TEST REPORT

FCC/ISED BT Test for W0C-0430
FCC: Class II Permissive Change
ISED: Class IV Permissive Change

APPLICANT
JVCKENWOOD Corporation

REPORT NO.
HCT-RF-2406-FI010-R2

DATE OF ISSUE
July 18, 2024

Tested by
Jeong Ho Kim

Technical Manager
Jong Seok Lee

HCT CO., LTD.
BongJai Huh / CEO

HCT CO., LTD. 2-6, 73, 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA Tel. +82 31 645 6300 Fax. +82 31 645 6401

HCT CO.,LTD.
2-6, 73, 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
Tel. +82 31 645 6300 Fax. +82 31 645 6401

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Applicant	**JVCKENWOOD Corporation** 1-16-2, Hakusan, Midori-ku, Yokohama-shi, Kanagawa, 226-8525 JAPAN
Product Name Model Name	Communication Module W0C-0430
FCC ID IC	K44515050 282F-515050
Max. RF Output Power	2.677 dBm (1.85 mW)
Date of Test	May 01, 2024 ~ June 14, 2024
FCC Classification	FCC Part 15 Spread Spectrum Transmitter
Test Standard Used	FCC Rule Part(s): Part 15.247 ISED Rule Part(s): RSS-247 Issue 3 (August 2023) RSS-Gen Issue 5_Amendment 2 (February 2021)
Test Results	PASS
Location of Test	■ Permanent Testing Lab ☐ On Site Testing (Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea)

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	June 20, 2024	Initial Release
1	July 10, 2024	- Added the note for all simultaneous transmission scenarios (page.30)
2	July 18, 2024	- Added the test software information (page.5)

Notice

Content
Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC/ISED Rules under normal use and maintenance. The results shown in this test report only apply to the sample(s), as received, provided by the applicant, unless otherwise stated. The test results have only been applied with the test methods required by the standard(s). The laboratory is not accredited for the test results marked *. Information provided by the applicant is marked **. Test results provided by external providers are marked ***. When confirmation of authenticity of this test report is required, please contact www.hct.co.kr The test results in this test report are not associated with the ((KS Q) ISO/IEC 17025) accreditation by KOLAS (Korea Laboratory Accreditation Scheme) / A2LA (American Association for Laboratory Accreditation) that are under the ILAC (International Laboratory Accreditation Cooperation) Mutual Recognition Agreement (MRA).

CONTENTS

1. EUT DESCRIPTION

EUT Type	Communication Module
FCC Model Name	W0C-0430
ISED Model Name	W0C-0430
Power Supply Voltage	DC 13.6V ± 15%
Frequency Range	2 402 MHz - 2 480 MHz
Max. RF Output Power	2.677 dBm (1.85 mW)
BT Operating Mode	Normal, EDR, AFH
Modulation Type	GFSK(Normal), π/4DQPSK and 8DPSK(EDR)
Modulation Technique	FHSS
Number of Channels	79 Channels, Minimum 20 Channels(AFH)
Antenna Specification	Type: Dipole Peak Gain: 4.45 dBi
Serial number	Conducted, Radiated : FES20066
PMN (Product Marketing Number)	W0C-0430
HVIN (Hardware Version Identification Number)	W0C-0430
FVIN (Firmware Version Identification Number)	N/A
HMN (Host Marketing Name)	VM8000-F
Test software(EUT for test)	Armada (S/W version : 1.42.0.200)
Host EUT description	This transmitter module has tested in the specific host devices , VM8000-F as non-stand-alone configuration.

2. Requirements for Bluetooth transmitter(15.247, RSS-247)

This Bluetooth module has been tested by a Bluetooth Qualification Lab, and we confirm the following:

1) This system is hopping pseudo-randomly.
2) Each frequency is used equally on the average by each transmitter.
3) The receiver input bandwidths that match the hopping channel bandwidths of their corresponding transmitters
4) The receiver shifts frequencies in synchronization with the transmitted signals.

▪ 15.247(g): The system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this Section 15.247 should the transmitter be presented with a continuous data (or information) stream.

▪ 15.247(h): The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

▪ RSS-247 5.1 (a): The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

3. TEST METHODOLOGY

The measurement procedure described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Device (ANSI C63.10-2013, KDB 558074) is used in the measurement of the test device.

EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpse of the measurements. According to its specifications, the EUT must comply with the requirements of the RSS-Gen issue 5, RSS-247 issue 3.

GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1 GHz. Above 1 GHz with 1.5m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6.6.5 of ANSI C63.10. (Version: 2013). To record the final measurements, the analyzer detector function was set to CISPR quasi-peak mode and the bandwidth of the spectrum analyzer was set to 120 kHz for frequencies below 1 GHz or 1 MHz for frequencies above 1 GHz. For average measurements above 1 GHz, the analyzer was set to peak detector and add the DCCF calculations.

DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards.
Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

5. FACILITIES AND ACCREDITATIONS

FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.
Detailed description of test facility was submitted to the Commission and accepted dated March 11, 2024 (Registration Number: KR0032).
For ISED, test facility was accepted dated March 13, 2024 (CAB identifier: KR0032).

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.
All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR § 15.203:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

(1) The antennas of this E.U.T are permanently attached.

(2) The E.U.T Complies with the requirement of § 15.20

According to RSS-GEN(Issue 5) Section 6.8:

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

7. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of
ANSI C63.10-2013.
All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence.
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.98 (Confidence level about 95 %, k=2)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.36 (Confidence level about 95 %, k=2)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.70 (Confidence level about 95 %, k=2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.52 (Confidence level about 95 %, k=2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.66 (Confidence level about 95 %, k=2)
Radiated Disturbance (Above 40 GHz)	5.58 (Confidence level about 95 %, k=2)

8. DESCRIPTION OF TESTS

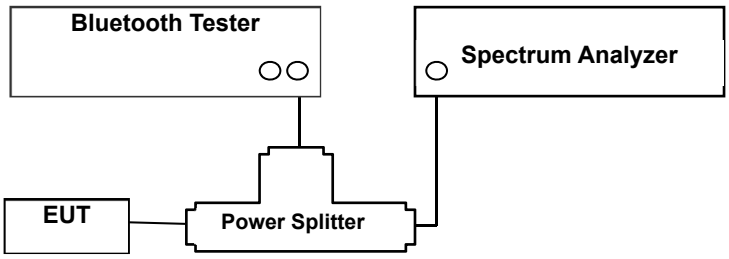
8.1. Conducted Maximum Peak Output Power

Limit

The maximum peak output power of the intentional radiator shall not exceed the following:

1. For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 W. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 W.
2. The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi.

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer. The Spectrum Analyzer is set to the peak detector mode. This test is performed with hopping off.

The Spectrum Analyzer is set to (7.8.5 in ANSI 63.10-2013& Procedure 9(b) in KDB 558074 v05r02)

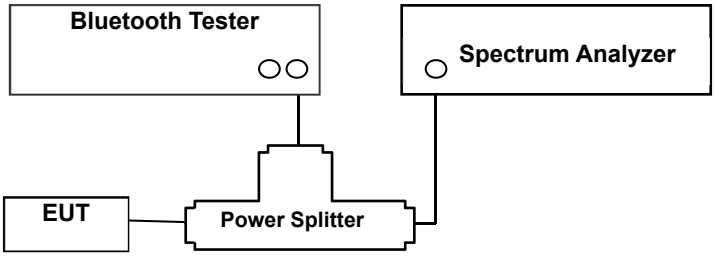
1) Span: approximately 5 times the 20 dB bandwidth, centered on a hopping channel
2) RBW> the 20 dB bandwidth of the emission being measured
3) VBW ≥ RBW
4) Sweep = Auto
5) Detector = Peak
6) Trace = Max hold

8.2. Conducted Band Edge(Out of Band Emissions)

Limit

According to § 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 a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Test Configuration



Test Procedure

This test is performed with hopping off and hopping on.

The Spectrum Analyzer is set to (6.10.4 in ANSI 63.10-2013& Procedure 8.5 and 8.6 in KDB 558074 v05r02)

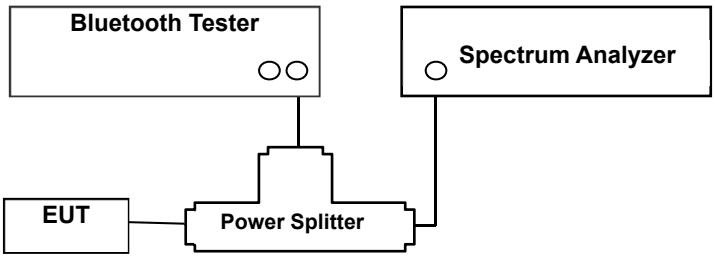
1) Span: Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation
2) Reference level: As required to keep the signal from exceeding the maximum instrument input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level.
3) Attenuation: Auto (at least 10 dB preferred).
4) Sweep time: Coupled.
5) RBW: 100 kHz
6) VBW: 300 kHz
7) Detector: Peak
8) Trace: Max hold

8.3. Frequency Separation & 20 dB Bandwidth

Limit

According to § 15.247(a)(1), Frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

Test Configuration



Test Procedure(Frequency Separation)

The Channel Separation test is performed with hopping on.
And the 20 dB Bandwidth test is performed with hopping off.

The Spectrum Analyzer is set to (7.8.2 in ANSI 63.10-2013& Procedure 9(b) in KDB 558074 v05r02)

1) Span: Wide enough to capture the peaks of two adjacent channels
2) RBW: Start with the RBW set to approximately 30 % of the channel spacing; adjust as necessary to best identify the center of each individual channel.
3) VBW ≥ RBW
4) Sweep: Auto
5) Detector: Peak
6) Trace: Max hold
7) All the trace to stabilize.
8) Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Compliance of an EUT with the appropriate regulatory limit shall be determined. A plot of the data shall be included in the test report.

Test Procedure (20 dB Bandwidth)

And the 20 dB Bandwidth test is performed with hopping off.

The Spectrum Analyzer is set to (6.9.2 in ANSI 63.10-2013)

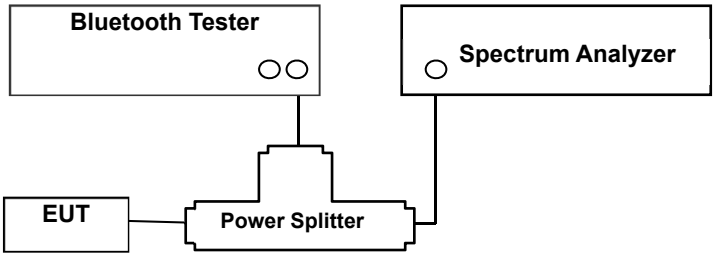
1) Span: Set between two times and five times the OBW
2) RBW: 1 % to 5 % of the OBW.
3) VBW ≥ 3 x RBW
4) Sweep: Auto
5) Detector: Peak
6) Trace: Max hold
7) All the trace to stabilize.

8.4. Number of Hopping Frequencies

Limit

According to § 15.247(a)(1)(iii), Frequency hopping systems operating in the 2400 MHz ~ 2483.5 MHz bands shall use at least 15 hopping frequencies.

Test Configuration



Test Procedure

The Bluetooth frequency hopping function of the EUT was enabled.

The Spectrum Analyzer is set to (7.8.3 in ANSI 63.10-2013& Procedure 9(b) in KDB 558074 v05r02)

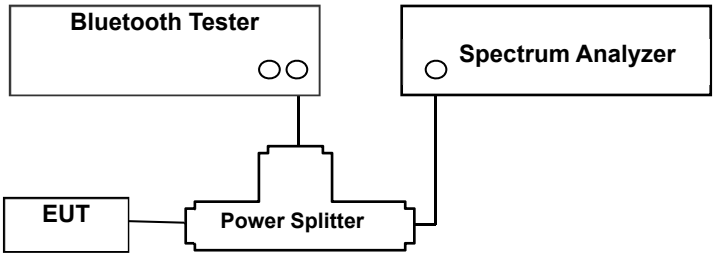
1) Span: the frequency band of operation
2) RBW: To identify clearly the individual channels, set the RBW to less than 30 % of the channel spacing or the 20 dB bandwidth, whichever is smaller.
3) VBW ≥ RBW
4) Sweep: Auto
5) Detector: Peak
6) Trace: Max hold
7) Allow the trace to stabilize.

8.5. Time of Occupancy

Limit

According to § 15.247(a)(1)(iii), Frequency hopping systems operating in the 2400 MHz ~ 2483.5 MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

Test Configuration



Test Procedure

This test is performed with hopping off.

The Spectrum Analyzer is set to (7.8.4 in ANSI 63.10-2013& Procedure 9(b) in KDB 558074 v05r02)

1) Span: Zero span, centered on a hopping channel
2) RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.
3) Sweep = as necessary to capture the entire dwell time per hopping channel
4) Detector: Peak
5) Trace: Max hold

The marker-delta function was used to determine the dwell time.

Sample Calculation

The following calculation process is not relevant to our measurement results. It is just an example.

(1) Non-AFH Mode

- DH 5 (GFSK) : 2.890 x (1600/6)/79 x 31.6 = 308.27 (ms)
- 2-DH 5 (π/4DQPSK) : 2.890 x (1600/6)/79 x 31.6 = 308.27 (ms)
- 3-DH 5 (8DPSK) : 2.890 x (1600/6)/79 x 31.6 = 308.27 (ms)

(2) AFH Mode

- DH 5 (GFSK) : 2.890 x (800/6)/20 x 8.0 = 154.13 (ms)
- 2-DH 5 (π/4DQPSK) : 2.890 x (800/6)/20 x 8.0 = 154.13 (ms)
- 3-DH 5 (8DPSK) : 2.890 x (800/6)/20 x 8.0 = 154.13 (ms)

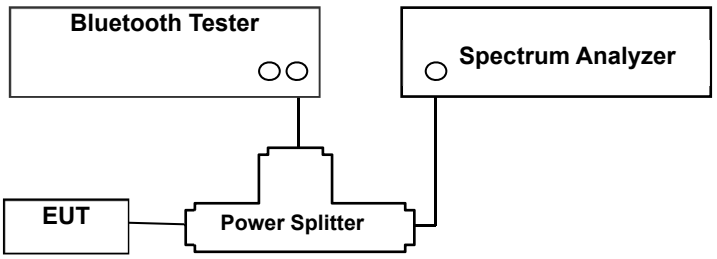
Note :
DH5 Packet need 5 time slot for transmitting and 1 time slot for receiving.
Then the system makes worst case 1600/6 hops per second with 79 channels. So the system have each channel 3.3755 times per second and so for 31.6 seconds the system have 106.667 times of appearance.
Each tx-time per appearance of DH5 is 2.890 ms.
Dwell time = Tx-time x 106.667 = 308.27 (ms)

8.6. Conducted Spurious Emissions

Limit

Conducted > 20 dBc

Test Configuration



Test Procedure

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer.
The Spectrum Analyzer is set to (7.8.8 in ANSI 63.10-2013& Procedure 8.5 and 8.6 in KDB 558074 v05r02)

1) Span:30 MHz to 10 times the operating frequency in GHz.
2) RBW: 100 kHz
3) VBW: 300 kHz
4) Sweep: Coupled
5) Detector: Peak

Measurements are made over the 30 MHz to 25 GHz range with the transmitter set to the lowest, middle, and highest channels.
This test is performed with hopping off.

Factors for frequency

Freq(MHz)	Factor(dB)
30	10.10
100	10.11
200	10.15
300	10.18
400	10.19
500	10.26
600	10.25
700	10.28
800	10.29
900	10.30
1000	10.30
2000	10.52
2400	10.60
2500	10.60
3000	10.62
4000	10.67
5000	10.80
6000	10.90
7000	10.90
8000	10.94
9000	11.04
10000	11.14
11000	11.18
12000	11.22
13000	11.28
14000	11.35
15000	11.44
16000	11.49
17000	11.53
18000	11.57
19000	11.63
20000	11.68
21000	11.71
22000	11.80
23000	11.82
24000	11.93
25000	11.95

Note : 1. 2400 ~ 2500 MHz is fundamental frequency range.

2. Factor = Attenuator loss + Cable loss

8.7. Radiated Test

Limit

FCC

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30

ISED

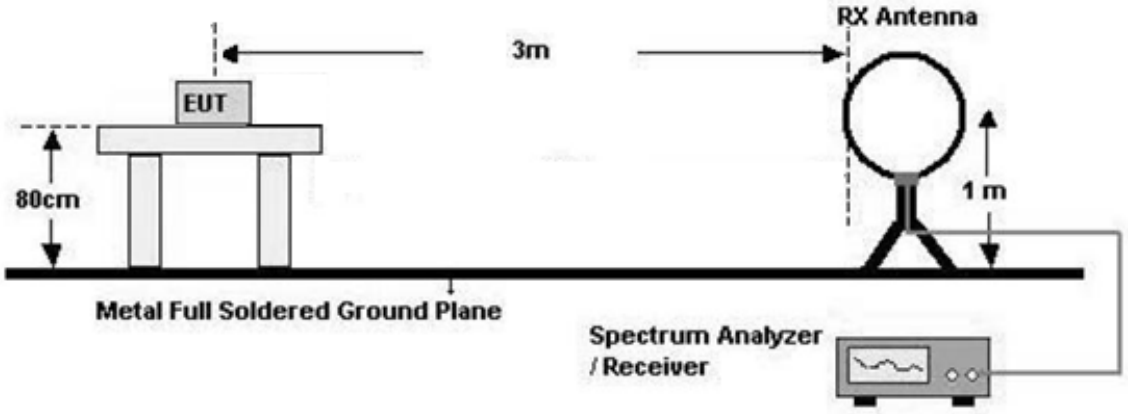
Frequency (MHz)	Field Strength (μA/m)	Measurement Distance (m)
0.009 – 0.490	6.37/F(kHz)	300
0.490 – 1.705	63.7/F(kHz)	30
1.705 – 30	0.08	30

FCC&ISED

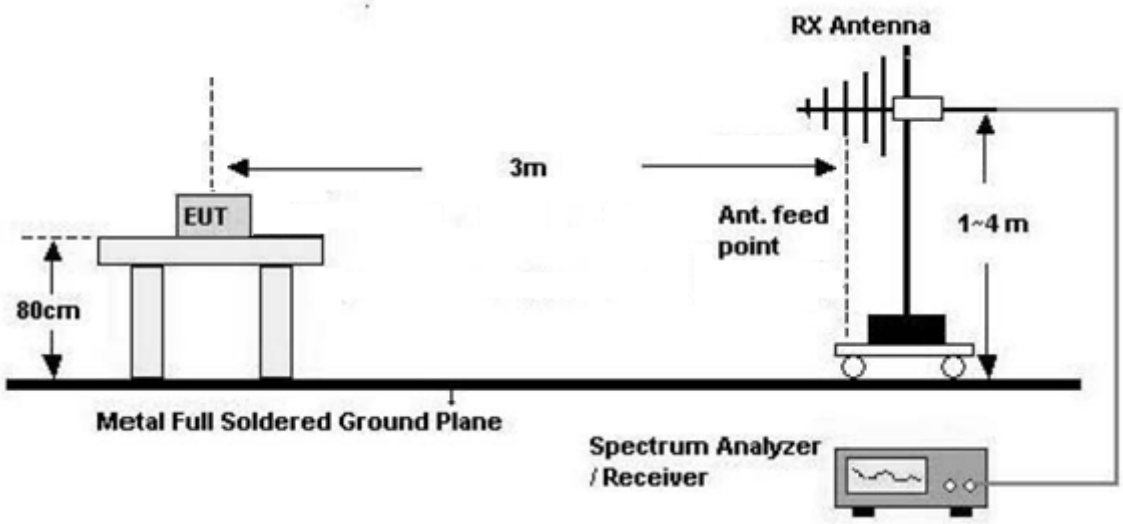
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

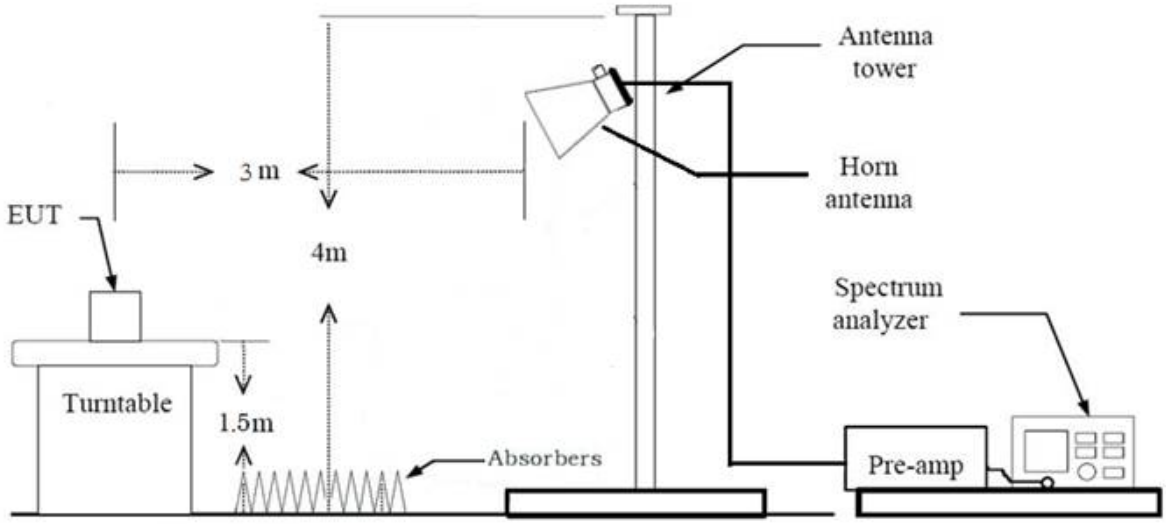
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions(Below30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor(0.009 MHz – 0.490 MHz) =40log(3 m/300 m)= - 80 dB
   Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) =40log(3 m/30 m)= - 40 dB
   Measurement Distance : 3 m
8. Spectrum Setting
   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = Max hold
   - RBW = 9 kHz
   - VBW ≥ 3 x RBW
9. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific

emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

KDB 414788 OFS and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

Test Procedure of Radiated spurious emissions(Below 1 GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8m above ground plane.
3. The Hybrid antenna was placed at a location 3m from the EUT, which is varied from 1m to 4m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 30 MHz – 1 GHz
      - Detector = Peak
      - Trace = Max hold
      - RBW = 100 kHz
      - VBW ≥ 3 x RBW
   (2) Measurement Type(Quasi-peak):
      - Measured Frequency Range : 30 MHz – 1 GHz
      - Detector = Quasi-Peak
      - RBW = 120 kHz

   ※In general, (1) is used mainly
7. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L)
8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

Test Procedure of Radiated spurious emissions (Above 1 GHz)

1. Radiated test is performed with hopping off.

2. The EUT is placed on a turntable, which is 1.5 m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
6. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
7. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
8. The unit was tested with its standard battery.
9. Spectrum Setting
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 1 GHz – 25 GHz
      - Detector = Peak
      - Trace = Max hold
      - RBW = 1 MHz
      - VBW ≥ 3 x RBW

(2) Measurement Type(Average):
      - Average value of pulsed emissions
      - Unless otherwise specified, when the radiated emission limits are expressed in terms of the average value of the emission and pulsed operation is employed, the average measurement shall determine from the peak field strength after correcting for the worst-case duty cycle as described in Number.14 (On Page. 23)

   ◆ Duty Cycle Correction(AFH) = 20log (Worst Case Dwell Time/ 100ms) dB = -24.7314 dB

10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
11. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
12. Total(Measurement Type : Peak)
   = Measured Value(Peak) + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) – Amp Gain(A.G)

   Total(Measurement Type : Average)
   = Measured Value(Peak) + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) - Amp Gain(A.G) + D.C.C.F(AFH)

Test Procedure of Radiated Restricted Band Edge

1. Radiated test is performed with hopping off.

2. The EUT is placed on a turntable, which is 1.5 m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting
   (1) Measurement Type(Peak):
      - Detector = Peak
      - Trace = Max hold
      - RBW = 1 MHz
      - VBW ≥ 3 x RBW
   (2) Measurement Type(Average):
      - Average value of pulsed emissions
      - Unless otherwise specified, when the radiated emission limits are expressed in terms of the average value of the emission and pulsed operation is employed, the average measurement shall determine from the peak field strength after correcting for the worst-case duty cycle as described in Number.14 (On Page. 23)
   ◆ Duty Cycle Correction(AFH) = 20log (Worst Case Dwell Time/ 100ms) dB = -24.7314 dB
9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
10. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
11.Total
   (1)Measurement(Peak)
      = Measured Value(Peak) + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) - Amp Gain(A.G) + Attenuator(ATT)
   (2)Measurement(Avg)
      = Measured Value(Peak) + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) - Amp Gain(A.G) + Attenuator(ATT) + D.C.C.F(AFH)

8.8. Receiver Spurious Emissions

Limit

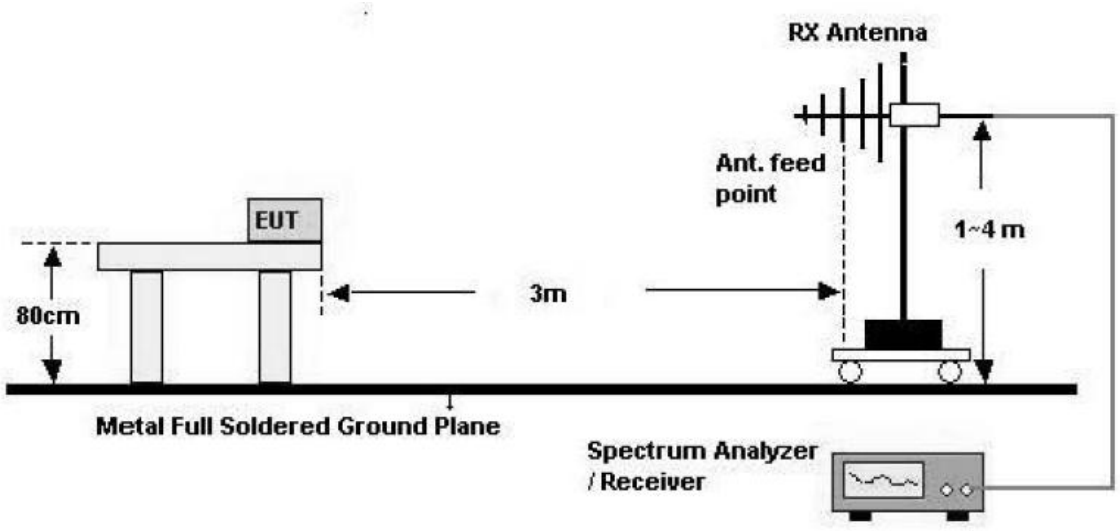
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

Measurements for compliance with the limits in table may be performed at distances other than 3 metres.

Test Configuration

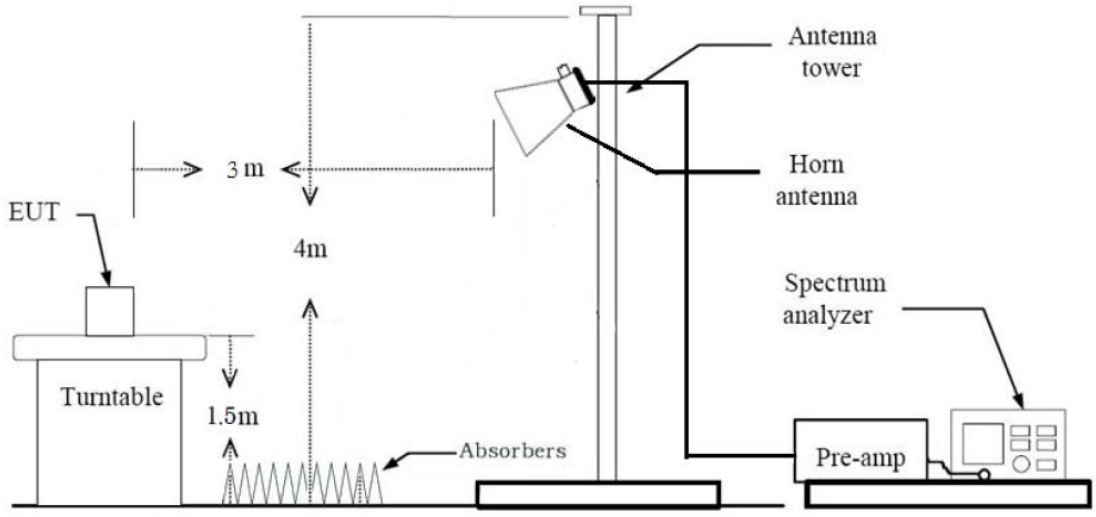
30 MHz - 1 GHz



Test Procedure of Receiver Spurious Emissions (Below 1GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8m above ground plane.
3. The Hybrid antenna was placed at a location 3m from the EUT, which is varied from 1m to 4m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 30 MHz – 1 GHz
      - Detector = Peak
      - Trace = Maxhold
      - RBW = 100 kHz
      - VBW ≥ 3 x RBW
7. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) – Amp Gain(A.G)

Above 1 GHz



Test Procedure of Radiated spurious emissions (Above 1 GHz)

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

4. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting
   (1) Measurement Type(Average):
      - RBW = 1 MHz
      - VBW = 3 MHz
      - Detector = Average(RMS)
      - Trace = Average
      - Trace was allowed to stabilize
9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
10. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G) + Distance Factor(D.F)

8.9. AC Power line Conducted Emissions

Limit

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56[a]	56 to 46[a]
0.50 to 5	56	46
5 to 30	60	50

[a]Decreases with the logarithm of the frequency.

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Annex A for the actual connections between EUT and support equipment.

Test Procedure

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors : Quasi Peak and Average Detector.
5. The EUT is the device operating below 30MHz.
   - For unterminated the Antenna, the AC line conducted tests are performed with the antenna connected
   - For terminated the Antenna, the AC line conducted tests are performed with a dummy load connected to the EUT antenna output terminal.

Sample Calculation

Quasi-peak(Final Result) = Measured Value + Correction Factor

8.10. Worst case configuration and mode

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone, Stand alone + External accessories (Microphone, Speaker, etc)
   - Worstcase : Stand alone + External accessories (Microphone, Speaker, etc)
2. EUT Axis
   - Radiated Spurious Emissions : Y
   - Radiated Restricted Band Edge : Z
3. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
   - Position : Horizontal, Vertical, Parallel to the ground plane
4. All data rate of operation were investigated and the test results are worst case in highest datarate of each mode.
   - GFSK : DH5
   - π/4DQPSK : 2-DH5
   - 8DPSK : 3-DH5
5. All simultaneous transmission scenarios of operation were investigated, and the test results showed no additional significant emissions relative to the least restrictive limit were observed. Therefore, only the worst case(Stand alone + External accessories) results were reported.

Conducted test

1. The EUT was configured with data rate of highest power.
   - GFSK : DH5
   - π/4DQPSK : 2-DH5
   - 8DPSK : 3-DH5

AC Power line Conducted Emissions

1. Not Tested.

9. SUMMARY TEST OF RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result	Status
20 dB Bandwidth	§ 15.247(a)(1)	N/A	Conducted	PASS	NT Note2
Occupied Bandwidth	N/A	N/A		PASS	NT Note2
Conducted Maximum Peak Output Power	§ 15.247(b)(1)	< 0.125 W		PASS	C Note4
Carrier Frequency Separation	§ 15.247(a)(1)	>25 kHz or >2/3 of the 20 dB BW		PASS	NT Note2
Number of Hopping Frequencies	§ 15.247(a)(1)(iii)	≥ 15		PASS	NT Note2
Time of Occupancy	§ 15.247(a)(1)(iii)	<400 ms		PASS	NT Note2
Conducted Spurious Emissions	§ 15.247(d)	> 20 dB for all out-of band emissions		PASS	NT Note2
Band Edge (Out of Band Emissions)	§ 15.247(d)	> 20 dB for all out-of band emissions		PASS	NT Note2
AC Power line Conducted Emissions	§ 15.207(a)	cf. Section 8.8		PASS	NT Note2
Radiated Spurious Emissions	§ 15.247(d), 15.205, 15.209	cf. Section 8.7	Radiated	PASS	C Note3
Radiated Restricted Band Edge	§ 15.247(d), 15.205, 15.209	cf. Section 8.7		PASS	C Note3
Receiver Spurious Emissions	N/A	cf. Section 8.9		PASS	C Note3

Note:

1. C = Comply, NT = Not Tested, NA = Not Applicable, NC = Not Comply
2. C2PC model is electrically identical to the Original model.
3. The data from that application has been verified through appropriate spot checks to demonstrate compliance for this device as shown in the test result of section 10.
4. Output power was verified to be within the expected tune up tolerances prior to performing the spot checks for radiated spurious emissions and band edge to confirm that the proposed changes to the digital circuitry had not adversely affected the previously reported values in the original filing.

Test Description	ISED Part Section(s)	Test Limit	Test Condition	Test Result	Status
20 dB Bandwidth	RSS-247, 5.1	N/A	Conducted	PASS	NT Note2
Occupied Bandwidth	RSS-GEN, 6.7	N/A		PASS	NT Note2
Conducted Maximum Peak Output Power	RSS-247, 5.1 b)	< 0.125 W		PASS	C Note4
Carrier Frequency Separation	RSS-247, 5.1 b)	>25 kHz or >2/3 of the 20 dB BW		PASS	NT Note2
Number of Hopping Frequencies	RSS-247, 5.1 d)	≥ 15		PASS	NT Note2
Time of Occupancy	RSS-247, 5.1 d)	<400 ms		PASS	NT Note2
Conducted Spurious Emissions	RSS-247, 5.5	> 20 dB for all out-of band emissions		PASS	NT Note2
Band Edge (Out of Band Emissions)	RSS-247, 5.5	> 20 dB for all out-of band emissions		PASS	NT Note2
AC Power line Conducted Emissions	RSS-GEN, 8.8	cf. Section 8.8		PASS	NT Note2
Radiated Spurious Emissions	RSS-GEN, 8.9	cf. Section 8.7	Radiated	PASS	C Note3
Radiated Restricted Band Edge	RSS-GEN, 8.9 RSS-GEN, 8.10	cf. Section 8.7		PASS	C Note3
Receiver Spurious Emissions	RSS-GEN, 7	cf. Section 8.9		PASS	C Note3

Note:

1. C = Comply, NT = Not Tested, NA = Not Applicable, NC = Not Comply
2. C4PC model is electrically identical to the Original model.
3. The data from that application has been verified through appropriate spot checks to demonstrate compliance for this device as shown in the test result of section 10.
4. Output power was verified to be within the expected tune up tolerances prior to performing the spot checks for radiated spurious emissions and band edge to confirm that the proposed changes to the digital circuitry had not adversely affected the previously reported values in the original filing.

10. TEST RESULT

10.1 Peak Power

Mode	Frequency [MHz]	Channel No.	Peak Power [dBm]	Limit (mW)
GFSK	2402	0	2.677	125
	2441	39	1.428	
	2480	78	1.580	
π/4DQPSK	2402	0	-0.136	
	2441	39	-0.206	
	2480	78	-0.118	
8DPSK	2402	0	0.181	
	2441	39	0.191	
	2480	78	0.257	

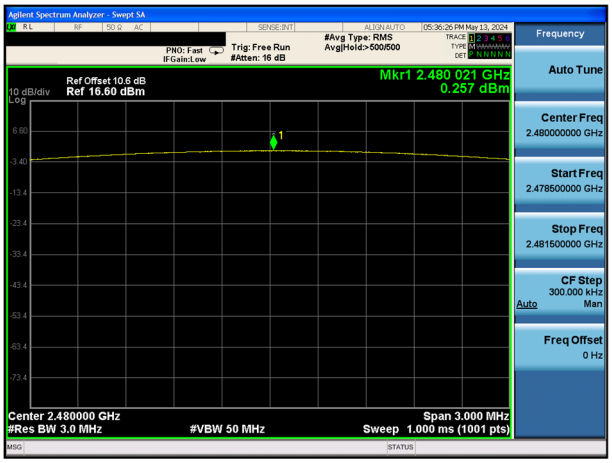
▣ TEST PLOTS

Note :
In order to simplify the report, attached plots were only the worst case channel.

GFSK : Peak Power (CH. 0)

π/4DQPSK : Peak Power (CH. 78)

8DPSK : Peak Power (CH. 78)



10.2 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30 MHz

Frequency	Measured Value	A.F+C.L+D.F	POL	Total	Limit	Margin
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]
No Critical peaks found						

Note:

1. The Measured of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
2. Distance extrapolation factor = 40log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBμV) + Distance extrapolation factor
4. Radiated test is performed with hopping off.

Frequency Range : Below 1 GHz

Frequency	Measured Value	A.F+C.L	POL	Total	Limit	Margin
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]
No Critical peaks found						

Note:

1. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
2. Radiated test is performed with hopping off.

Frequency Range : Above 1 GHz

Operation Mode	Normal(GFSK)
Operating Frequency	2402 MHz
Channel No	CH. 0

Frequency	Measured Value	A.F+C.L -A.G+D.F	Pol.	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dB]	[dBµV/m]	[dBµV/m]	[dB]	
4804	42.78	4.46	V	0.00	47.24	73.98	26.75	PK
4804	42.78	4.46	V	-24.73	22.50	53.98	31.48	AV
7206	37.47	13.17	V	0.00	50.64	73.98	23.35	PK
7206	37.47	13.17	V	-24.73	25.90	53.98	28.08	AV
4804	43.17	4.08	H	0.00	47.25	73.98	26.73	PK
4804	43.17	4.08	H	-24.73	22.52	53.98	31.46	AV
7206	38.45	12.81	H	0.00	51.26	73.98	22.72	PK
7206	38.45	12.81	H	-24.73	26.53	53.98	27.45	AV

Operation Mode	Normal(GFSK)
Operating Frequency	2441 MHz
Channel No	CH. 39

Frequency	Measured Value	A.F+C.L -A.G+D.F	Pol.	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dB]	[dBµV/m]	[dBµV/m]	[dB]	
4882	43.98	4.51	V	0.00	48.49	73.98	25.49	PK
4882	43.98	4.51	V	-24.73	23.76	53.98	30.22	AV
7323	39.43	12.25	V	0.00	51.68	73.98	22.30	PK
7323	39.43	12.25	V	-24.73	26.95	53.98	27.03	AV
4882	43.31	4.51	H	0.00	47.82	73.98	26.16	PK
4882	43.31	4.51	H	-24.73	23.09	53.98	30.89	AV
7323	39.91	12.25	H	0.00	52.16	73.98	21.82	PK
7323	39.91	12.25	H	-24.73	27.43	53.98	26.55	AV

Operation Mode	Normal(GFSK)
Operating Frequency	2480 MHz
Channel No	CH. 78

Frequency	Measured Value	A.F+C.L -A.G+D.F	Pol.	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dB]	[dBµV/m]	[dBµV/m]	[dB]	
4960	43.47	5.29	V	0.00	48.76	73.98	25.22	PK
4960	43.47	5.29	V	-24.73	24.03	53.98	29.95	AV
7440	**39.93**	**12.71**	**V**	**0.00**	**52.64**	**73.98**	**21.34**	**PK**
7440	**39.93**	**12.71**	**V**	**-24.73**	**27.90**	**53.98**	**26.08**	**AV**
4960	42.52	5.29	H	0.00	47.81	73.98	26.17	PK
4960	42.52	5.29	H	-24.73	23.08	53.98	30.90	AV
7440	39.47	12.71	H	0.00	52.18	73.98	21.80	PK
7440	39.47	12.71	H	-24.73	27.44	53.98	26.54	AV

Operation Mode	Normal(π/4DQPSK)
Operating Frequency	2402 MHz
Channel No	CH. 0

Frequency	Measured Value	A.F+C.L -A.G+D.F	Pol.	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
4804	42.21	4.46	V	0.00	46.67	73.98	27.32	PK
4804	42.21	4.46	V	-24.73	21.93	53.98	32.05	AV
7206	37.76	13.17	V	0.00	50.93	73.98	23.06	PK
7206	37.76	13.17	V	-24.73	26.19	53.98	27.79	AV
4804	43.39	4.08	H	0.00	47.47	73.98	26.51	PK
4804	43.39	4.08	H	-24.73	22.74	53.98	31.24	AV
7206	38.45	12.81	H	0.00	51.26	73.98	22.72	PK
7206	38.45	12.81	H	-24.73	26.53	53.98	27.45	AV

Operation Mode	Normal(π/4DQPSK)
Operating Frequency	2441 MHz
Channel No	CH. 39

Frequency	Measured Value	A.F+C.L -A.G+D.F	Pol.	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
4882	43.95	4.51	V	0.00	48.46	73.98	25.52	PK
4882	43.95	4.51	V	-24.73	23.73	53.98	30.25	AV
7323	38.12	12.25	V	0.00	50.37	73.98	23.61	PK
7323	38.12	12.25	V	-24.73	25.64	53.98	28.34	AV
4882	44.55	4.51	H	0.00	49.06	73.98	24.92	PK
4882	44.55	4.51	H	-24.73	24.33	53.98	29.65	AV
7323	39.28	12.25	H	0.00	51.53	73.98	22.45	PK
7323	39.28	12.25	H	-24.73	26.80	53.98	27.18	AV

Operation Mode	Normal(π/4DQPSK)
Operating Frequency	2480 MHz
Channel No	CH. 78

Frequency	Measured Value	A.F+C.L -A.G+D.F	Pol.	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
4960	43.22	5.29	V	0.00	48.51	73.98	25.47	PK
4960	43.22	5.29	V	-24.73	23.78	53.98	30.20	AV
7440	**39.69**	**12.71**	**V**	**0.00**	**52.40**	**73.98**	**21.58**	**PK**
7440	**39.69**	**12.71**	**V**	**-24.73**	**27.66**	**53.98**	**26.32**	**AV**
4960	42.31	5.29	H	0.00	47.60	73.98	26.38	PK
4960	42.31	5.29	H	-24.73	22.87	53.98	31.11	AV
7440	39.16	12.71	H	0.00	51.87	73.98	22.11	PK
7440	39.16	12.71	H	-24.73	27.13	53.98	26.85	AV

Operation Mode	Normal(8DPSK)
Operating Frequency	2402 MHz
Channel No	CH. 0

Frequency	Measured Value	A.F+C.L -A.G+D.F	Pol.	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
4804	42.59	4.08	V	0.00	46.67	73.98	27.31	PK
4804	42.59	4.08	V	-24.73	21.94	53.98	32.04	AV
7206	37.13	12.81	V	0.00	49.94	73.98	24.04	PK
7206	37.13	12.81	V	-24.73	25.21	53.98	28.77	AV
4804	42.86	4.08	H	0.00	46.94	73.98	27.04	PK
4804	42.86	4.08	H	-24.73	22.21	53.98	31.77	AV
7206	38.02	12.81	H	0.00	50.83	73.98	23.15	PK
7206	38.02	12.81	H	-24.73	26.10	53.98	27.88	AV

Operation Mode	Normal(8DPSK)
Operating Frequency	2441 MHz
Channel No	CH. 39

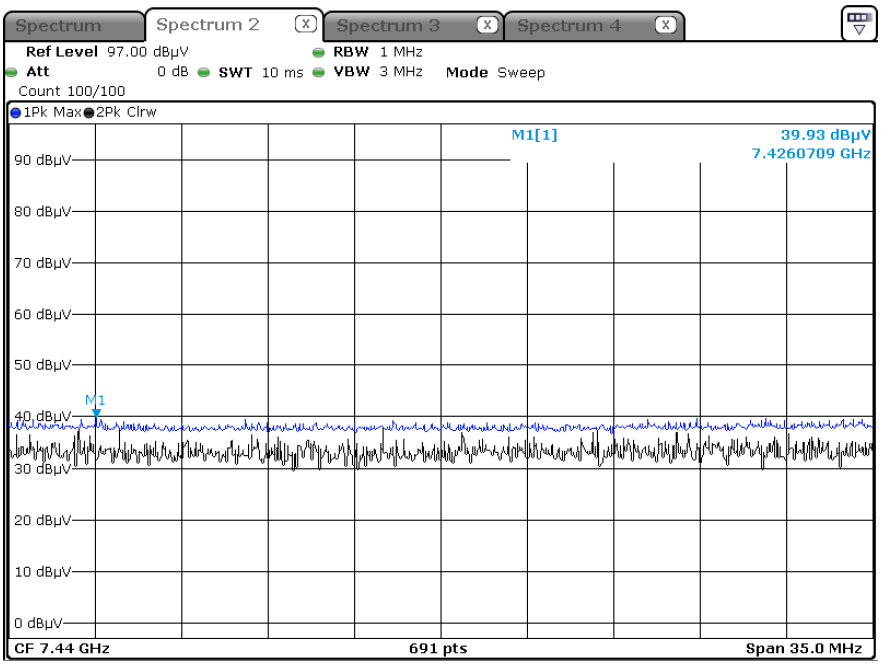
Frequency	Measured Value	A.F+C.L -A.G+D.F	Pol.	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
4882	43.75	4.51	V	0.00	48.26	73.98	25.72	PK
4882	43.75	4.51	V	-24.73	23.53	53.98	30.45	AV
7323	38.35	12.25	V	0.00	50.60	73.98	23.38	PK
7323	38.35	12.25	V	-24.73	25.87	53.98	28.11	AV
4882	44.20	4.51	H	0.00	48.71	73.98	25.27	PK
4882	44.20	4.51	H	-24.73	23.98	53.98	30.00	AV
7323	39.62	12.25	H	0.00	51.87	73.98	22.11	PK
7323	39.62	12.25	H	-24.73	27.14	53.98	26.84	AV

Operation Mode	Normal(8DPSK)
Operating Frequency	2480 MHz
Channel No	CH. 78

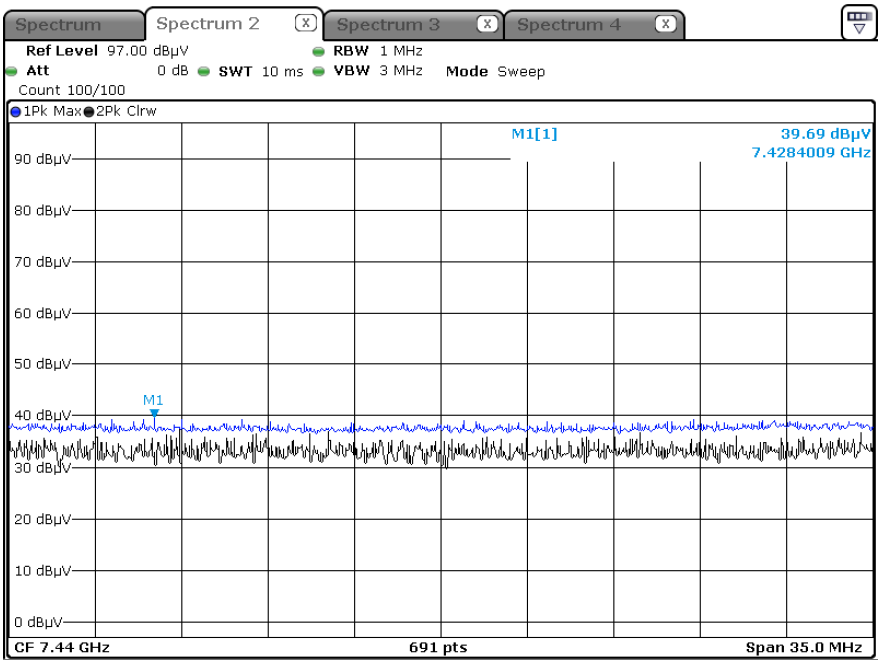
Frequency	Measured Value	A.F+C.L -A.G+D.F	Pol.	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dB]	[dBµV/m]	[dBµV/m]	[dB]	
4960	43.61	5.29	V	0.00	48.90	73.98	25.08	PK
4960	43.61	5.29	V	-24.73	24.17	53.98	29.81	AV
7440	**39.49**	**12.71**	**V**	**0.00**	**52.20**	**73.98**	**21.78**	**PK**
7440	**39.49**	**12.71**	**V**	**-24.73**	**27.46**	**53.98**	**26.52**	**AV**
4960	43.01	5.29	H	0.00	48.30	73.98	25.68	PK
4960	43.01	5.29	H	-24.73	23.57	53.98	30.41	AV
7440	38.62	12.71	H	0.00	51.33	73.98	22.65	PK
7440	38.62	12.71	H	-24.73	26.59	53.98	27.39	AV

RESULT PLOTS

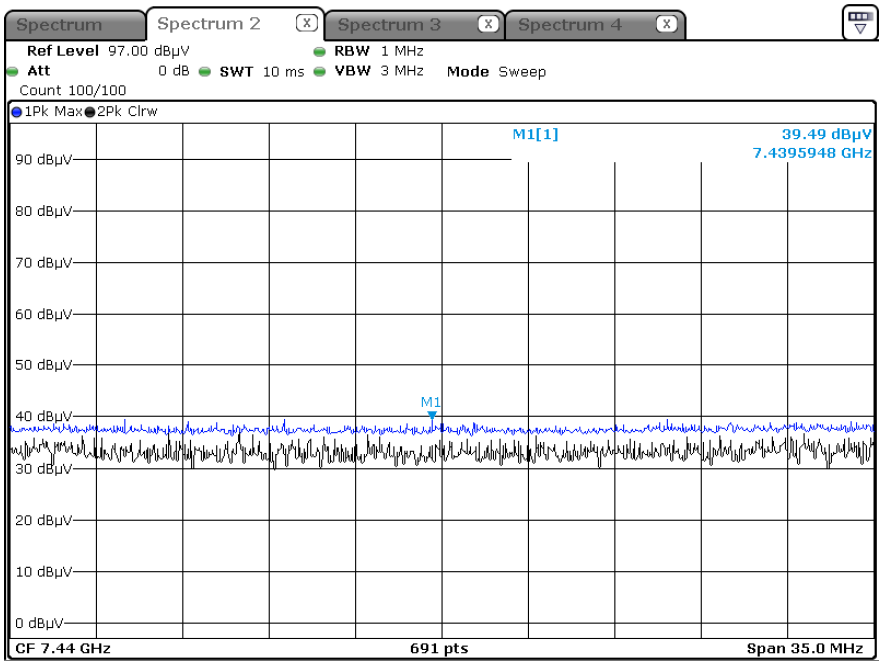
Radiated Spurious Emissions plot – Peak & Average Result (GFSK, Ch.78 3rd Harmonic, V)



Radiated Spurious Emissions plot – Peak & Average Result (π/4DQPSK, Ch.78 3rd Harmonic, V)



Radiated Spurious Emissions plot – Peak & Average Result (8DPSK, Ch.78 3rd Harmonic, V)



Note: Plots of worst case are only reported.

10.3 RADIATED RESTRICTED BAND EDGES

Operation Mode	Normal(GFSK)
Operating Frequency	2402 MHz, 2480 MHz
Channel No	CH. 0, CH. 78

Frequency	Measured Level	A.F+C.L-A.G +ATT+D.F	Pol.	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
2390.0	47.60	2.58	H	0	50.18	73.98	23.81	PK
2390.0	47.60	2.58	H	-24.73	25.44	53.98	28.54	AV
2390.0	46.58	2.58	V	0	49.16	73.98	24.83	PK
2390.0	46.58	2.58	V	-24.73	24.42	53.98	29.56	AV
2483.5	**48.46**	**3.28**	**H**	**0**	**51.74**	**73.98**	**22.24**	**PK**
2483.5	**48.46**	**3.28**	**H**	**-24.73**	**27.01**	**53.98**	**26.97**	**AV**
2483.5	46.89	3.28	V	0	50.17	73.98	23.81	PK
2483.5	46.89	3.28	V	-24.73	25.44	53.98	28.54	AV

Operation Mode	EDR(π/4DQPSK)
Operating Frequency	2402 MHz, 2480 MHz
Channel No	CH. 0, CH. 78

Frequency	Measured Level	A.F+C.L-A.G +ATT+D.F	Pol.	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
2390.0	47.40	2.58	H	0	49.98	73.98	24.01	PK
2390.0	47.40	2.58	H	-24.73	25.24	53.98	28.74	AV
2390.0	46.85	2.58	V	0	49.43	73.98	24.56	PK
2390.0	46.85	2.58	V	-24.73	24.69	53.98	29.29	AV
2483.5	**47.60**	**3.28**	**H**	**0**	**50.88**	**73.98**	**23.10**	**PK**
2483.5	**47.60**	**3.28**	**H**	**-24.73**	**26.15**	**53.98**	**27.83**	**AV**
2483.5	46.59	3.28	V	0	49.87	73.98	24.11	PK
2483.5	46.59	3.28	V	-24.73	25.14	53.98	28.84	AV

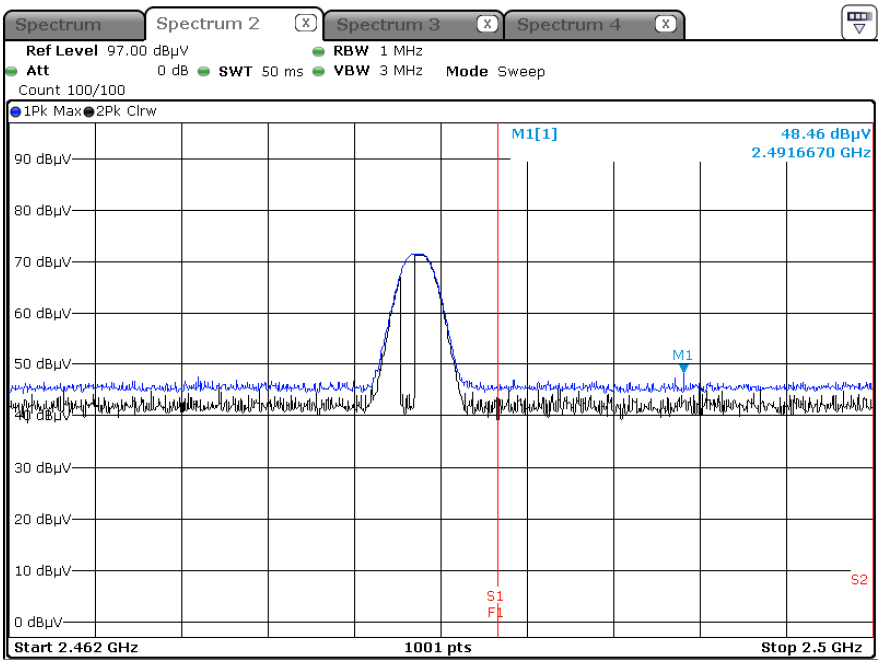
Operation Mode	EDR(8DPSK)
Operating Frequency	2402 MHz, 2480 MHz
Channel No	CH. 0, CH. 78

Frequency	Measured Level	A.F+C.L-A.G +ATT+D.F	Pol.	Duty Cycle Correction	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dB]	[dBμV/m]	[dBμV/m]	[dB]	
2390.0	47.39	2.58	H	0	49.97	73.98	24.02	PK
2390.0	47.39	2.58	H	-24.73	25.23	53.98	28.75	AV
2390.0	46.82	2.58	V	0	49.40	73.98	24.59	PK
2390.0	46.82	2.58	V	-24.73	24.66	53.98	29.32	AV
2483.5	**47.48**	**3.28**	**H**	**0**	**50.76**	**73.98**	**23.22**	**PK**
2483.5	**47.48**	**3.28**	**H**	**-24.73**	**26.03**	**53.98**	**27.95**	**AV**
2483.5	46.55	3.28	V	0	49.83	73.98	24.15	PK
2483.5	46.55	3.28	V	-24.73	25.10	53.98	28.88	AV

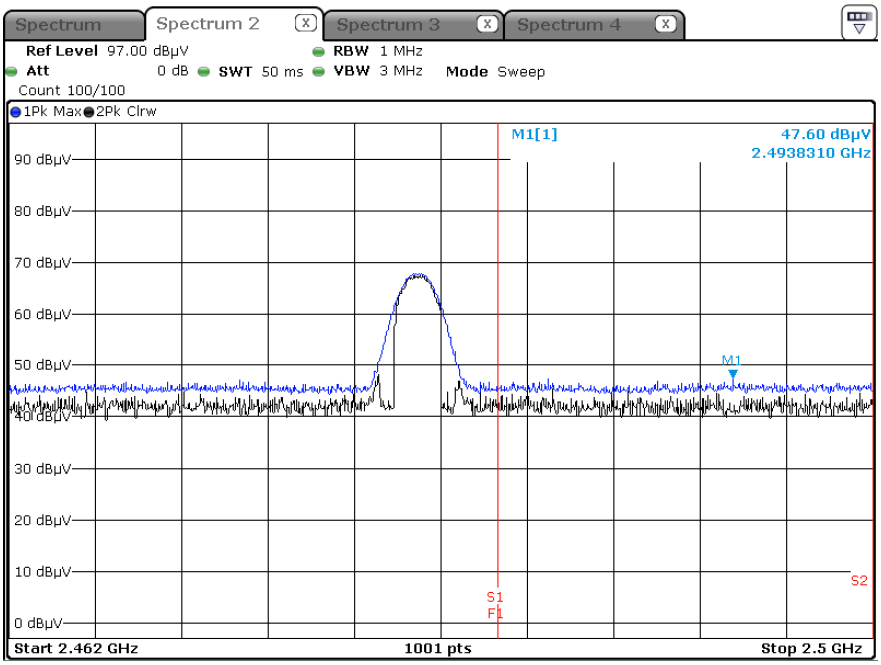
RESULT PLOTS

[Ant.1]

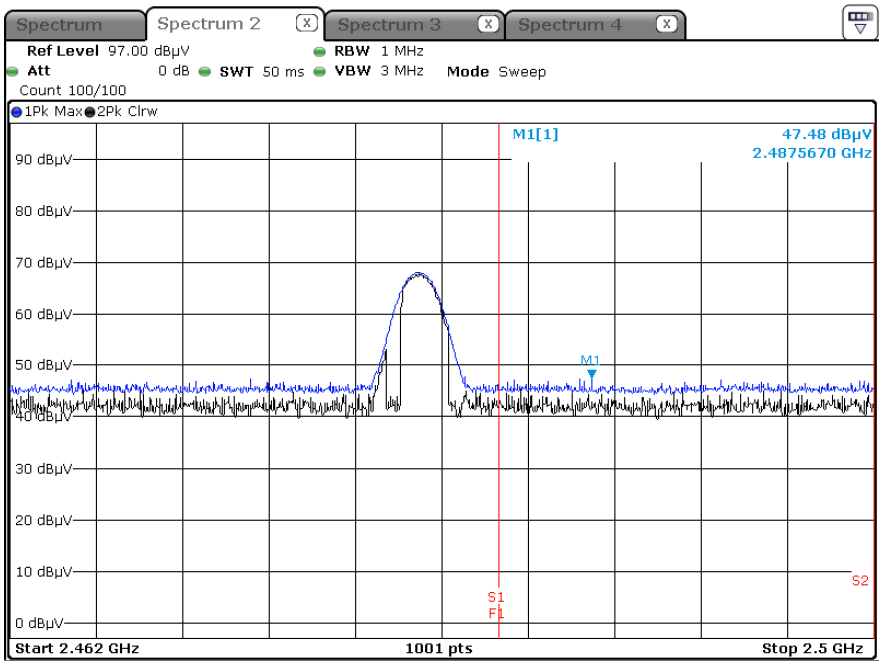
Radiated Restricted Band Edges plot – Average & Peak Result (GFSK, Ch. 78, X-H)



Radiated Restricted Band Edges plot – Average & Peak Result (π/4DQPSK, Ch. 78, Z-V)



Radiated Restricted Band Edges plot – Average & Peak Result (8DPSK, Ch. 78, Z-V)



Note:

Plot of worst case are only reported.

10.4 RECEIVER SPURIOUS EMISSIONS

Frequency Range : Below 1 GHz

Frequency	Measured Value	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	[dBμV/m]	dBm/m	dBm	(H/V)	[dBμV/m]	[dBμV/m]	dB
No Critical peaks found							

Note:

1. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.

Frequency Range : Above 1 GHz

Frequency	Measured Value	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	[dBμV/m]	dBm/m	dBm	(H/V)	[dBμV/m]	[dBμV/m]	dB
No Critical peaks found							

11. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	08/02/2024	Annual
EMI Test Receiver	ESCI	Rohde & Schwarz	100584	05/08/2025	Annual
Temperature Chamber	SU-642	ESPEC	0093008124	02/19/2025	Annual
Signal Analyzer	N9030A	Agilent	MY49431210	12/19/2024	Annual
Power Meter	N1911A	Agilent	MY45100523	02/28/2025	Annual
Power Sensor	N1921A	Agilent	MY57820067	02/22/2025	Annual
Directional Coupler	87300B	Agilent	3116A03621	10/30/2024	Annual
Power Splitter	11667B	Hewlett Packard	10545	02/06/2025	Annual
DC Power Supply	E3632A	Agilent	KR75305528	01/02/2025	Annual
Attenuator(10 dB)	8493C	Hewlett Packard	07560	06/05/2025	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	HCT CO., LTD.	N/A	N/A	N/A
Bluetooth Tester	CBT	Rohde & Schwarz	100808	02/15/2025	Annual

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

Radiated Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller(Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	S2AM	08/03/2025	Biennial
Controller	EM1000	Audix	060520	N/A	N/A
Turn Table	N/A	Audix	N/A	N/A	N/A
Loop Antenna	FMZB 1513	Rohde & Schwarz	1513-333	03/07/2026	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	760	02/24/2025	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	02299	01/29/2026	Biennial
Horn Antenna (15GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Spectrum Analyzer	FSV40	Rohde & Schwarz	100901	02/22/2025	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	5	06/04/2025	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	6	06/04/2025	Annual
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	01/02/2025	Annual
Band Reject Filter	WRCJV5100/5850-40/50-8EEK	Wainwright Instruments	1	02/14/2025	Annual
RF Switching System	FMSR-04B (3G HPF+LNA)	T&M SYSTEM	S2L1	12/27/2024	Annual
RF Switching System	FMSR-04B (10dB ATT+LNA)	T&M SYSTEM	S2L2	12/27/2024	Annual
RF Switching System	FMSR-04B (3dB ATT+LNA)	T&M SYSTEM	S2L3	12/27/2024	Annual
RF Switching System	FMSR-04B (LNA)	T&M SYSTEM	S2L4	12/27/2024	Annual
RF Switching System	FMSR-04B (7G HPF+LNA)	T&M SYSTEM	S2L5	12/27/2024	Annual
Power Amplifier	CBL18265035	CERNEX	22966	11/17/2024	Annual
Power Amplifier	CBL26405040	CERNEX	25956	02/26/2025	Annual

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
3. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5(Version : 2017).

12. ANNEX A_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-2406-FI010-P