FCC Test Report
(Class II Permissive Change)

Product Name	Realtime radio module
Model No.	TM4969
FCC ID.	2AHCI-TM4969

Applicant	TOYOTA TECHNICAL DEVELOPMENT CORPORATION
Address	1-9 Imae,Hanamoto-cho,Toyota Aichi, 470-0334 Japan

Date of Receipt	Jan. 25, 2021
Issued Date	Mar, 02, 2021
Report No.	2110805R-E3032700115
Report Version	V1.0

Testing Laboratory
3023

Test Report

Issued Date: Mar, 02, 2021
Report No.: 2110805R-E3032700115

Product Name	Realtime radio module
Applicant	TOYOTA TECHNICAL DEVELOPMENT CORPORATION
Address	1-9 Imae,Hanamoto-cho,Toyota Aichi, 470-0334 Japan
Manufacturer	Keitsu Electronic Co., Ltd.
Model No.	TM4969
FCC ID.	2AHCI-TM4969
Host Rated Voltage	DC 12V (Power by PoE)
Host Test Voltage	AC 120V/60Hz
Trade Name	TTDC
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By : Anita Chou

(Senior Engineering Adm. Specialist / Anita Chou)

Tested By : Tom Hsieh

(Manager, Product Testing / Tom Hsieh)

Approved By :

(Director / Vincent Lin)

Revision History

Report No.	Version	Description	Issued Date
2110805R-E3032700115	V1.0	Initial issue of report.	2021-03-02

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Realtime radio module
Trade Name	TTDC
Model No.	TM4969
FCC ID.	2AHCI-TM4969
Frequency Range	2402 – 2479MHz
Channel Number	78
Type of Modulation	GFSK
Antenna Type	Patch Antenna
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”

Antenna List

No.	Manufacturer	Product No.	Antenna Type	Peak Gain
1	NATEC	PA2409S	Patch Antenna	8.1dBi for 2.4 GHz

Note: The EUT has an external antenna connector (SMAP-SMAP), this installed by the professionals.

Center Frequency of Each Channel:

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

Note:

1. The EUT is a Realtime radio module with a built-in GFSK transceiver.
2. The EUT was installed into Wireless VIM Station (Trade name: TTDC, Model Name: TM4875B) during test.
3. This Wireless VIM Station uses two identical Realtime radio modules (FCC ID: 2AHCI-TM4969)
4. These tests were conducted on a sample for the purpose of demonstrating compliance of GFSK transmitter with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
5. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
6. This is to request a Class II permissive change for FCC ID: 2AHCI-TM4969, originally granted on 03/11/2016.

   The major change filed under this application is:

   Change #1:

   Addition of a new host configuration. These are no changes to the hardware or the software of the module.

Test Mode	Mode 1: Transmit - Antenna1 Mode 2: Transmit - Antenna2

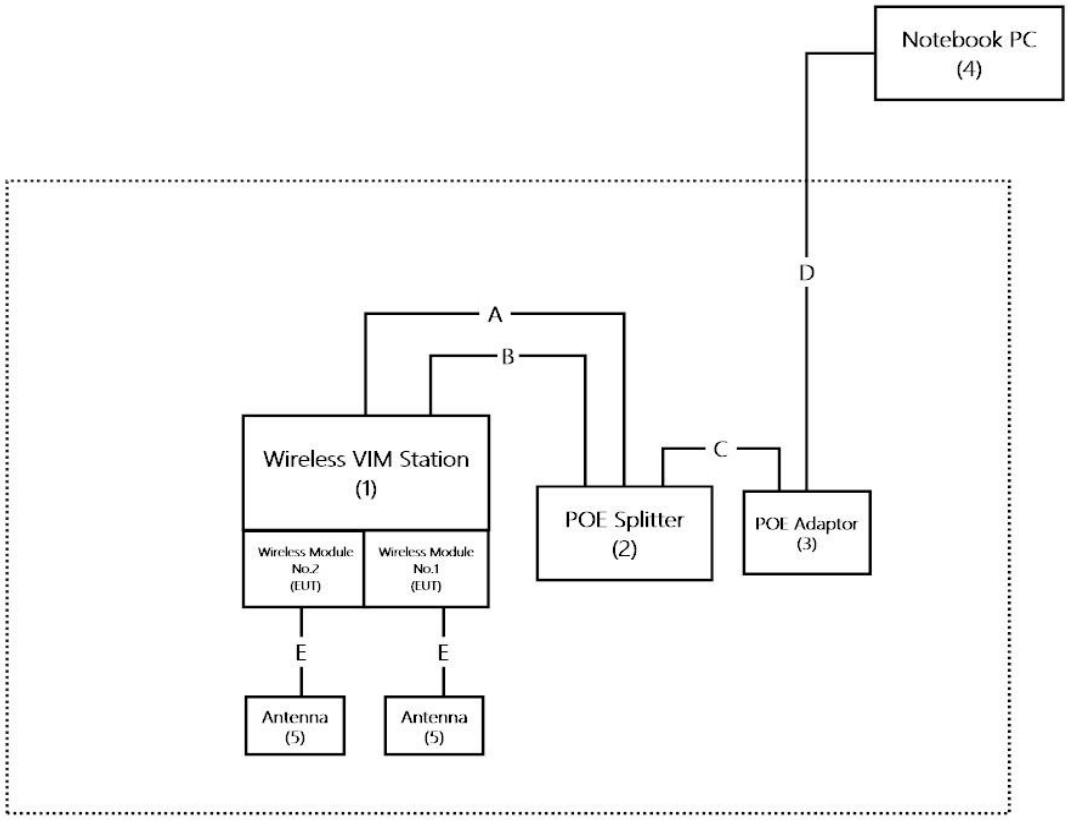
1.2. Tested System Details

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	Wireless VIM Station	TOYOTA TECHNICAL DEVELOPMENT CORPORATION	TM4875B	N/A	N/A
2	POE Splitter	Digital Data Communications GmbH	N/A	N/A	N/A
3	POE Adaptor	Levelone	POI-2002	N/A	Non-Shielded, 2m
4	Notebook PC	DELL	PPT	N/A	Non-Shielded, 0.8m
5	Antenna	NATEC	PA2409S	N/A	N/A

Signal Cable Type		Signal cable Description
A	Power Out Cable	Non-Shielded, 0.59m
B	LAN Cable	Non-Shielded, 0.52m
C	LAN Cable	Non-Shielded, 0.52m
D	LAN Cable	Non-Shielded, 3m
E	Coaxial Cable	Non-Shielded, 10m, two PCS.

1.3. Configuration of Tested System



1.4. EUT Exercise Software

1. Setup the EUT as shown in Section 1.4.
2. Execute software “ Wireless Test Tool ” on the Notebook PC.
3. Configure the test mode, the test channel.
4. Press “OK” to start the continuous Transmit.
5. Verify that the EUT works properly.

1.5. Test Facility

Ambient conditions in the EMC laboratory:

Performed Item	Items	Required	Actual
Conducted Emission	Temperature (°C)	10~40 °C	19.1 °C
	Humidity (%RH)	10~90 %	56 %
Conductive	Temperature (°C)	10~40 °C	22 °C
	Humidity (%RH)	10~90 %	55 %

Ambient conditions in the Wenlin laboratory:

Performed Item	Items	Required	Actual
Radiated Emission	Temperature (°C)	10~40 °C	20.4 °C
	Humidity (%RH)	10~90 %	68.0 %

EMC laboratory:

USA : FCC Registration Number: TW3023

Canada : Company Number: 4075A

Site Description : Accredited by TAF
Accredited Number: 3023

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

Wenlin laboratory:

USA : FCC Registration Number: TW0031

Canada : Company Number: 26443

Site Description : Accredited by TAF
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd
Address : No. 6, Lane 75, Wenlin St., Linkou Dist., New Taipei City 24457, Taiwan, R.O.C.
Phone number : 886-2-2602-7968
Fax number : 866-2-2602-3286

1.6. List of Test Equipment

For Conduction measurements /SR1 (EMC laboratory)

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	EMI Test Receiver	R&S	ESR3	102041	2020.05.12	2021.05.11
X	LISN	Schwarzback	8226	8226/176	2020.05.29	2021.05.28
	LISN	Schwarzback	8226	8226/177	2020.05.29	2021.05/28
X	LISN	R&S	ESH3-Z5	836679/023	2020.0./07	2021.04.06

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 Conducted measurements /CTR01 (EMC laboratory)

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Spectrum Analyzer	Agilent	N9010A	MY55150401	2020.09.15	2021.09.14
	Spectrum Analyzer	R&S	FSV30	103466	2020.12.28	2021.12.27
X	Power Meter	Anritsu	ML2496A	MY51000539	2020.05.13	2021.05.12
X	Power Sensor	Anritsu	MA2411B	MY59240002	2020.05.22	2021.05.21
X	Power Sensor	Anritsu	MA2411B	MY59240003	2020.05.22	2021.05.21

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 /AC3 (Wenlin laboratory)

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Loop Antenna	AMETEK	HLA6121	49611	2020.03.16	2021.03.15
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	01125	2020.07.20	2021.07.19
X	Horn Antenna	ETS-Lindgren	3117	00227700	2020.09.21	2021.09.20
X	Horn Antenna	Com-Power	AH-840	101087	2020.06.08	2021.06.07
X	Pre-Amplifier	EMCI	EMC330	060736	2020.06.04	2021.06.03
X	Pre-Amplifier	EMCI	PRAMP118	20200701	2020.06.10	2021.06.09
X	Pre-Amplifier	EMCI	PRAMP0510	20200703	2020.09.18	2021.09.17
X	Pre-Amplifier	EMCI	EMC184045SE	980314	2020.06.10	2021.06.09
X	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	101602	2019.12.16	2020.12.15
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. Loop Antenna is calibrated every two years, the other 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.

EMC laboratory:

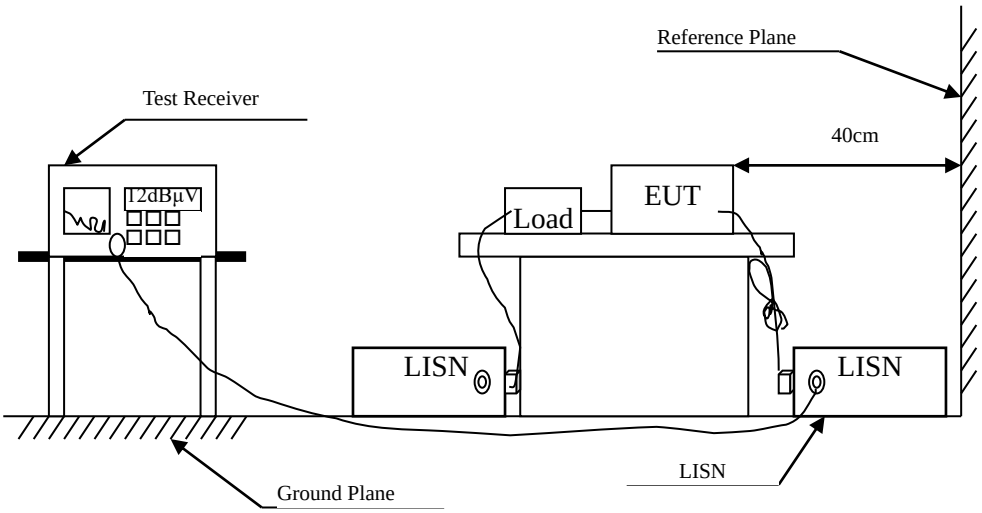
Test item	Uncertainty
Conducted Emission	±3.42 dB
Peak Power Output	±0.91 dB

Wenlin laboratory:

Test item	Uncertainty	
Radiated Emission	Under 1GHz ±4.17 dB	Above 1GHz ±4.22 dB
Band Edge	Under 1GHz ±4.17 dB	Above 1GHz ±4.22 dB

1. Conducted Emission

1.1. Test Setup



1.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBµV) 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.

1.3. Test Procedure

The EUT and Peripherals 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 refer to the block diagram of the test setup and photographs.)

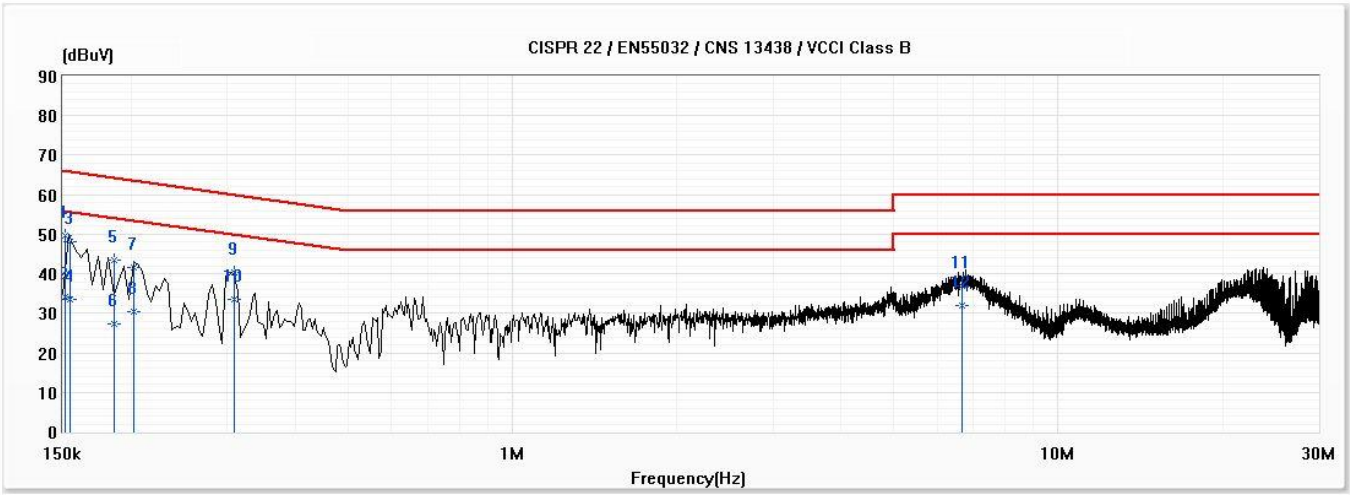
Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

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

The EUT setup and the test procedure are according to ANSI C63.4, 2014 to comply with the requirements of FCC 47CFR Subpart C.

1.4. Test Result of Conducted Emission

Product : Realtime radio module
Test Item : Conducted Emission Test
Power Line : L1
Test Mode : Mode 1: Transmit - Antenna1 (2441MHz)
Test Date : 2021/02/22

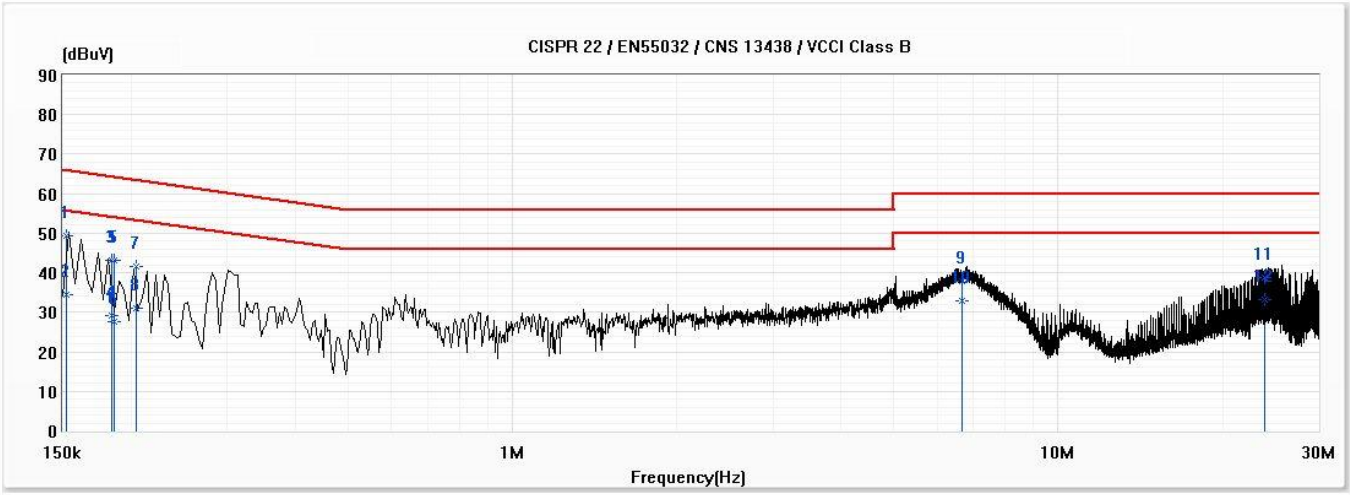


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
*1	0.152	49.71	65.91	-16.21	39.93	9.78	QP
2	0.152	34.21	55.91	-21.70	24.43	9.78	AV
3	0.155	48.21	65.73	-17.52	38.43	9.78	QP
4	0.155	33.37	55.73	-22.36	23.59	9.78	AV
5	0.186	43.44	64.21	-20.77	33.66	9.78	QP
6	0.186	27.45	54.21	-26.76	17.67	9.78	AV
7	0.203	41.59	63.49	-21.90	31.81	9.78	QP
8	0.203	30.40	53.49	-23.09	20.62	9.78	AV
9	0.310	40.33	59.97	-19.64	30.55	9.77	QP
10	0.310	33.52	49.97	-16.45	23.75	9.77	AV
11	6.683	36.90	60.00	-23.10	26.93	9.97	QP
12	6.683	32.04	50.00	-17.96	22.08	9.97	AV

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Product : Realtime radio module
Test Item : Conducted Emission Test
Power Line : N
Test Mode : Mode 1: Transmit - Antenna1 (2441MHz)
Test Date : 2021/02/22

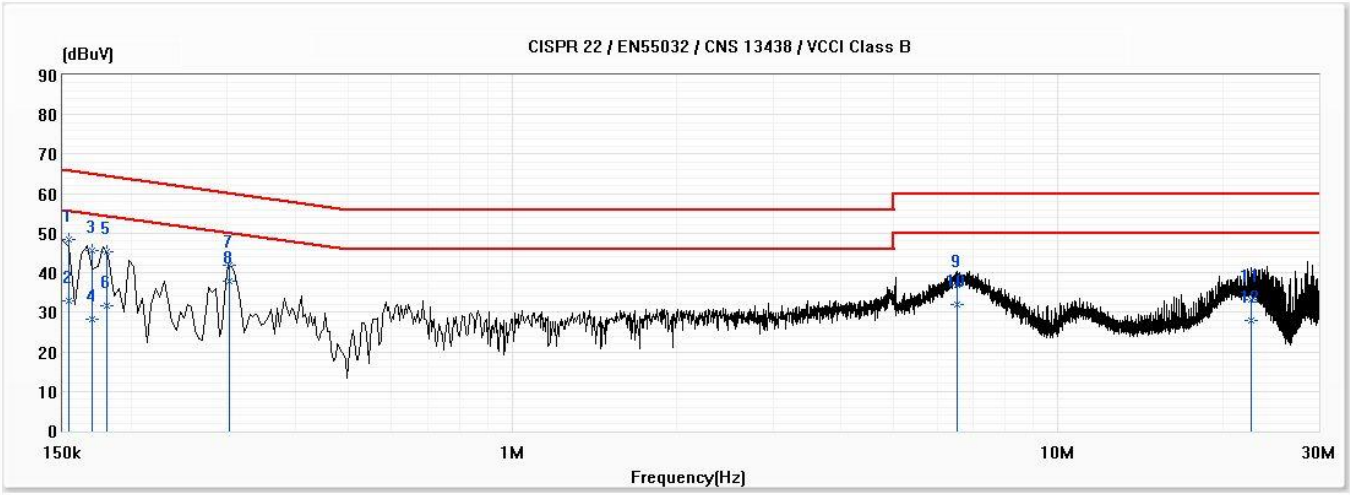


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
*1	0.152	49.44	65.88	-16.44	39.66	9.78	QP
2	0.152	34.33	55.88	-21.55	24.55	9.78	AV
3	0.185	43.20	64.26	-21.07	33.42	9.77	QP
4	0.185	29.25	54.26	-25.01	19.48	9.77	AV
5	0.186	43.24	64.21	-20.98	33.47	9.77	QP
6	0.186	27.61	54.21	-26.60	17.84	9.77	AV
7	0.204	41.51	63.44	-21.93	31.74	9.77	QP
8	0.204	31.11	53.44	-22.33	21.34	9.77	AV
9	6.661	37.96	60.00	-22.04	27.99	9.98	QP
10	6.661	32.91	50.00	-17.09	22.94	9.98	AV
11	23.948	38.64	60.00	-21.36	28.17	10.47	QP
12	23.948	33.25	50.00	-16.75	22.79	10.47	AV

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ * “ means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Product : Realtime radio module
Test Item : Conducted Emission Test
Power Line : L1
Test Mode : Mode 2: Transmit - Antenna2 (2441MHz)
Test Date : 2021/02/22

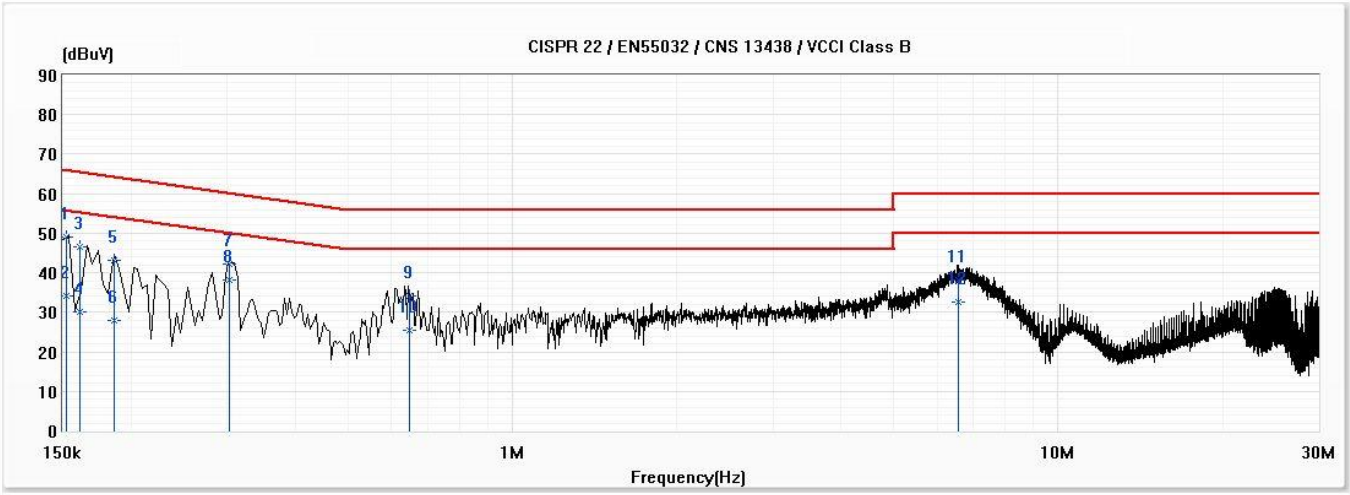


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.154	48.48	65.78	-17.30	38.70	9.78	QP
2	0.154	32.85	55.78	-22.93	23.07	9.78	AV
3	0.170	45.54	64.95	-19.41	35.76	9.78	QP
4	0.170	28.36	54.95	-26.59	18.58	9.78	AV
5	0.180	45.25	64.47	-19.22	35.47	9.78	QP
6	0.180	31.74	54.47	-22.73	21.96	9.78	AV
7	0.303	41.88	60.16	-18.28	32.11	9.77	QP
*8	0.303	37.82	50.16	-12.34	28.05	9.77	AV
9	6.521	36.99	60.00	-23.01	27.03	9.96	QP
10	6.521	31.82	50.00	-18.18	21.86	9.96	AV
11	22.551	33.19	60.00	-26.81	22.91	10.28	QP
12	22.551	27.98	50.00	-22.02	17.70	10.28	AV

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ * “ means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Product : Realtime radio module
Test Item : Conducted Emission Test
Power Line : N
Test Mode : Mode 2: Transmit - Antenna2 (2441MHz)
Test Date : 2021/02/22



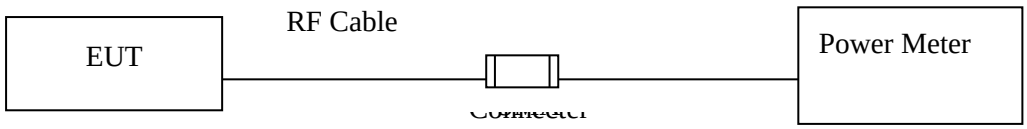
No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.152	49.06	65.87	-16.81	39.28	9.78	QP
2	0.152	34.20	55.87	-21.67	24.42	9.78	AV
3	0.162	46.70	65.38	-18.68	36.92	9.78	QP
4	0.162	29.96	55.38	-25.42	20.18	9.78	AV
5	0.186	43.02	64.22	-21.20	33.24	9.77	QP
6	0.186	28.02	54.22	-26.19	18.25	9.77	AV
7	0.303	42.11	60.17	-18.06	32.35	9.76	QP
*8	0.303	38.24	50.17	-11.93	28.48	9.76	AV
9	0.647	34.04	56.00	-21.96	24.26	9.77	QP
10	0.647	25.57	46.00	-20.43	15.79	9.77	AV
11	6.558	38.10	60.00	-21.90	28.13	9.97	QP
12	6.558	32.73	50.00	-17.27	22.76	9.97	AV

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ * “ means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

2. Peak Power Output

2.1. Test Setup



2.2. Limit

The maximum peak power shall be less 1Watt.

2.3. Test Procedure

Tested according to FHSS test procedure of KDB 558074 section 9 (b for compliance to FCC 47CFR 15.247 requirements.

The EUT was tested according to C63.10:2013 for compliance to FCC 47CFR 15.247 requirements.

The maximum peak conducted output power using C63.10:2013 Section 11.9.1.3 PKPM1 Peak power meter method.

2.4. Test Result of Peak Power Output

Product : Realtime radio module
Test Item : Peak Power Output
Test Mode : Mode 1: Transmit - Antenna1
Test Date : 2021/02/20

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 01	2402	4.30	1 Watt= 30 dBm	Pass
Channel 40	2441	4.15	1 Watt= 30 dBm	Pass
Channel 78	2479	4.00	1 Watt= 30 dBm	Pass

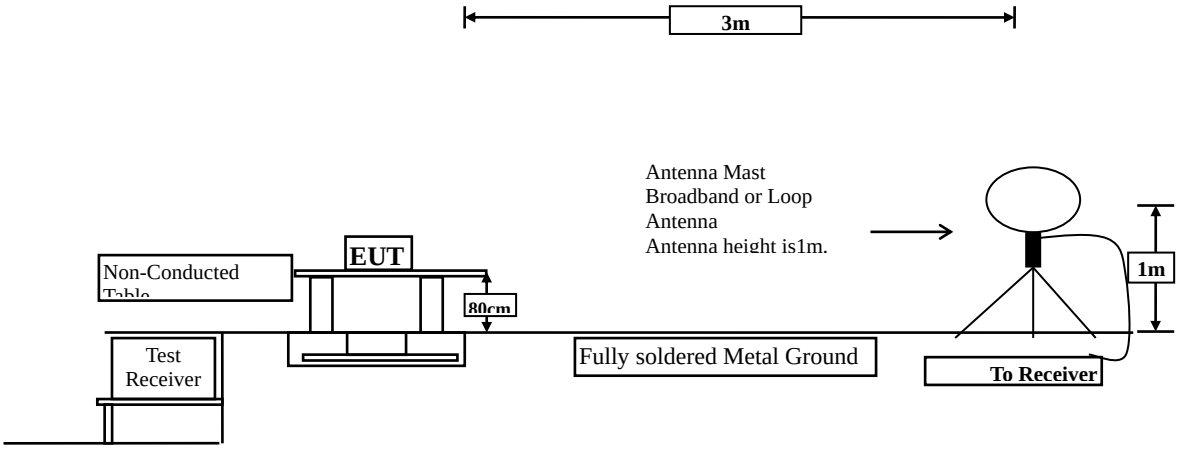
Product : Realtime radio module
Test Item : Peak Power Output
Test Mode : Mode 2: Transmit - Antenna2
Test Date : 2021/02/20

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 01	2402	4.50	1 Watt= 30 dBm	Pass
Channel 40	2441	4.20	1 Watt= 30 dBm	Pass
Channel 78	2479	4.03	1 Watt= 30 dBm	Pass

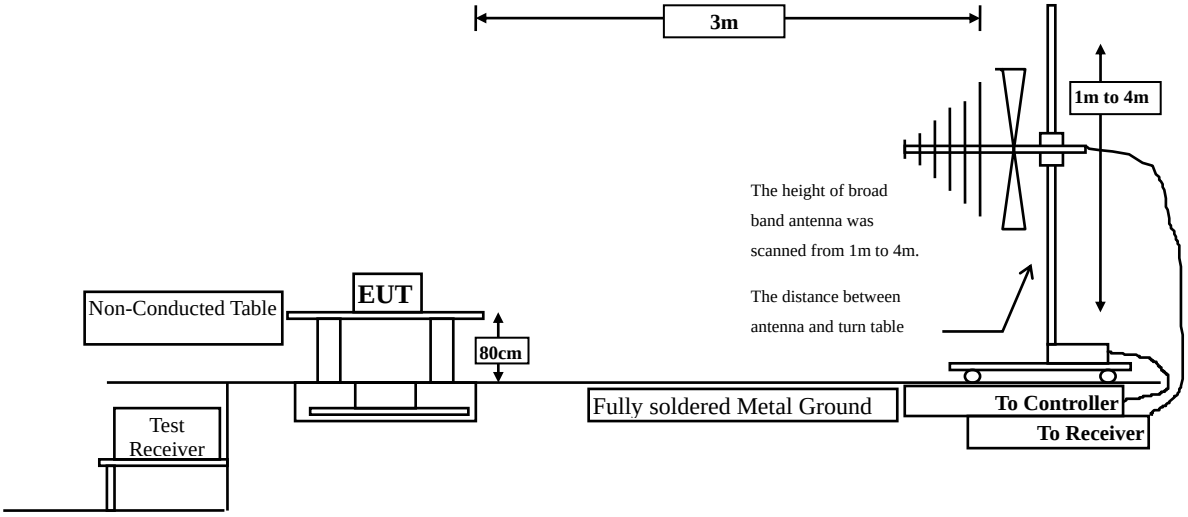
3. Radiated Emission

3.1. Test Setup

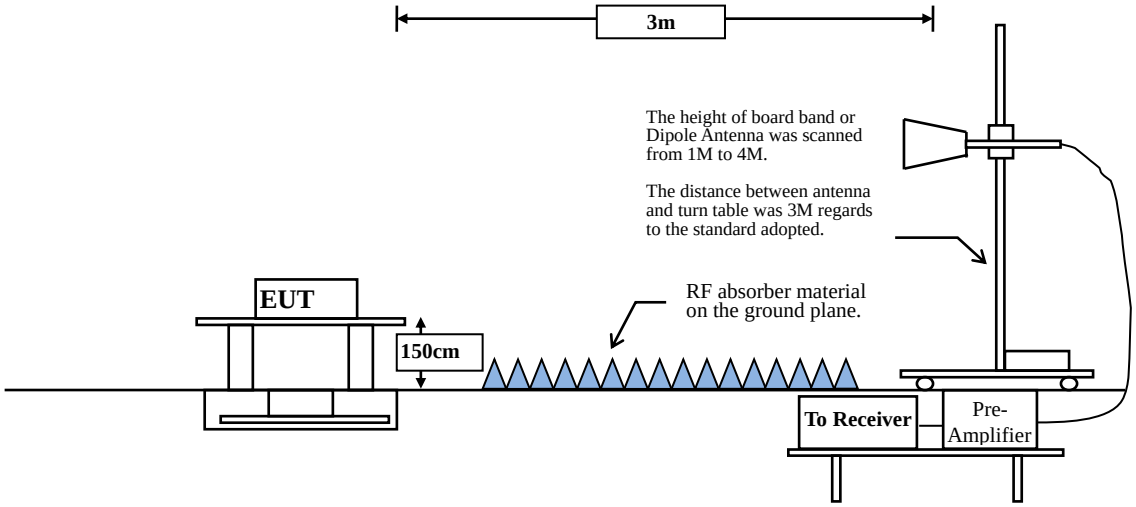
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



3.2. Limits

➢ **General Radiated Emission Limits**

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

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

The EUT was setup according to ANSI C63.10, 2013 and tested compliance to FCC 47CFR 15.247 requirements.

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 is rotated 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 is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~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 form 9kHz - 10th Harmonic of fundamental was investigated.

RBW and VBW Parameter setting:

According to C63.10 Section 11.12.2.4 Peak measurement procedure.

RBW = as specified in Table 1.

VBW ≥ 3 x RBW.

Table 1 —RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

According to C63.10 Section 11.12.2.5 Average measurement procedure.

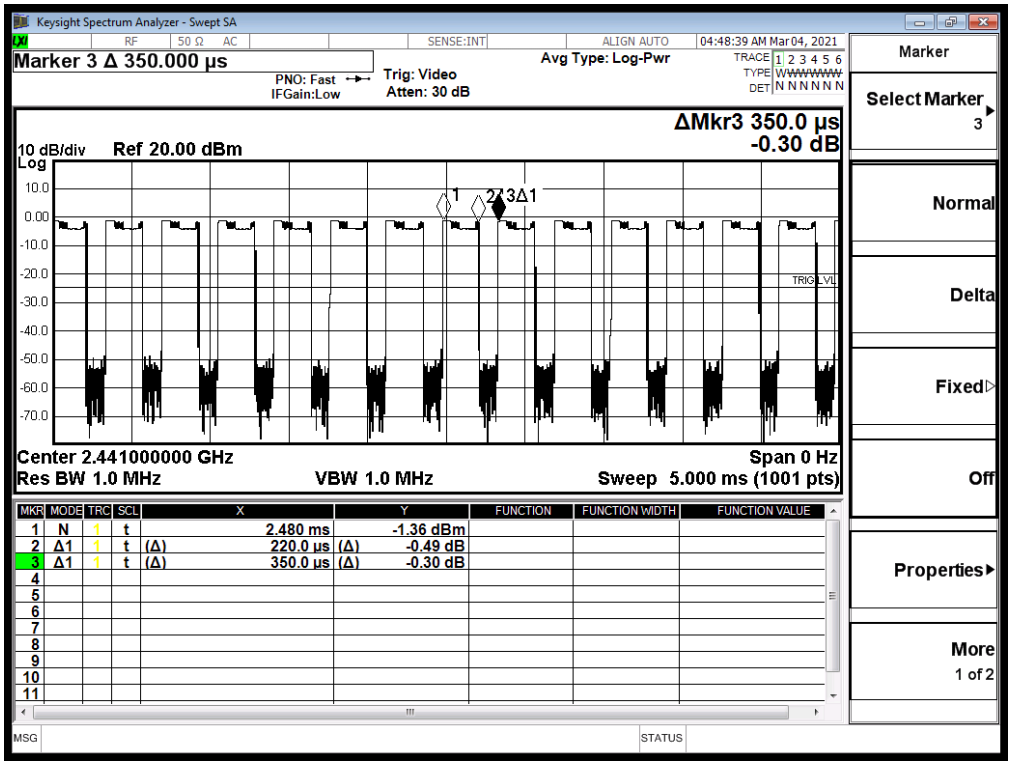
RBW = 1MHz.

VBW = 10Hz, when duty cycle ≥ 98 %

VBW ≥ 1/T, when duty cycle < 98 %

(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
GFSK	62.85	0.22	4545	5k

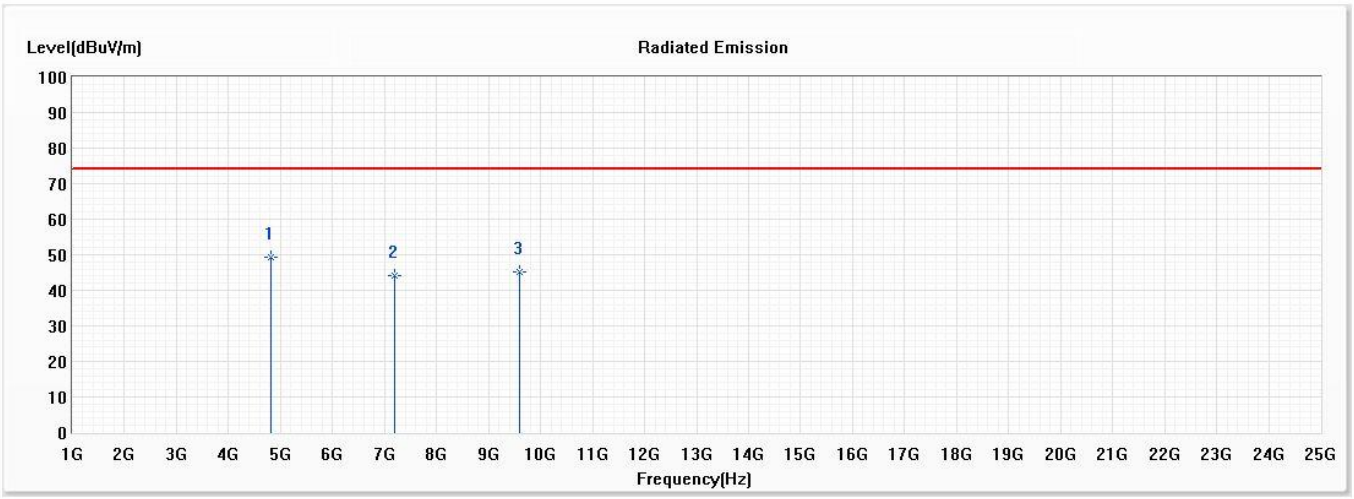


Note: Duty Cycle = Ton / (Ton + Toff)

3.4. Test Result of Radiated Emission

Product : Realtime radio module
Test Item : Harmonic Radiated Emission
Test Mode : Mode 1: Transmit - Antenna1 (2402MHz)
Test Date : 2021/02/20

Horizontal



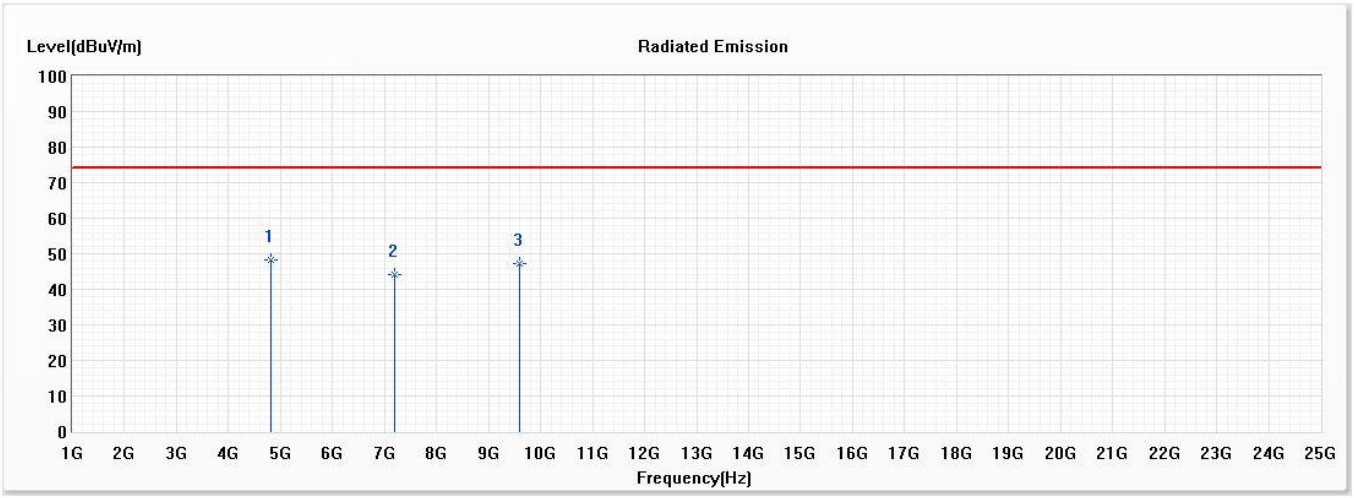
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	4804.000	49.19	74.00	-24.81	51.57	-2.38	PK
2	7206.000	44.11	74.00	-29.89	43.17	0.94	PK
3	9608.000	45.31	74.00	-28.69	42.75	2.56	PK

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 : Realtime radio module
Test Item : Harmonic Radiated Emission
Test Mode : Mode 1: Transmit - Antenna1 (2402MHz)
Test Date : 2021/02/20

Vertical



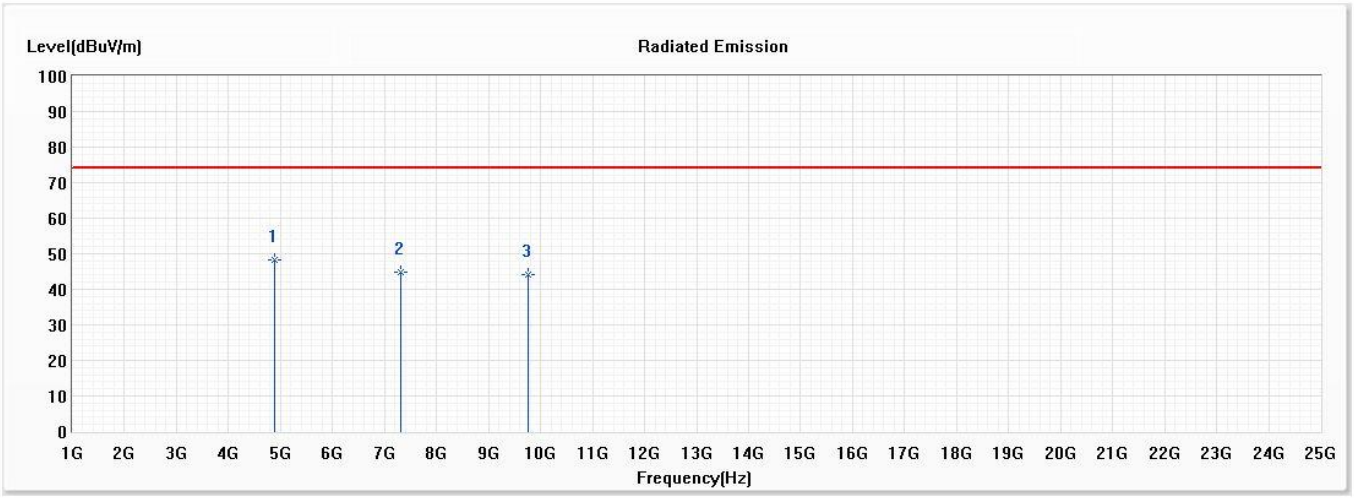
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	4804.000	48.30	74.00	-25.70	50.68	-2.38	PK
2	7206.000	44.26	74.00	-29.74	43.32	0.94	PK
3	9608.000	47.23	74.00	-26.77	44.67	2.56	PK

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 : Realtime radio module
Test Item : Harmonic Radiated Emission
Test Mode : Mode 1: Transmit - Antenna1 (2441MHz)
Test Date : 2021/02/20

Horizontal

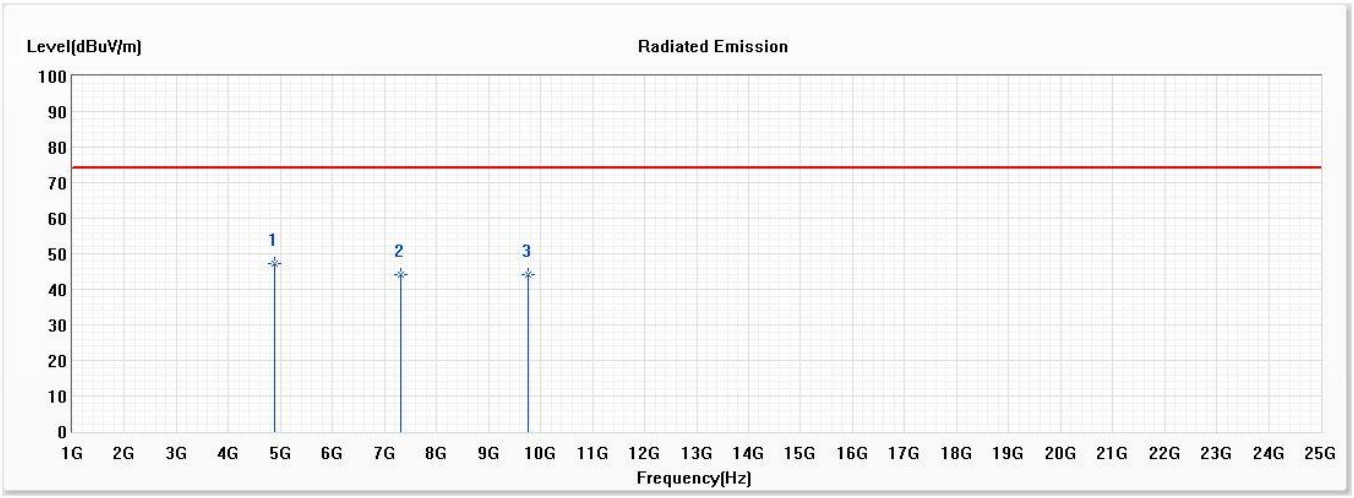


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	4882.000	48.12	74.00	-25.88	50.50	-2.38	PK
2	7323.000	44.99	74.00	-29.01	44.02	0.97	PK
3	9764.000	44.30	74.00	-29.70	41.39	2.91	PK

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 : Realtime radio module
Test Item : Harmonic Radiated Emission
Test Mode : Mode 1: Transmit - Antenna1 (2441MHz)
Test Date : 2021/02/20

Vertical



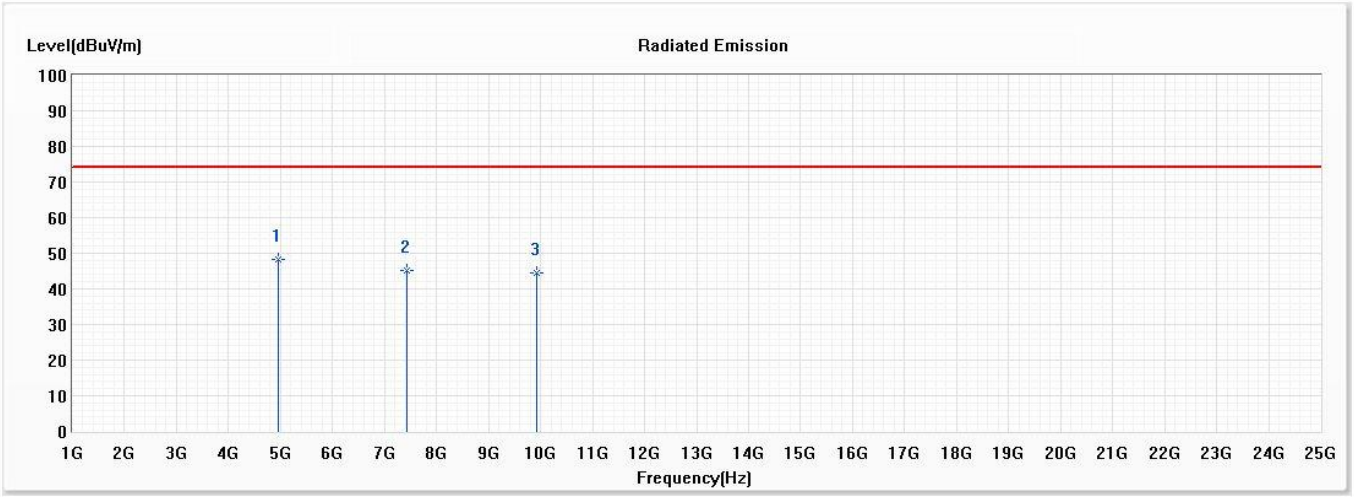
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	4882.000	47.18	74.00	-26.82	49.56	-2.38	PK
2	7323.000	44.01	74.00	-29.99	43.04	0.97	PK
3	9764.000	44.25	74.00	-29.75	41.34	2.91	PK

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	:	Realtime radio module
Test Item	:	Harmonic Radiated Emission
Test Mode	:	Mode 1: Transmit - Antenna1 (2479MHz)
Test Date	:	2021/02/20

Horizontal



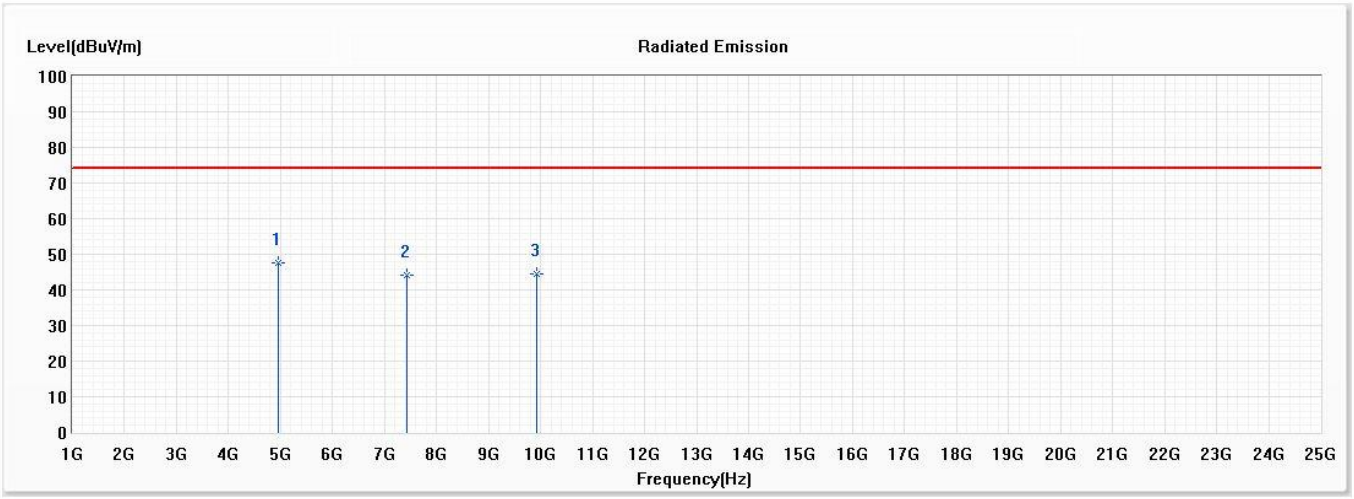
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	4958.000	48.33	74.00	-25.67	50.33	-2.00	PK
2	7437.000	45.01	74.00	-28.99	43.93	1.08	PK
3	9916.000	44.47	74.00	-29.53	41.38	3.09	PK

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	:	Realtime radio module
Test Item	:	Harmonic Radiated Emission
Test Mode	:	Mode 1: Transmit - Antenna1 (2479MHz)
Test Date	:	2021/02/20

Vertical



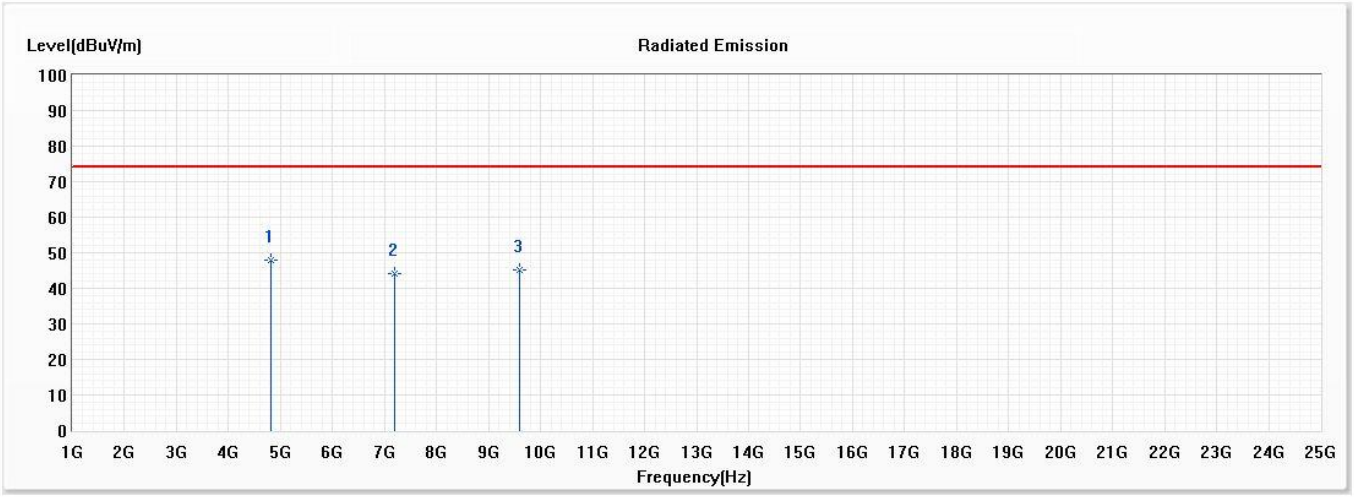
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	4958.000	47.55	74.00	-26.45	49.55	-2.00	PK
2	7437.000	44.12	74.00	-29.88	43.04	1.08	PK
3	9916.000	44.58	74.00	-29.42	41.49	3.09	PK

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 : Realtime radio module
Test Item : Harmonic Radiated Emission
Test Mode : Mode 2: Transmit - Antenna2 (2402MHz)
Test Date : 2021/02/20

Horizontal



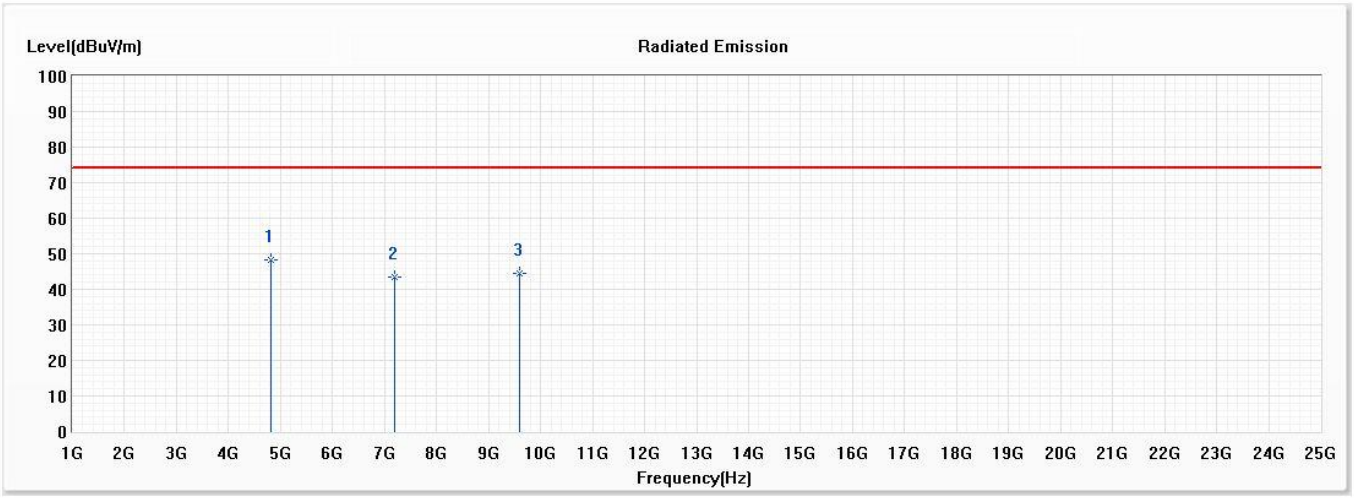
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	4804.000	47.78	74.00	-26.22	50.16	-2.38	PK
2	7206.000	44.06	74.00	-29.94	43.12	0.94	PK
3	9608.000	45.06	74.00	-28.94	42.50	2.56	PK

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	:	Realtime radio module
Test Item	:	Harmonic Radiated Emission
Test Mode	:	Mode 2: Transmit - Antenna2 (2402MHz)
Test Date	:	2021/02/20

Vertical



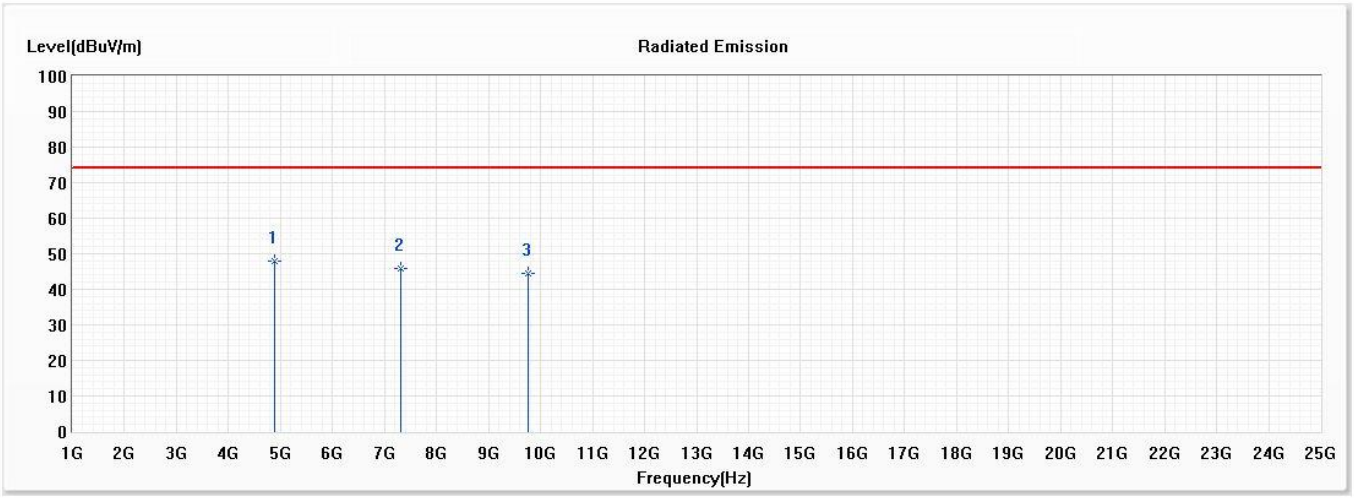
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	4804.000	48.42	74.00	-25.58	50.80	-2.38	PK
2	7206.000	43.42	74.00	-30.58	42.48	0.94	PK
3	9608.000	44.60	74.00	-29.40	42.04	2.56	PK

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	:	Realtime radio module
Test Item	:	Harmonic Radiated Emission
Test Mode	:	Mode 2: Transmit - Antenna2 (2441MHz)
Test Date	:	2021/02/20

Horizontal



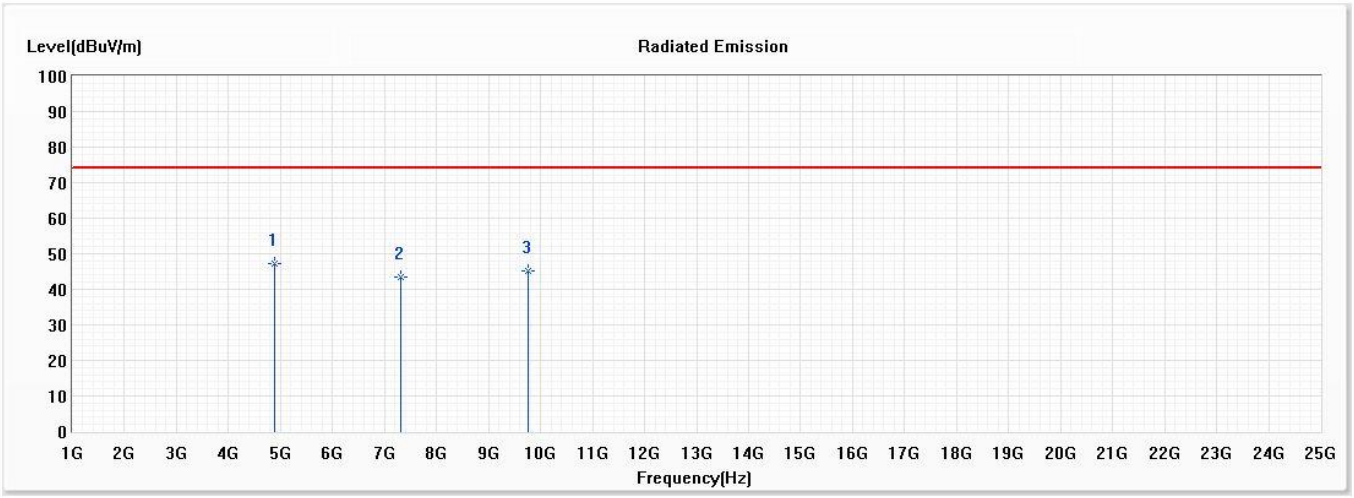
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	4882.000	47.76	74.00	-26.24	50.14	-2.38	PK
2	7323.000	45.83	74.00	-28.17	44.86	0.97	PK
3	9764.000	44.52	74.00	-29.48	41.61	2.91	PK

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 : Realtime radio module
Test Item : Harmonic Radiated Emission
Test Mode : Mode 2: Transmit - Antenna2 (2441MHz)
Test Date : 2021/02/20

Vertical



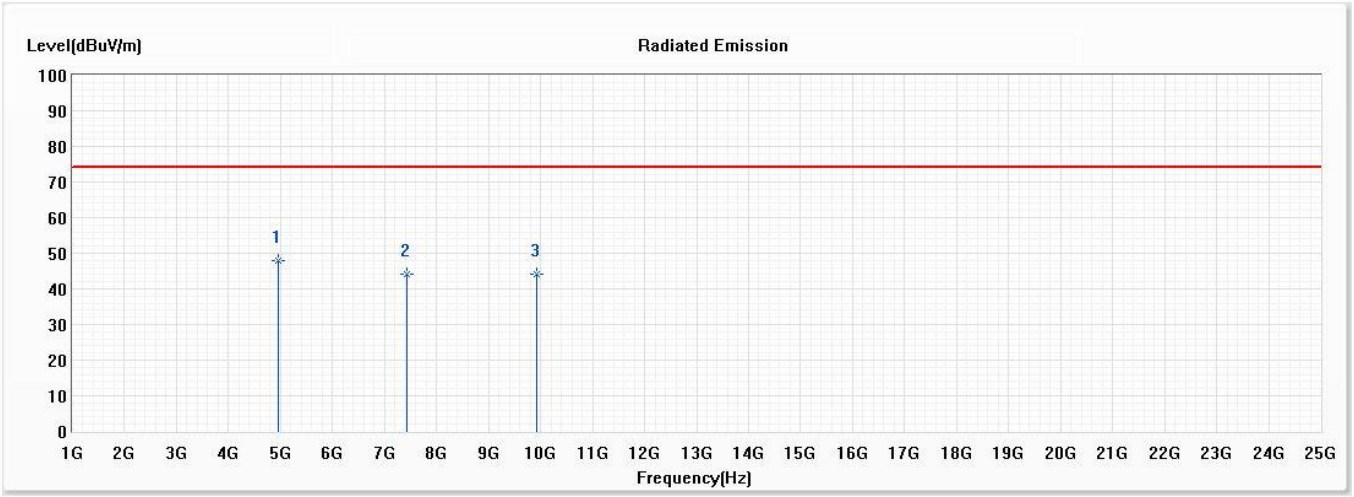
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	4882.000	47.15	74.00	-26.85	49.53	-2.38	PK
2	7323.000	43.56	74.00	-30.44	42.59	0.97	PK
3	9764.000	45.10	74.00	-28.90	42.19	2.91	PK

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 : Realtime radio module
Test Item : Harmonic Radiated Emission
Test Mode : Mode 2: Transmit - Antenna2 (2479MHz)
Test Date : 2021/02/20

Horizontal



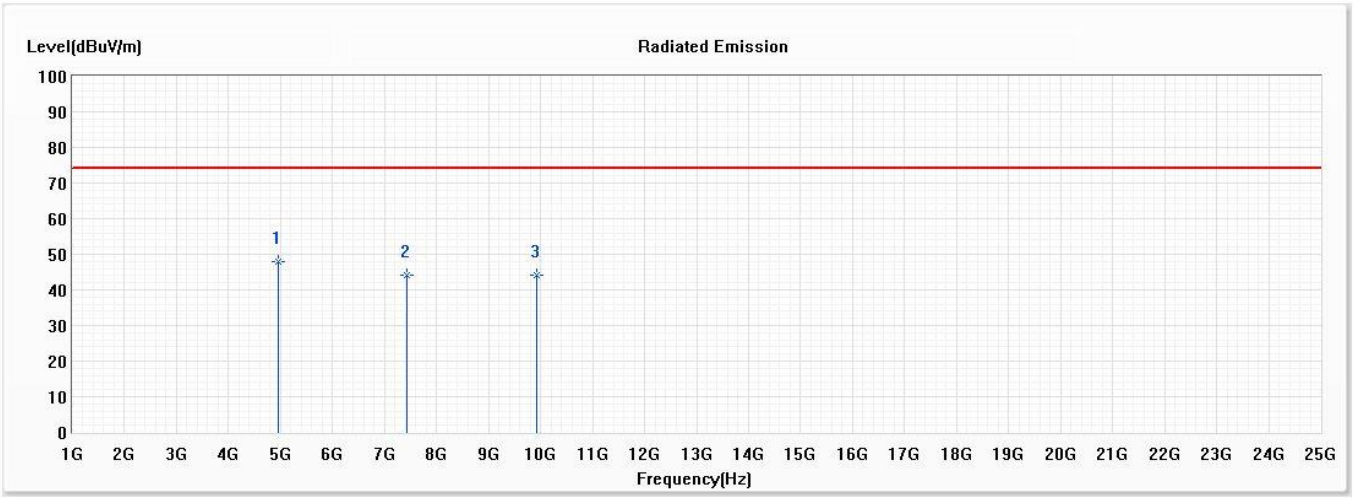
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	4958.000	47.87	74.00	-26.13	49.87	-2.00	PK
2	7437.000	44.30	74.00	-29.70	43.22	1.08	PK
3	9916.000	44.31	74.00	-29.69	41.22	3.09	PK

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	:	Realtime radio module
Test Item	:	Harmonic Radiated Emission
Test Mode	:	Mode 2: Transmit - Antenna2 (2479MHz)
Test Date	:	2021/02/20

Vertical



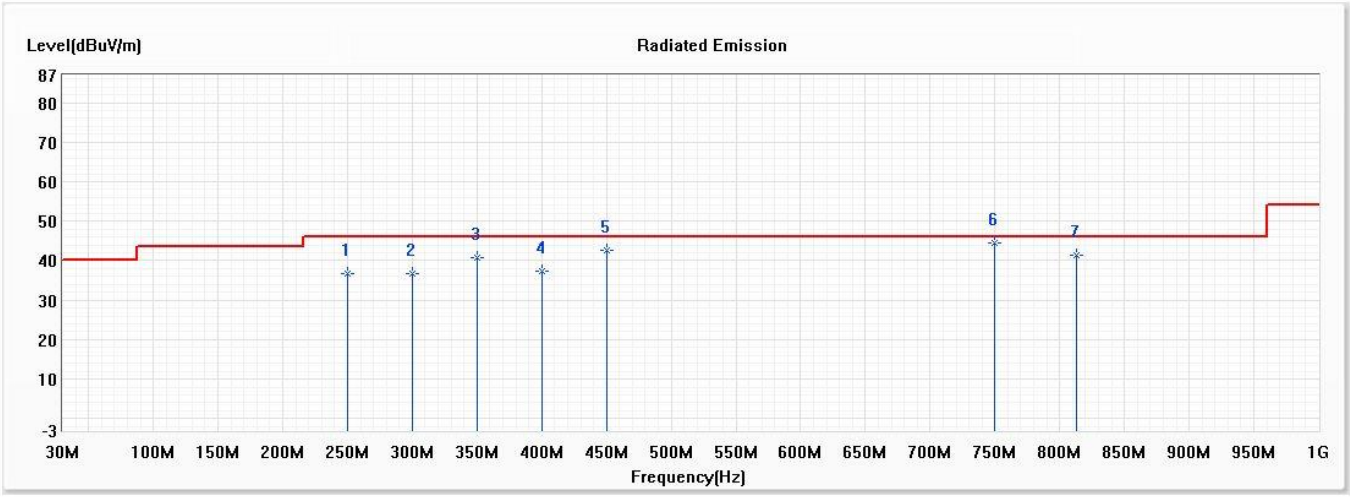
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	4958.000	47.76	74.00	-26.24	49.76	-2.00	PK
2	7437.000	44.20	74.00	-29.80	43.12	1.08	PK
3	9916.000	44.23	74.00	-29.77	41.14	3.09	PK

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 : Realtime radio module
Test Item : General Radiated Emission
Test Mode : Mode 1: Transmit - Antenna1 (2441MHz)
Test Date : 2021/02/22

Horizontal



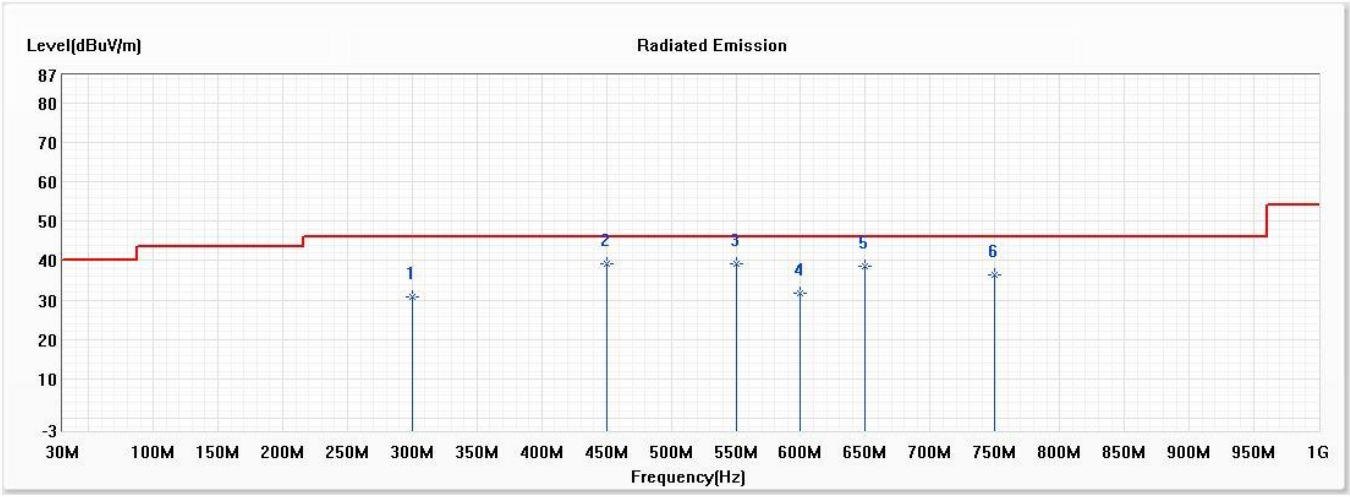
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	249.990	36.80	46.00	-9.20	56.56	-19.76	QP
2	299.990	36.80	46.00	-9.20	54.86	-18.06	QP
3	349.990	40.70	46.00	-5.30	57.50	-16.80	QP
4	399.980	37.40	46.00	-8.60	52.74	-15.34	QP
5	449.990	42.70	46.00	-3.30	56.89	-14.19	QP
* 6	750.000	44.40	46.00	-1.60	48.09	-3.69	QP
7	812.530	41.23	46.00	-4.77	40.54	0.69	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 : Realtime radio module
Test Item : General Radiated Emission
Test Mode : Mode 1: Transmit - Antenna1 (2441MHz)
Test Date : 2021/02/22

Vertical



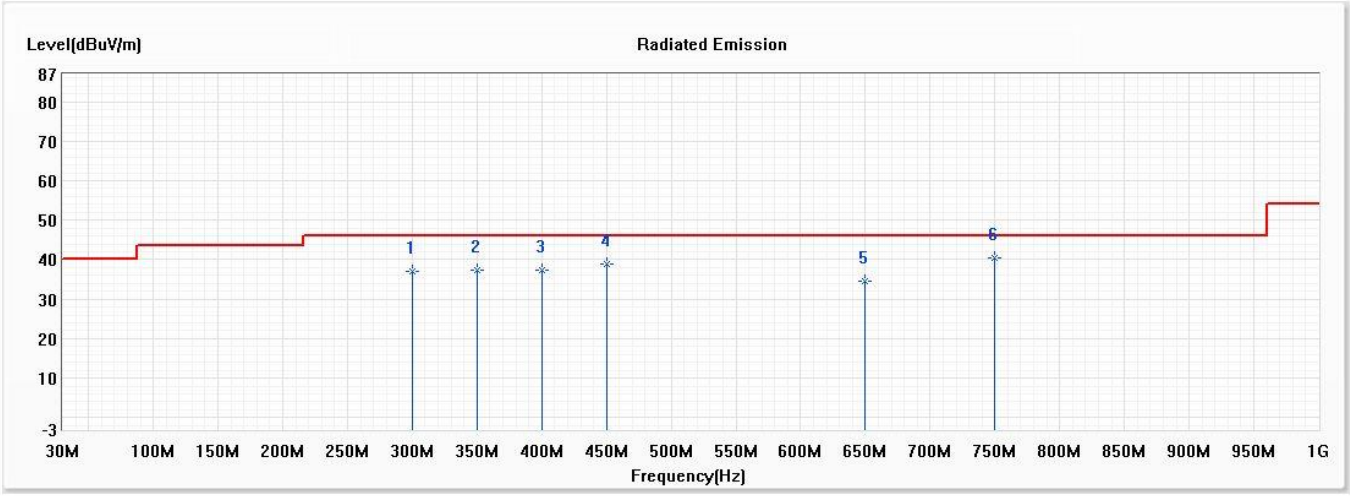
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	300.010	30.98	46.00	-15.02	49.04	-18.06	QP
* 2	449.990	39.20	46.00	-6.80	53.39	-14.19	QP
3	549.990	39.20	46.00	-6.80	51.37	-12.17	QP
4	600.000	31.80	46.00	-14.20	42.72	-10.92	QP
5	649.990	38.66	46.00	-7.34	49.06	-10.40	QP
6	750.030	36.40	46.00	-9.60	40.09	-3.69	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 : Realtime radio module
Test Item : General Radiated Emission
Test Mode : Mode 2: Transmit - Antenna2 (2441MHz)
Test Date : 2021/02/22

Horizontal



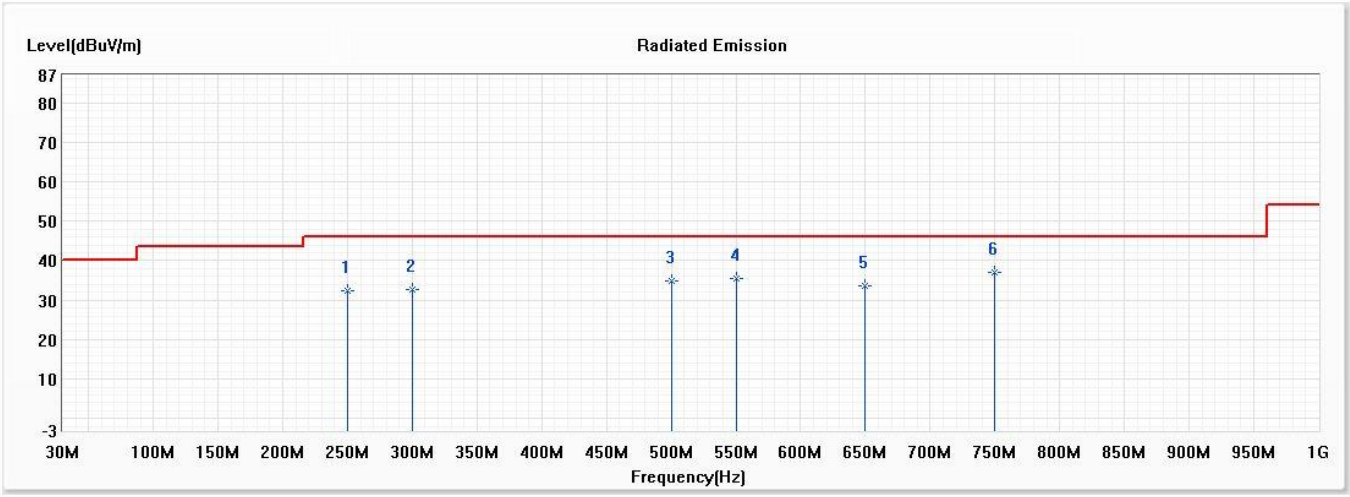
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	299.980	36.94	46.00	-9.06	55.00	-18.06	QP
2	349.990	37.19	46.00	-8.81	53.99	-16.80	QP
3	400.000	37.19	46.00	-8.81	52.53	-15.34	QP
4	450.010	38.81	46.00	-7.19	53.00	-14.19	QP
5	649.970	34.65	46.00	-11.35	45.05	-10.40	QP
* 6	750.000	40.53	46.00	-5.47	44.22	-3.69	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 : Realtime radio module
Test Item : General Radiated Emission
Test Mode : Mode 2: Transmit - Antenna2 (2441MHz)
Test Date : 2021/02/22

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	249.900	32.40	46.00	-13.60	52.16	-19.76	QP
2	299.970	32.78	46.00	-13.22	50.84	-18.06	QP
3	499.980	34.90	46.00	-11.10	48.24	-13.34	QP
4	549.980	35.60	46.00	-10.40	47.77	-12.17	QP
5	650.000	33.77	46.00	-12.23	44.17	-10.40	QP
* 6	750.010	36.98	46.00	-9.02	40.67	-3.69	QP

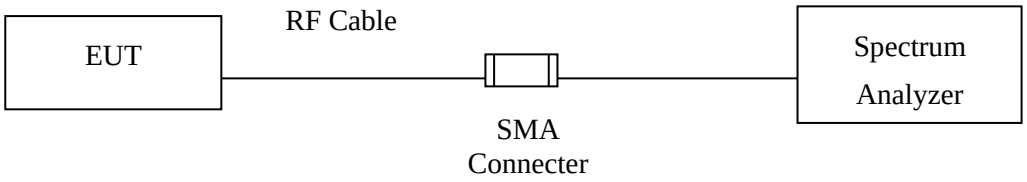
Note:

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.

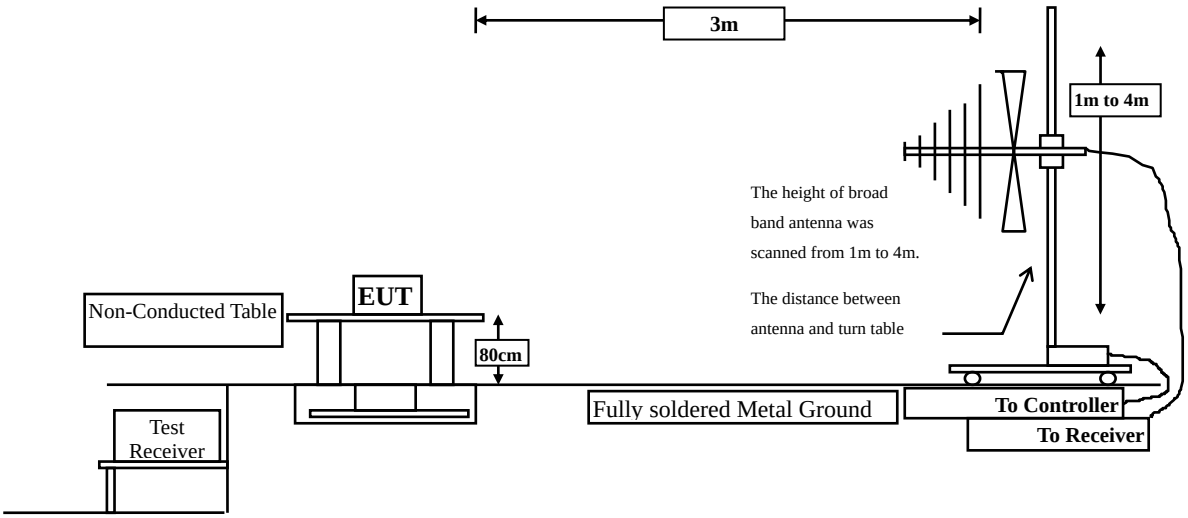
4. Band Edge

4.1. Test Setup

RF Conducted Measurement



RF Radiated Measurement:



4.2. Limit

According to FCC Section 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 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, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

4.3. Test Procedure

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 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 bandwidth setting below 1GHz and above 1GHz on the field strength meter is 120 kHz and 1MHz, respectively.

RBW and VBW Parameter setting:

According to C63.10 Section 11.12.2.4 Peak measurement procedure.

RBW = as specified in Table 1.

VBW ≥ 3 x RBW.

Table 1 —RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

According to C63.10 Section 11.12.2.5 Average measurement procedure.

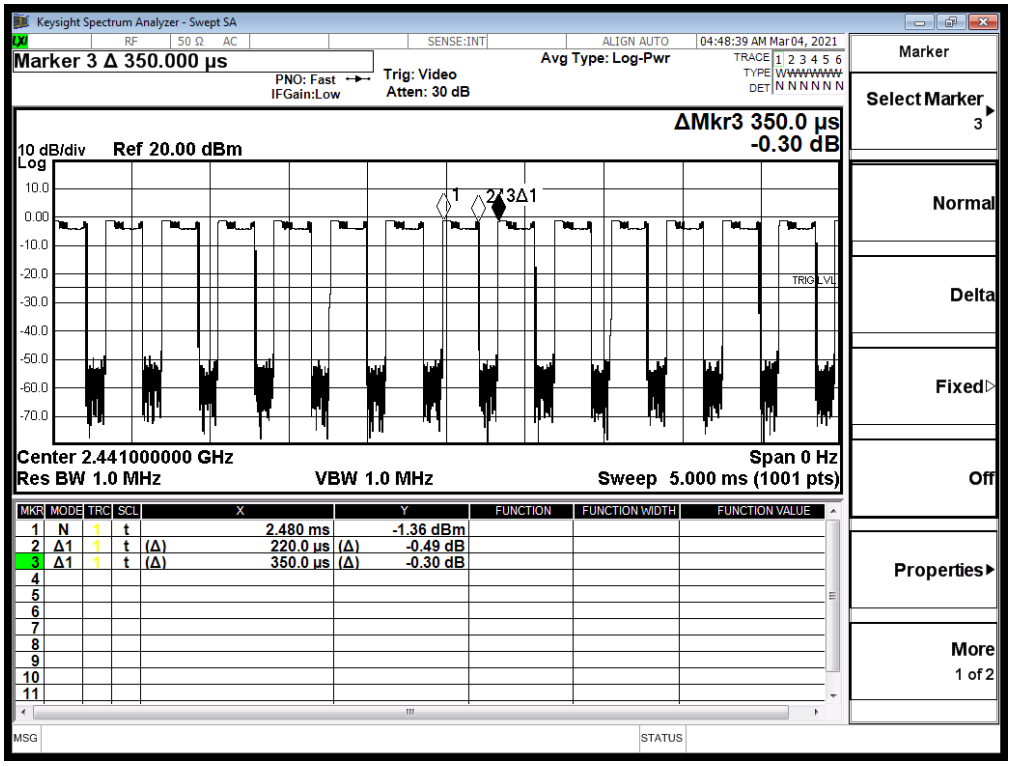
RBW = 1MHz.

VBW = 10Hz, when duty cycle ≥ 98 %

VBW ≥ 1/T, when duty cycle < 98 %

(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
GFSK	62.85	0.22	4545	5k

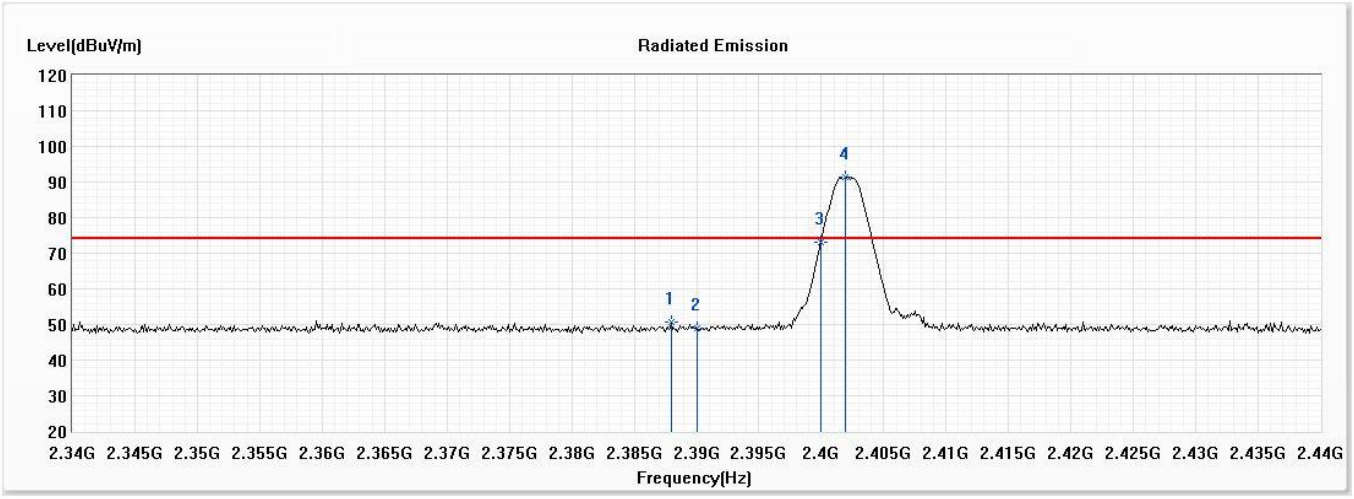


Note: Duty Cycle = Ton / (Ton + Toff)

4.4. Test Result of Band Edge

Product : Realtime radio module
Test Item : Band Edge
Test Mode : Mode 1: Transmit - Antenna1 (2402MHz)
Test Date : 2021/02/20

Horizontal



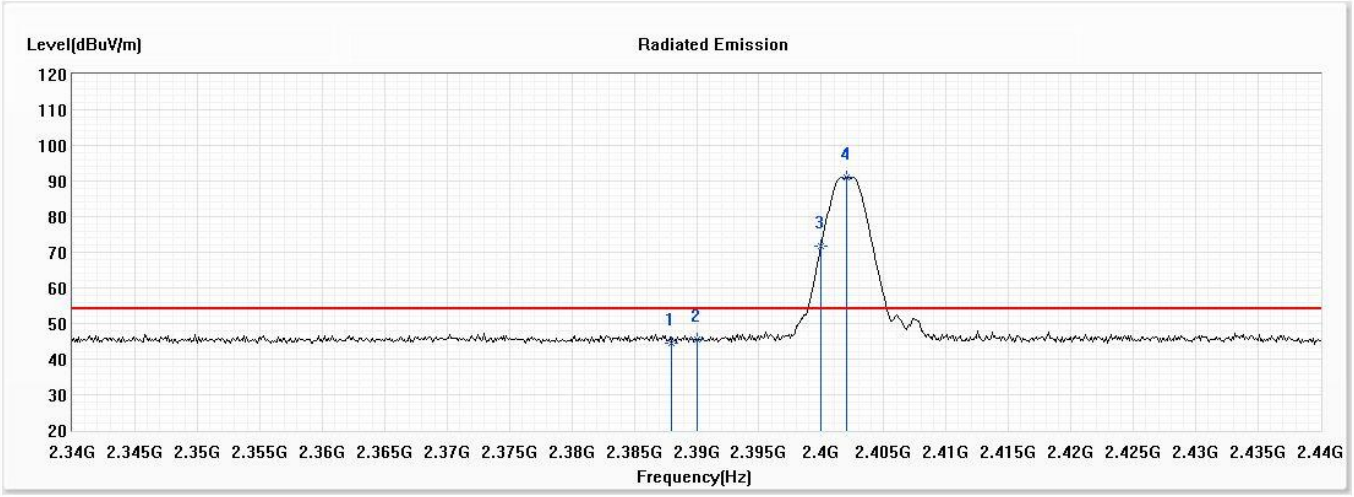
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2388.000	50.57	74.00	-23.43	57.93	-7.36	PK
2	2390.000	48.80	74.00	-25.20	56.16	-7.36	PK
3	2400.000	73.16	74.00	-0.84	80.47	-7.31	PK
! 4	2401.900	91.30	--	--	98.61	-7.31	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Realtime radio module
Test Item : Band Edge
Test Mode : Mode 1: Transmit - Antenna1 (2402MHz)
Test Date : 2021/02/20

Horizontal



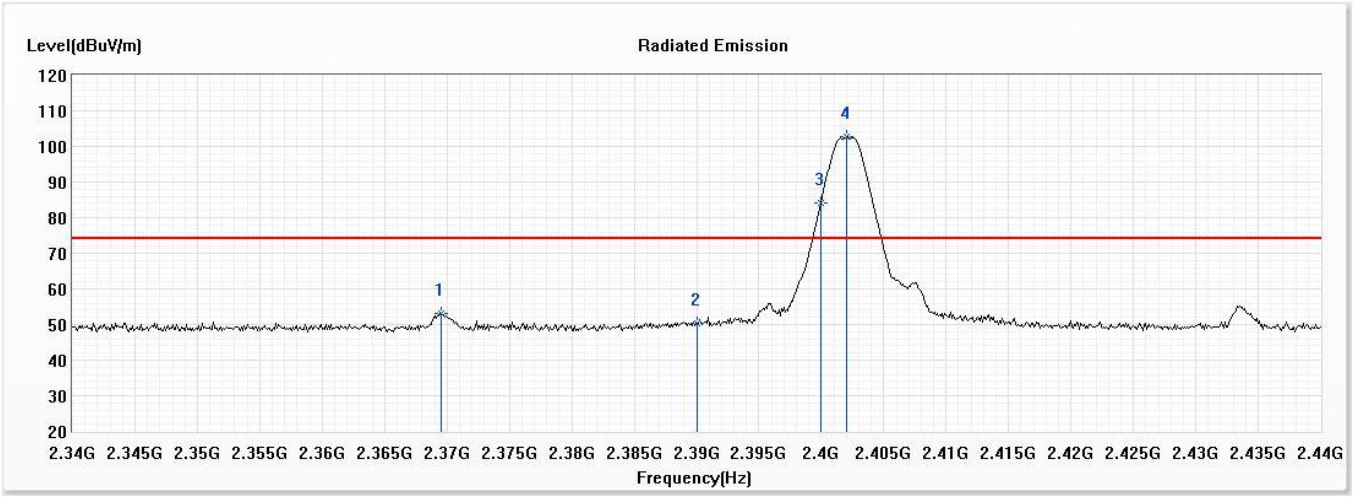
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2388.000	44.65	54.00	-9.35	52.01	-7.36	AV
2	2390.000	45.54	54.00	-8.46	52.90	-7.36	AV
! 3	2400.000	71.56	--	--	78.87	-7.31	AV
! 4	2402.000	91.20	--	--	98.51	-7.31	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Realtime radio module
Test Item : Band Edge
Test Mode : Mode 1: Transmit - Antenna1 (2402MHz)
Test Date : 2021/02/20

Vertical



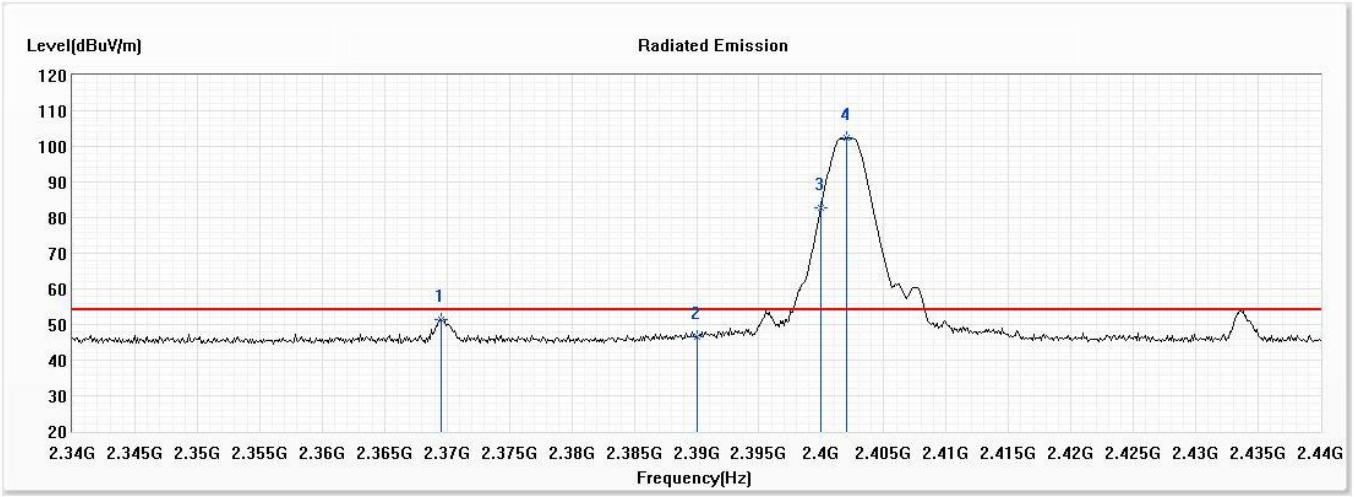
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2369.500	53.23	74.00	-20.77	60.67	-7.44	PK
2	2390.000	50.25	74.00	-23.75	57.61	-7.36	PK
! 3	2400.000	84.18	--	--	91.49	-7.31	PK
! 4	2402.000	102.66	--	--	109.97	-7.31	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Realtime radio module
Test Item	:	Band Edge
Test Mode	:	Mode 1: Transmit - Antenna1 (2402MHz)
Test Date	:	2021/02/20

Vertical



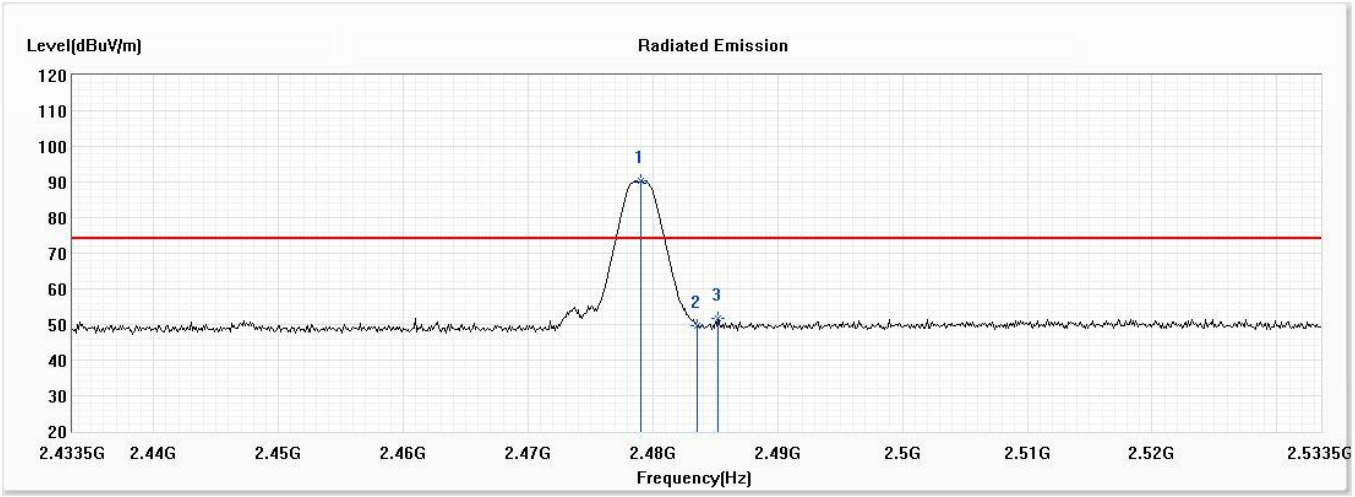
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2369.500	51.55	54.00	-2.45	58.99	-7.44	AV
2	2390.000	46.40	54.00	-7.60	53.76	-7.36	AV
! 3	2400.000	82.92	--	--	90.23	-7.31	AV
! 4	2402.000	102.54	--	--	109.85	-7.31	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Realtime radio module
Test Item : Band Edge
Test Mode : Mode 1: Transmit - Antenna1 (2479MHz)
Test Date : 2021/02/20

Horizontal



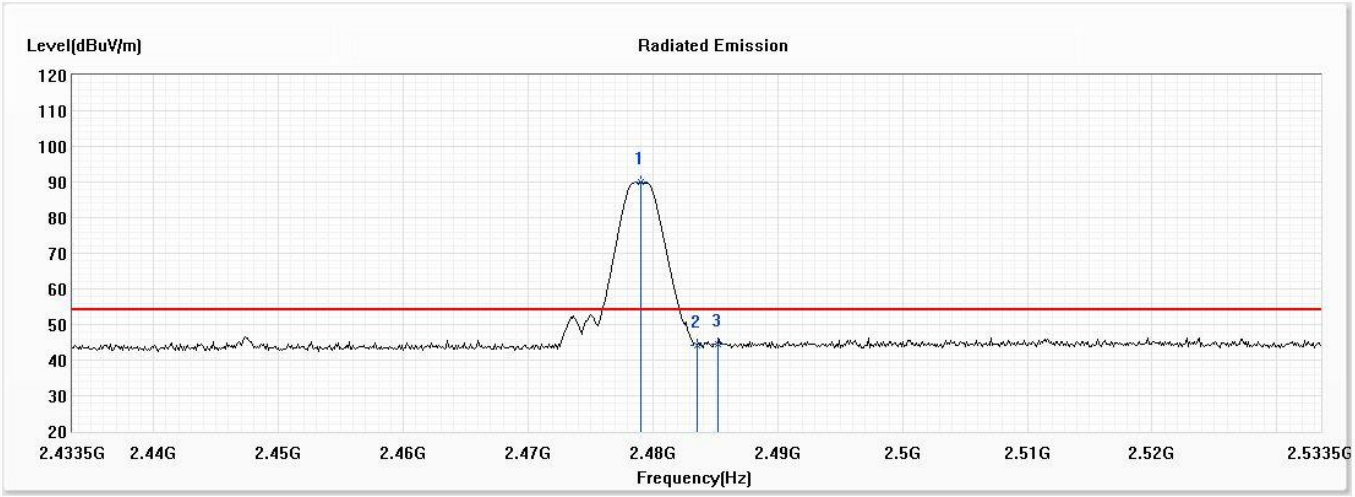
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
! 1	2479.000	90.30	--	--	97.30	-7.00	PK
2	2483.500	49.77	74.00	-24.23	56.73	-6.96	PK
3	2485.200	51.66	74.00	-22.34	58.61	-6.95	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Realtime radio module
Test Item : Band Edge
Test Mode : Mode 1: Transmit - Antenna1 (2479MHz)
Test Date : 2021/02/20

Horizontal



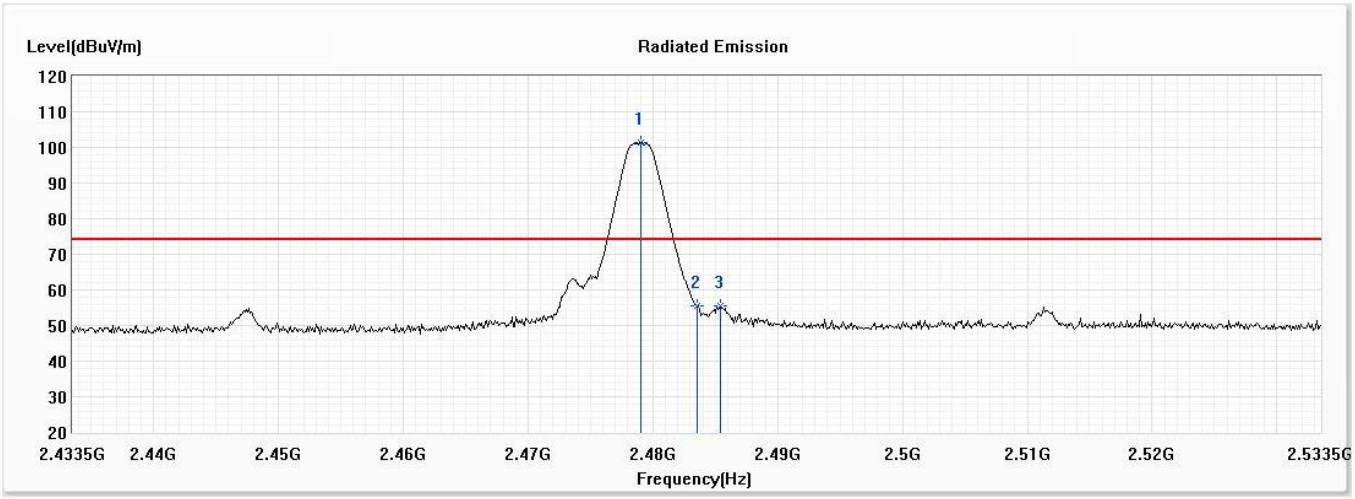
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
! 1	2479.000	89.99	--	--	96.99	-7.00	AV
2	2483.500	44.31	54.00	-9.69	51.27	-6.96	AV
3	2485.200	44.48	54.00	-9.52	51.43	-6.95	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Realtime radio module
Test Item	:	Band Edge
Test Mode	:	Mode 1: Transmit - Antenna1 (2479MHz)
Test Date	:	2021/02/20

Vertical



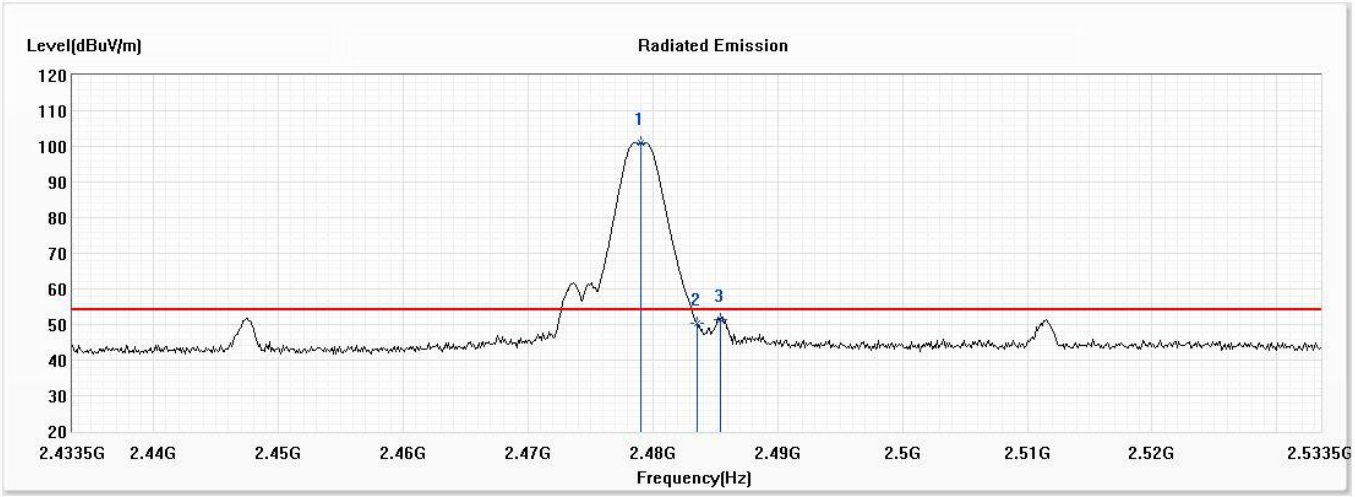
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
! 1	2479.000	101.35	--	--	108.35	-7.00	PK
2	2483.500	55.35	74.00	-18.65	62.31	-6.96	PK
3	2485.400	55.54	74.00	-18.46	62.49	-6.95	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Realtime radio module
Test Item	:	Band Edge
Test Mode	:	Mode 1: Transmit - Antenna1 (2479MHz)
Test Date	:	2021/02/20

Vertical



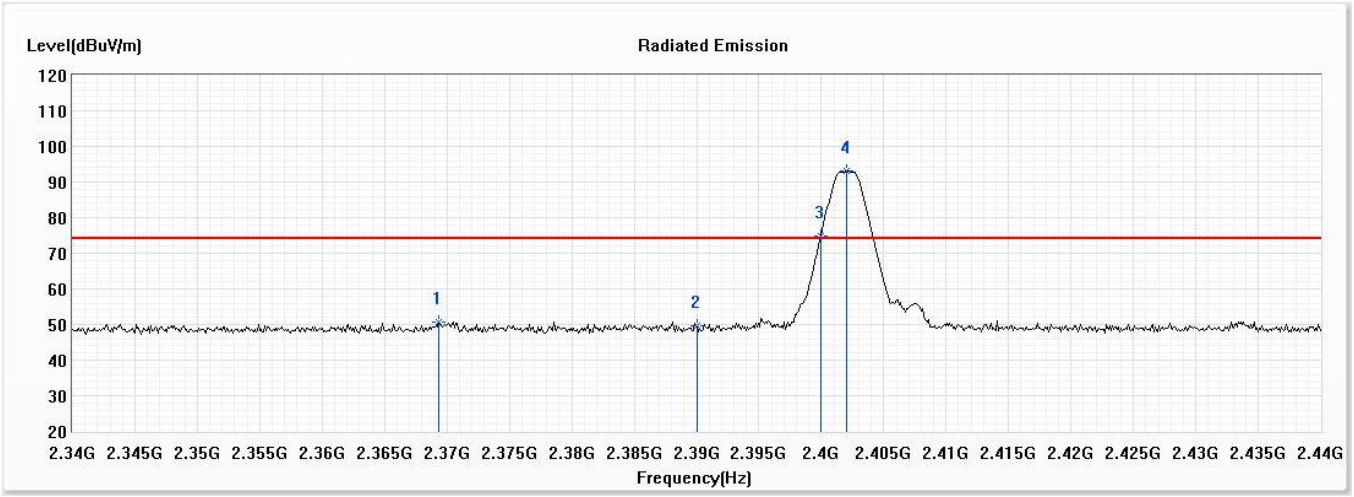
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
! 1	2479.000	101.06	--	--	108.06	-7.00	AV
2	2483.500	50.44	54.00	-3.56	57.40	-6.96	AV
3	2485.400	51.44	54.00	-2.56	58.39	-6.95	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Realtime radio module
Test Item	:	Band Edge
Test Mode	:	Mode 2: Transmit - Antenna2 (2402MHz)
Test Date	:	2021/02/20

Horizontal



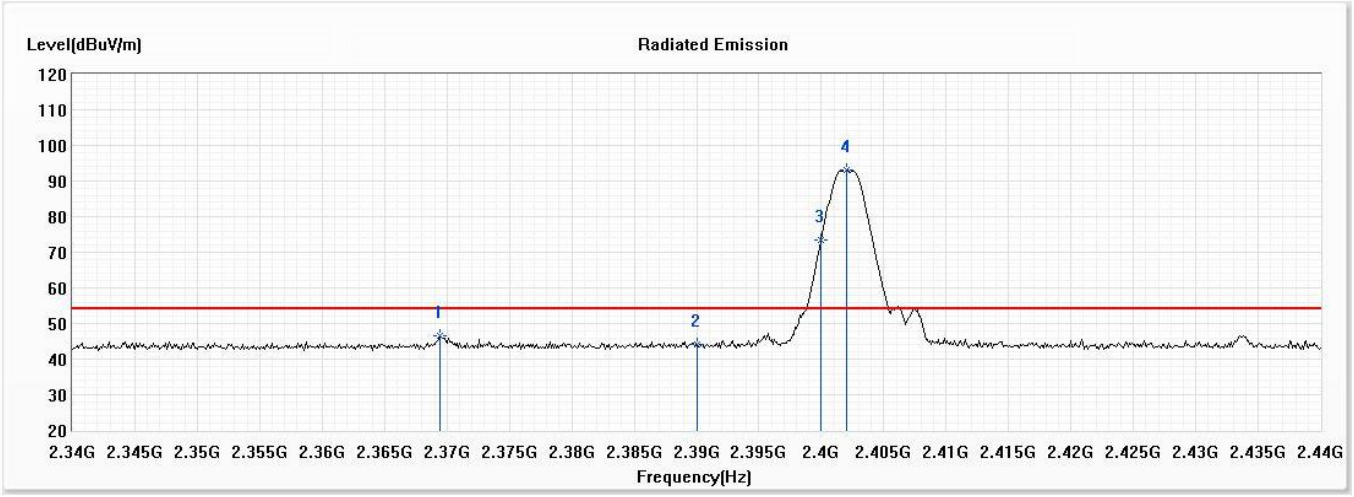
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2369.300	50.66	74.00	-23.34	58.10	-7.44	PK
2	2390.000	49.69	74.00	-24.31	57.05	-7.36	PK
! 3	2400.000	74.91	--	--	82.22	-7.31	PK
! 4	2402.000	93.25	--	--	100.56	-7.31	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Realtime radio module
Test Item : Band Edge
Test Mode : Mode 2: Transmit - Antenna2 (2402MHz)
Test Date : 2021/02/20

Horizontal



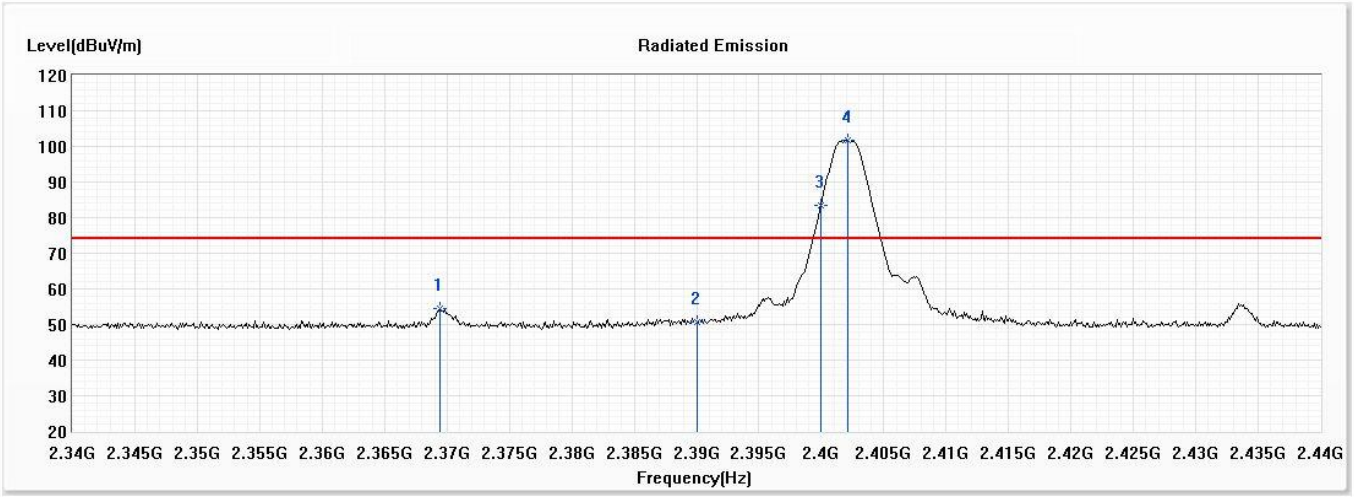
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2369.400	46.53	54.00	-7.47	53.97	-7.44	AV
2	2390.000	44.13	54.00	-9.87	51.49	-7.36	AV
! 3	2400.000	73.59	--	--	80.90	-7.31	AV
! 4	2402.000	92.98	--	--	100.29	-7.31	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Realtime radio module
Test Item : Band Edge
Test Mode : Mode 2: Transmit - Antenna2 (2402MHz)
Test Date : 2021/02/20

Vertical



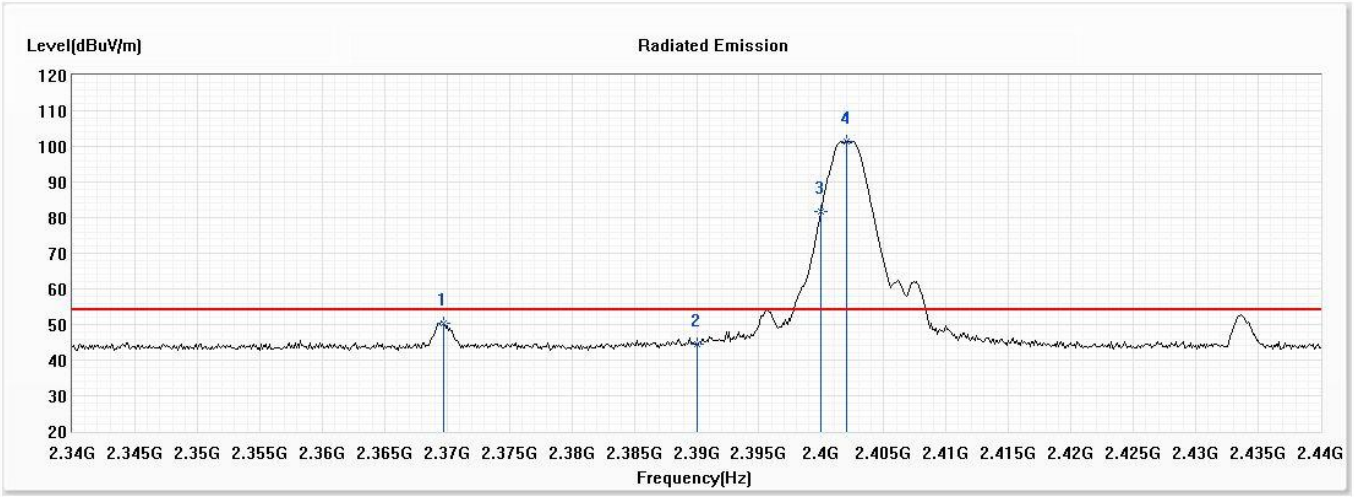
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2369.400	54.34	74.00	-19.66	61.78	-7.44	PK
2	2390.000	50.66	74.00	-23.34	58.02	-7.36	PK
! 3	2400.000	83.54	--	--	90.85	-7.31	PK
! 4	2402.100	101.71	--	--	109.02	-7.31	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Realtime radio module
Test Item : Band Edge
Test Mode : Mode 2: Transmit - Antenna2 (2402MHz)
Test Date : 2021/02/20

Vertical



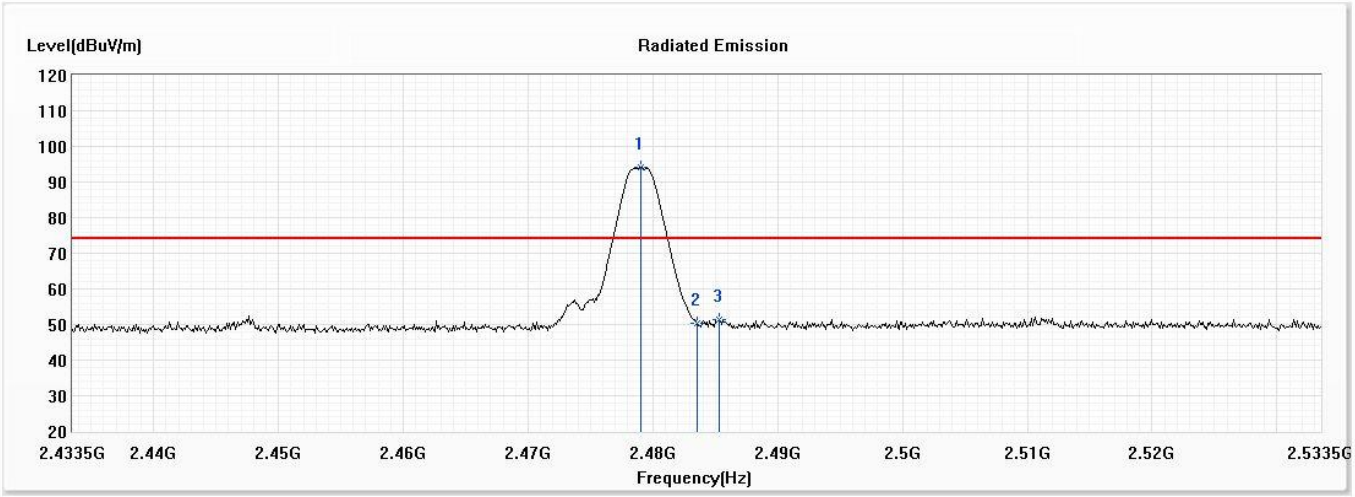
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2369.700	50.40	54.00	-3.60	57.84	-7.44	AV
2	2390.000	44.44	54.00	-9.56	51.80	-7.36	AV
! 3	2400.000	81.78	--	--	89.09	-7.31	AV
! 4	2402.000	101.45	--	--	108.76	-7.31	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Realtime radio module
Test Item	:	Band Edge
Test Mode	:	Mode 2: Transmit - Antenna2 (2479MHz)
Test Date	:	2021/02/20

Horizontal



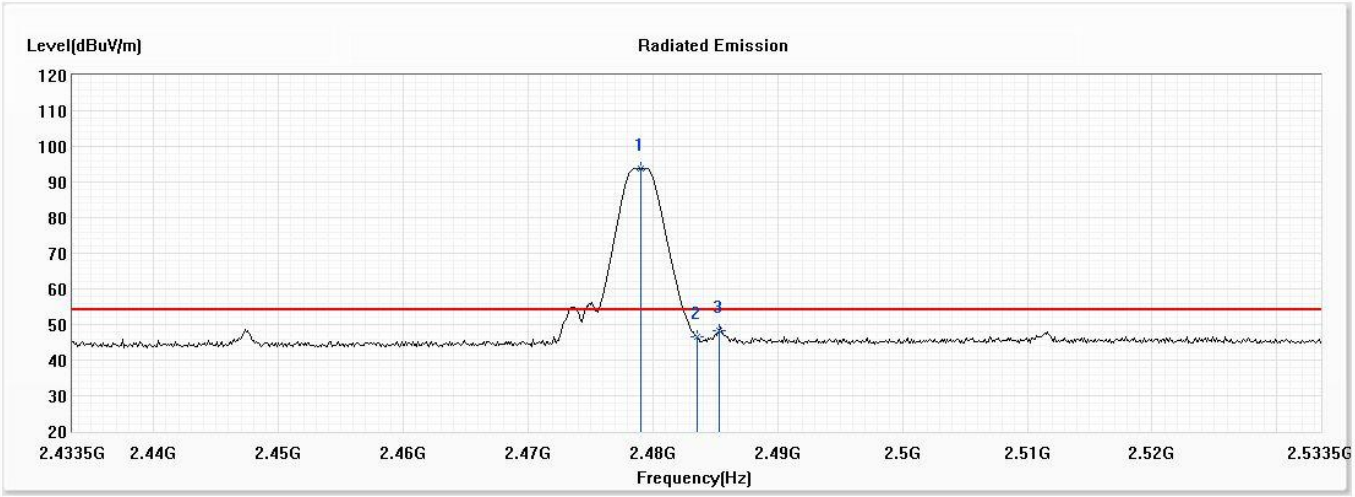
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
! 1	2479.000	94.22	--	--	101.22	-7.00	PK
2	2483.500	50.18	74.00	-23.82	57.14	-6.96	PK
3	2485.300	51.26	74.00	-22.74	58.21	-6.95	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Realtime radio module
Test Item	:	Band Edge
Test Mode	:	Mode 2: Transmit - Antenna2 (2479MHz)
Test Date	:	2021/02/20

Horizontal



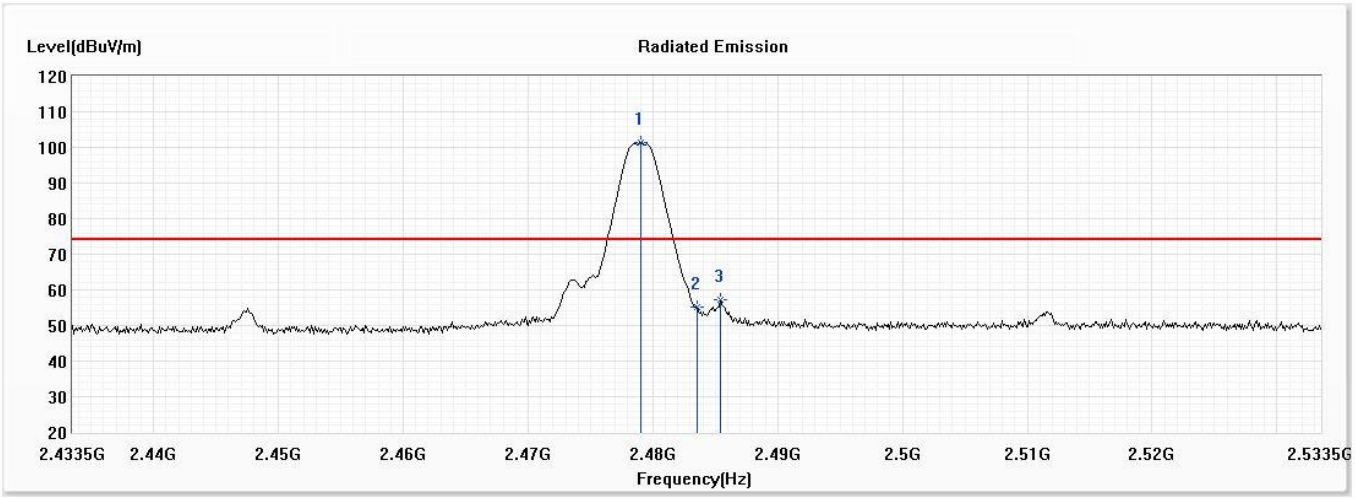
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
! 1	2479.000	93.96	--	--	100.96	-7.00	AV
2	2483.500	46.44	54.00	-7.56	53.40	-6.96	AV
3	2485.300	48.18	54.00	-5.82	55.13	-6.95	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product	:	Realtime radio module
Test Item	:	Band Edge
Test Mode	:	Mode 2: Transmit - Antenna2 (2479MHz)
Test Date	:	2021/02/20

Vertical



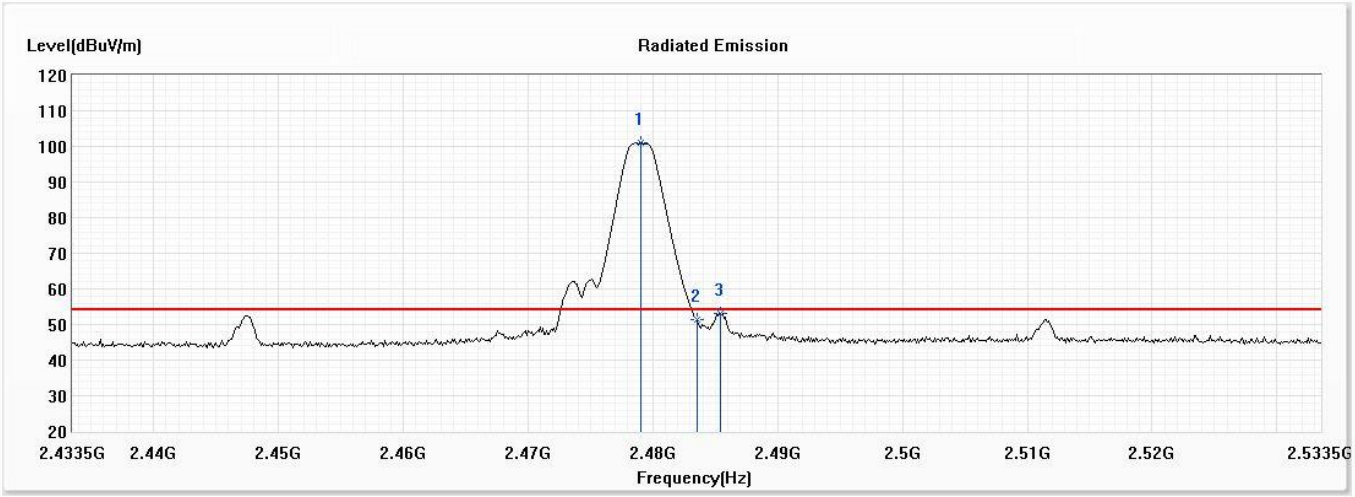
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
! 1	2479.000	101.37	--	--	108.37	-7.00	PK
2	2483.500	55.34	74.00	-18.66	62.30	-6.96	PK
3	2485.400	57.13	74.00	-16.87	64.08	-6.95	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Realtime radio module
Test Item : Band Edge
Test Mode : Mode 2: Transmit - Antenna2 (2479MHz)
Test Date : 2021/02/20

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
! 1	2479.000	101.08	--	--	108.08	-7.00	AV
2	2483.500	51.28	54.00	-2.72	58.24	-6.96	AV
3	2485.400	53.10	54.00	-0.90	60.05	-6.95	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

5. EMI Reduction Method During Compliance Testing

No modification was made during testing.