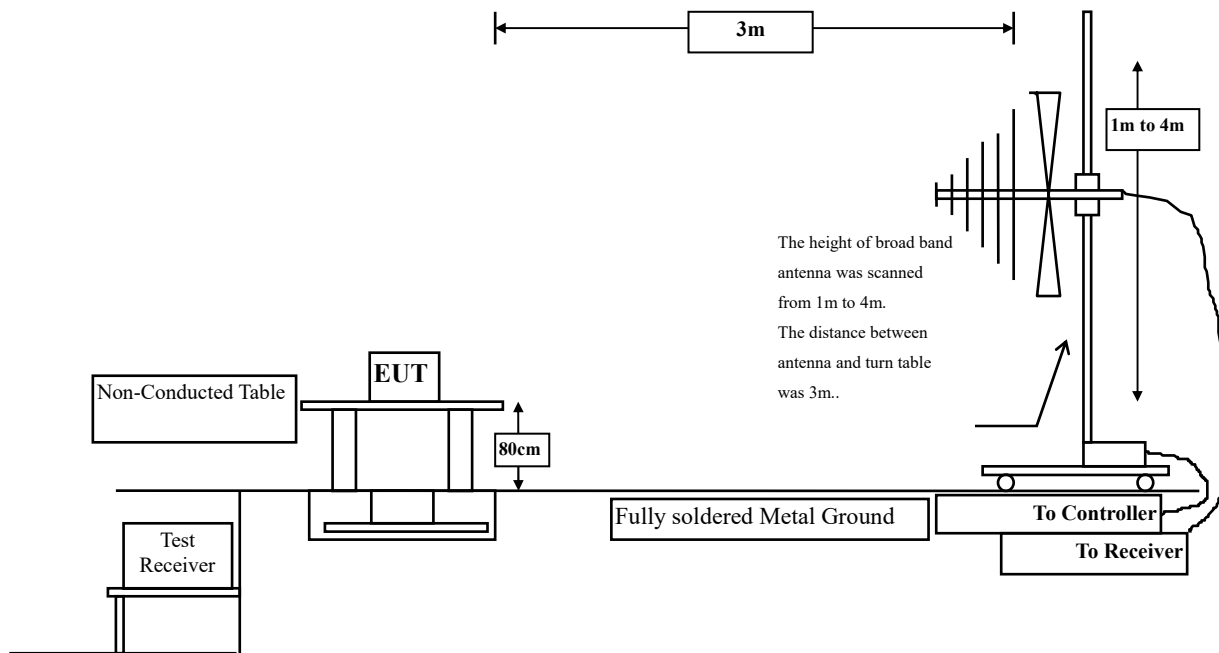
2.4. Test Result of Conducted Emission



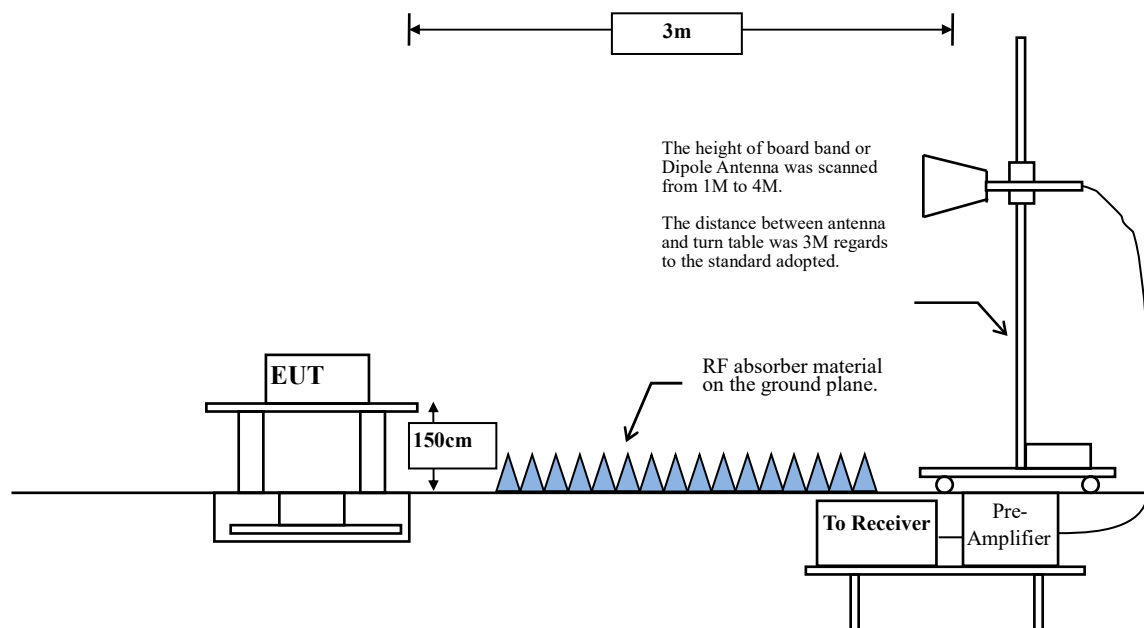
3. Radiated Emission

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.

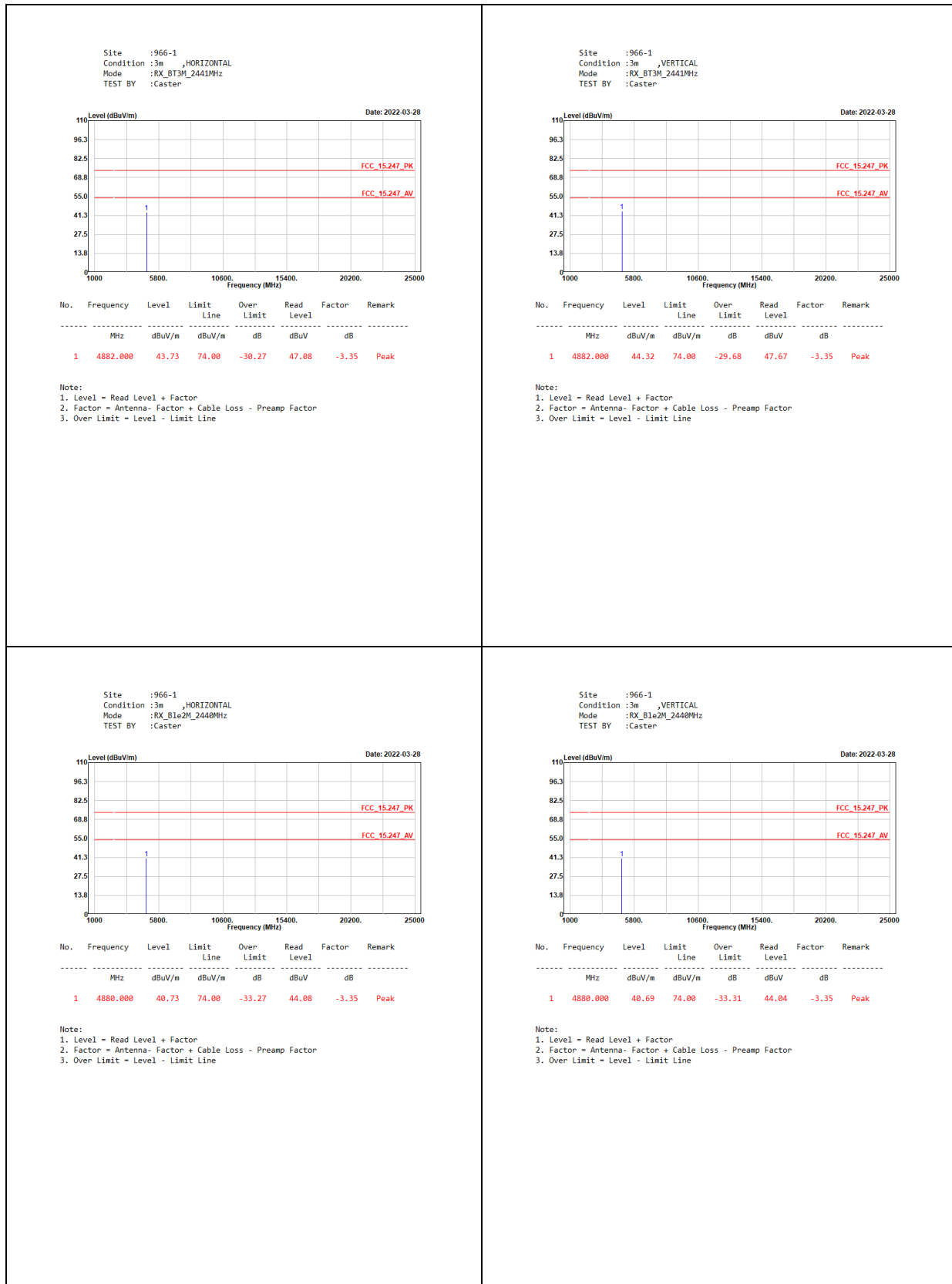
The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz. Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

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

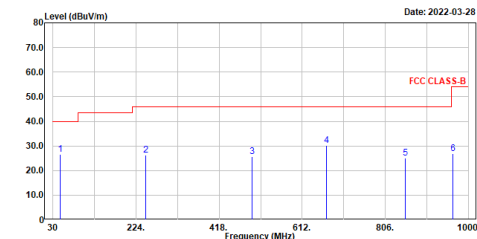
The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the 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



Site :966-1
Condition :3m ,HORIZONTAL
Mode :RX_BT3M_2441MHz
TEST BY :Caster

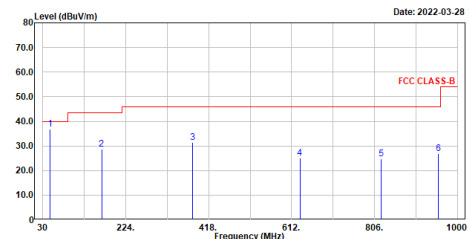


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	46.490	26.49	40.00	-13.51	50.29	-23.80	QP
2	247.280	26.23	46.00	-19.77	51.53	-25.30	QP
3	494.630	25.81	46.00	-20.19	44.51	-18.70	QP
4	668.260	30.33	46.00	-15.67	45.67	-15.34	QP
5	852.560	25.04	46.00	-20.96	37.97	-12.93	QP
6	964.110	26.92	54.00	-27.08	38.51	-11.59	QP

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.

Site :966-1
Condition :3m ,VERTICAL
Mode :RX_BT3M_2441MHz
TEST BY :Caster

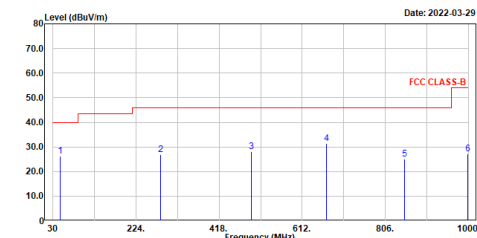


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	46.490	36.88	40.00	-3.12	60.68	-23.80	QP
2	167.740	28.69	43.50	-14.81	52.92	-24.23	QP
3	381.140	31.29	46.00	-14.71	52.67	-21.38	QP
4	631.400	24.93	46.00	-21.07	40.68	-15.75	QP
5	821.520	24.72	46.00	-21.28	37.98	-13.26	QP
6	955.380	26.97	46.00	-19.03	38.65	-11.68	QP

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.

Site :966-1
Condition :3m ,HORIZONTAL
Mode :RX_812m_2440MHz
TEST BY :Caster

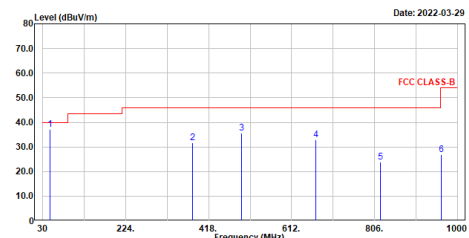


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	47.460	26.32	40.00	-13.68	50.15	-23.83	QP
2	282.200	26.88	46.00	-19.12	50.87	-23.99	QP
3	492.690	28.18	46.00	-17.82	46.94	-18.76	QP
4	668.260	31.43	46.00	-14.57	46.77	-15.34	QP
5	850.620	25.06	46.00	-20.94	38.02	-12.96	QP
6	998.060	27.09	54.00	-26.91	38.58	-11.49	QP

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.

Site :966-1
Condition :3m ,VERTICAL
Mode :RX_812m_2440MHz
TEST BY :Caster



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	46.490	37.15	40.00	-2.85	60.95	-23.80	QP
2	381.140	31.74	46.00	-14.26	53.12	-21.38	QP
3	494.630	35.72	46.00	-10.28	54.42	-18.70	QP
4	668.260	32.91	46.00	-13.09	48.25	-15.34	QP
5	819.580	23.93	46.00	-22.07	37.20	-13.27	QP
6	962.170	26.99	54.00	-27.01	38.58	-11.59	QP

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.

4. EMI Reduction Method During Compliance Testing

No modification was made during testing.