

TEST REPORT

FCC BT LE Test for UTR 3.0
Certification

APPLICANT
Mobile Appliance, Inc.

REPORT NO.
HCT-RF-2604-FC003

DATE OF ISSUE
April 22, 2026

Tested by
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TEST REPORT

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Additional Model

Universal Traffic Recorder 3, Lamborghini Eye 3.0

Applicant**Mobile Appliance, Inc.**

1701~1706, 401, Simin-daero, Dongan-gu, Anyang-si, Gyeonggi-do, Republic of Korea

**Product Name
Model Name**

Dashcam Front
UTR 3.0

FCC ID

WHBUTR3

Date of Test

March 11, 2026 ~ April 20, 2026

FCC Classification

Digital Transmission System(DTS)

Test Standard Used

FCC Rule Part(s): Part 15.247

Test Results

PASS

Location of Test

☒ Permanent Testing Lab ☐ On Site Testing Lab

(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	April 22, 2026	Initial Release

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 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).

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1. EUT DESCRIPTION

Model	UTR 3.0	
Additional Model	Universal Traffic Recorder 3, Lamborghini Eye 3.0	
EUT Type	Dashcam Front	
Power Supply	DC 12.00 V	
Frequency Range	2 402 – 2 480 MHz	
Number of Channels	40 Channels	
Max. RF Output Power (Normal)	Peak	1 M Bit/s: 4.91 dBm (3.10 mW)
	Average	1 M Bit/s: 4.76 dBm (2.99 mW)
Modulation Type	GFSK	
Bluetooth Version	5.0	
Antenna Information	Please refer to the Antenna Specification document.	
Serial number	Conducted : UTR3.0_Front_C106 Radiated : UTR3.0_Front_C115	

Grant Notes :

1. Output Power listed is conducted(Peak)

2. TEST METHODOLOGY

Unlicensed wireless device were tested using the following measurement procedure.

[1] KDB 558074 D01 15.247 Meas Guidance v05r02

[2] ANSI C63.10-2020 + Cor. 1-2023

Note : Here in after, ANSI C63.10-2020 + Cor. 1-2023 will be referred to as ANSI C63.10-2020

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.

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 C63.10-2020 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

According to the requirements in Section 6.3 ~ Section 6.6 of ANSI C63.10-2020

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1 GHz. Above 1 GHz with 1.5 m 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.

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.

3. 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 ANSI C63.5-2017.

4. 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, Republic of Korea. The site is constructed in conformance with the requirements of ANSI C63.4-2014 and CISPR Publication 22.

Detailed description of test facility was submitted to the Commission and accepted dated February 26, 2026 (Registration Number: 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 ANSI/USEMCSC C63.2-2023, "American National Standard for Specifications of Electromagnetic Interference and Field Strength Measuring Instrumentation in the Frequency Range 9 kHz to 40 GHz".

5. 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.”

6. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2020.

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 ($\pm$ kHz)
X dB, 99% Bandwidth	95 (Confidence level about 95 %, $k=2$)
Frequency stability	28 (Confidence level about 95 %, $k=2$)

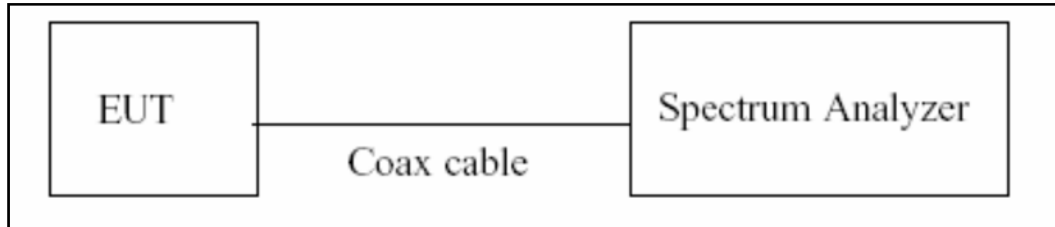
Parameter	Expanded Uncertainty ($\pm$ dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.96 (Confidence level about 95 %, $k=2$)
Conducted Output Power(Power Meter)	0.54 (Confidence level about 95 %, $k=2$)
Conducted Output Power(Signal Analyzer)	0.73 (Confidence level about 95 %, $k=2$)
Power Spectral Density	0.98 (Confidence level about 95 %, $k=2$)
Band Edge (Out of Band Emissions)	1.11 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.54 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.74 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.80 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.86 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (Above 40 GHz)	5.44 (Confidence level about 95 %, $k=2$)

7. DESCRIPTION OF TESTS

Test Item	Test Procedure
Duty Cycle	- ANSI C63.10-2020 – Section 11.6
6 dB Bandwidth	- ANSI C63.10-2020 – Section 11.8
Output Power	- ANSI C63.10-2020 – Section 11.9.1.2(Peak) & 11.9.2.3(Avg)
Power Spectral Density	- ANSI C63.10-2020 – Section 11.10
Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions	- ANSI C63.10-2020– Section 11.11
Radiated Test	- ANSI C63.10-2020 – Section 6.4 (Below 30 MHz) - ANSI C63.10-2020 – Section 6.5 (30 MHz to 1000 MHz) - ANSI C63.10-2020 – Section 6.6 (1 GHz to 40 GHz) - ANSI C63.10-2020 – Section 6.10 & 11.12 (Restricted frequency bands)
AC Power line Conducted Emissions	- ANSI C63.10-2020– Section 6.2

7.1. Duty Cycle

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

The largest available value of RBW is 8 MHz and VBW is 50 MHz.

The zero-span method of measuring duty cycle shall not be used if $T \leq 6.25$ microseconds. ($50/6.25 = 8$)

The zero-span method was used because all measured T data are > 6.25 microseconds and both RBW and VBW are $> 50/T$.

The Spectrum Analyzer is set to

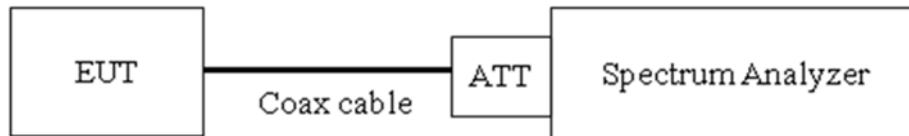
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz ($\geq$ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = $T_{\text{on}}/T_{\text{total}}$ and Duty Cycle Factor = $10\log(1/\text{Duty Cycle})$

7.2. 6 dB Bandwidth

Limit

The minimum permissible 6 dB bandwidth is 500 kHz.

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to

- 1) RBW = shall be in the range of 1% to 5% of the OBW but not less than 100 kHz.
- 2) VBW $\geq 3 \times$ RBW
- 3) Detector = Peak
- 4) Trace mode = max hold
- 5) Sweep = No faster than coupled (auto) time.
- 6) Allow the trace to stabilize
- 7) We tested 6 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set 6 dB.

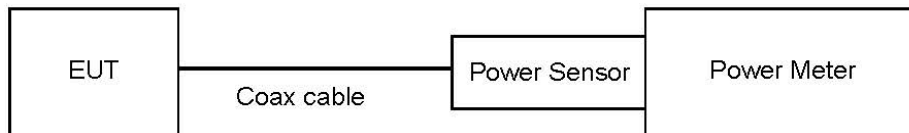
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

7.3. Output Power

Limit

The maximum permissible conducted output power is 1 Watt.

Test Configuration



Test Procedure

The transmitter output is connected to the Power Meter.

- Peak Power
: Measure the peak power of the transmitter.
- Average Power
 - 1) Measure the duty cycle.
 - 2) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
 - 3) Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Sample Calculation

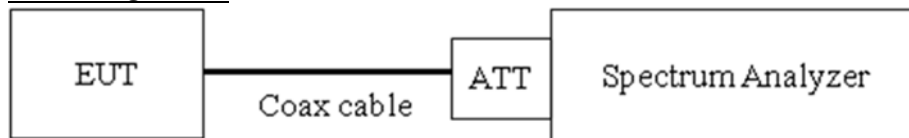
- Conducted Output Power(Peak) = Measured Value + ATT loss + Cable loss
- Conducted Output Power(Average) = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

7.4. Power Spectral Density

Limit

The transmitter power density average over 1-second interval shall not be greater than 8 dBm in any 3 kHz BW.

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

The spectrum analyzer is set to :

- 1) Set analyzer center frequency to DTS channel center frequency.
- 2) Set span to at least 1.5 times the DTS bandwidth.
- 3) $RBW = 3 \text{ kHz} \leq RBW \leq 100 \text{ kHz}$.
- 4) $VBW \geq 3 \times RBW$.
- 5) Sweep = No faster than coupled (auto) time.
- 6) Detector = Peak.
- 7) Trace mode = max hold.
- 8) Allow trace to fully stabilize.
- 9) Use the peak marker function to determine the maximum amplitude level within the RBW.
- 10) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Sample Calculation

- Power Spectral Density = Measured Value + ATT loss + Cable loss

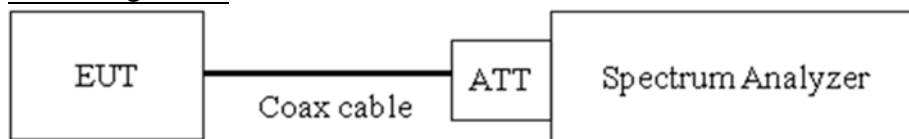
7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

Limit

The maximum conducted (Peak) output power was used to demonstrate compliance, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz.

[Conducted > 20 dBc]

Test Configuration



Test Procedure

The transmitter output is connected to the spectrum analyzer.

- 1) RBW = 100 kHz
- 2) VBW $\geq 3 \times$ RBW
- 3) Set span to encompass the spectrum to be examined
- 4) Detector = Peak
- 5) Trace Mode = max hold
- 6) Sweep time = No faster than coupled (auto) time.
- 7) Allow trace to fully stabilize.
- 8) Use peak marker function to determine the maximum amplitude level.

Measurements are made over the 30 MHz to 25 GHz range with the transmitter set to the lowest, middle, and highest channels.

Factors for frequency

Freq(MHz)	Factor(dB)
30	20.06
100	20.14
200	20.17
300	20.21
400	20.28
500	20.28
600	20.28
700	20.28
800	20.30
900	20.31
1000	20.35
2000	20.55
2400	20.86
2500	20.86
3000	20.87
4000	20.80
5000	20.90
5150	20.84
5850	20.84
6000	20.83
7000	20.92
8000	20.97
9000	21.09
10000	21.18
11000	21.27
12000	21.33
13000	21.33
14000	21.40
15000	21.49
16000	21.52
17000	21.55
18000	21.63
19000	21.65
20000	21.66
21000	21.76
22000	21.82
23000	21.86
24000	21.90
25000	21.92
26000	22.04

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

2. Factor = Attenuator loss + Cable loss

3. EUT cable loss = 1 dB

4. Total Port offset = 21.86 Db

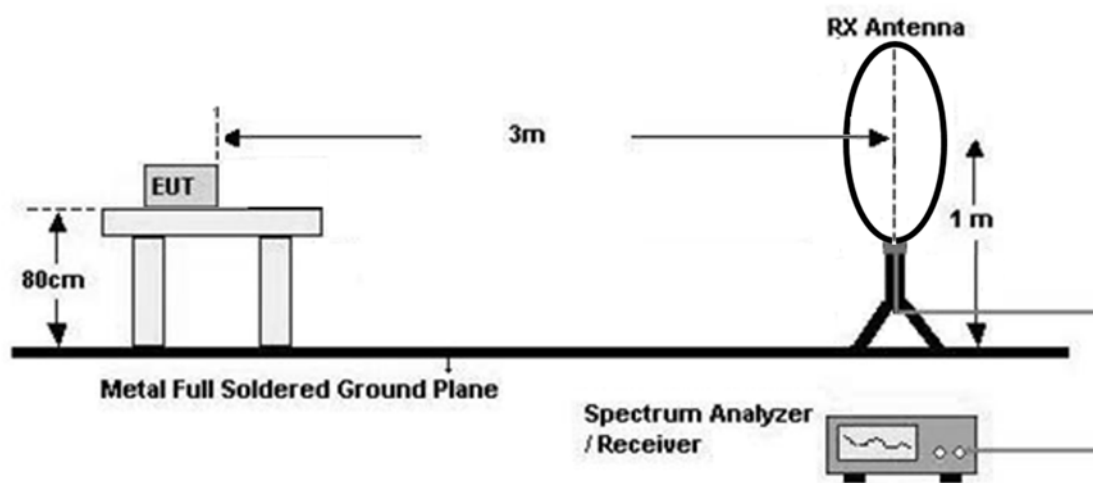
7.6. Radiated Test

Limit

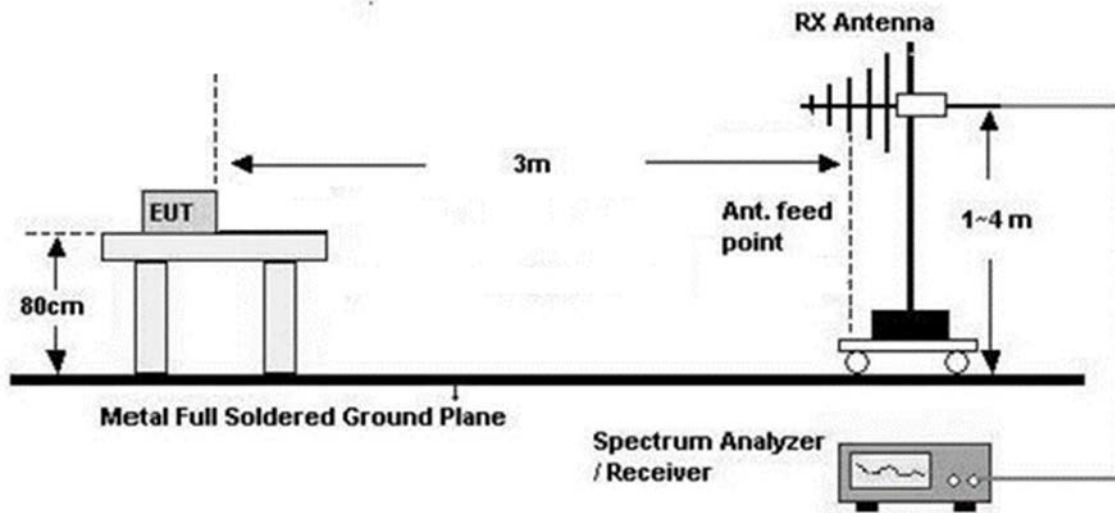
Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 – 0.490	$2400/F(\text{kHz})$	300
0.490 – 1.705	$24000/F(\text{kHz})$	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

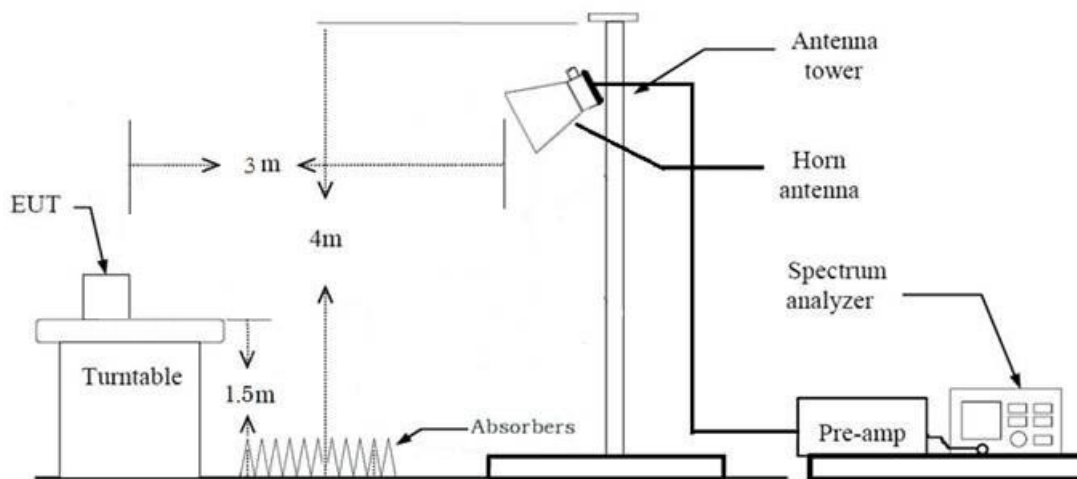
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions(Below 30 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 3 m from the EUT
3. The EUT is placed on a turntable, which is 0.8 m 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) = $40\log(3\text{ m}/300\text{ m}) = -80\text{ dB}$
Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = $40\log(3\text{ m}/30\text{ m}) = -40\text{ dB}$
Measurement Distance : 3 m
8. Spectrum Analyzer Setting
 - Frequency Range = 9 kHz ~ 30 MHz
 - Detector = Peak
 - Trace = Max hold
 - RBW = 9 kHz
 - VBW $\geq 3 \times$ 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 0.8 m above ground plane.
3. The Hybrid antenna was placed at a location 3 m from the EUT, which is varied from 1m to 4 m 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 Analyzer Setting**(1) Measurement Type(Peak):**

- Measured Frequency Range : 30 MHz – 1 GHz
- Detector = Peak
- Trace = Max hold
- RBW = 100 kHz
- VBW $\geq$ 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. 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 1 m to 4 m 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. Spectrum Setting
 7. Spectrum Analyzer Setting
 - (1) Measurement Type(Peak):
 - Measured Frequency Range : 1 GHz – 25 GHz
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 1 MHz
 - VBW $\geq 3 \times$ RBW
 - (2) Measurement Type(Average):
 - Measured Frequency Range : 1 GHz – 25 GHz
 - Detector = RMS
 - Averaging type = power (*i.e.*, RMS)
 - RBW = 1 MHz
 - VBW $\geq 3 \times$ RBW
 - Sweep time = auto.
 - Trace mode = average (at least 100 traces).
 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.
 9. Distance extrapolation factor = $20\log(\text{test distance} / \text{specific distance})$ (dB)
 10. Total (Measurement Type : Peak)
 - = Peak Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G)
 - + Distance Factor(D.F)
 - Total (Measurement Type : Average)
 - = Average Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G)
 - + Distance Factor(D.F)
- #Note : Used Average measurement method according to KDB 558074 Section11 Q3

Test Procedure of Radiated Restricted Band Edge

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 1 m to 4 m 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. Spectrum Analyzer Setting
 - (1) Measurement Type(Peak):
 - Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
 - Detector = Peak
 - Trace = Max hold
 - RBW = 1 MHz
 - VBW $\geq 3 \times$ RBW
 - (2) Measurement Type(Average):
 - Measured Frequency Range : 2310 MHz ~ 2390 MHz / 2483.5 MHz ~ 2500 MHz
 - Detector = RMS
 - Averaging type = power (*i.e.*, RMS)
 - RBW = 1 MHz
 - VBW $\geq 3 \times$ RBW
 - Sweep time = auto.
 - Trace mode = average (at least 100 traces).
 - (3) Measurement Type(Average , Integration Method)
 - Measured Frequency Range : 2388 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2485.5 MHz
 - Detector = RMS
 - Averaging type = power (*i.e.*, RMS)
 - RBW = 100 kHz
 - VBW $\geq 3 \times$ RBW
 - Sweep time = auto.
 - Trace mode = average (at least 100 traces).
 - Compute the power by integrating the spectrum over 1 MHz using the analyzer's band-power measurement function with band limits set equal to the emission frequency ($f_{\text{emission}} \pm 0.5$ MHz). If the instrument does not have a band-power function, then sum the amplitude levels (in power units) at 100 kHz intervals extending across the 1 MHz spectrum defined by $f_{\text{emission}} \pm 0.5$ MHz

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.

9. Distance extrapolation factor = $20\log(\text{test distance} / \text{specific distance})$ (dB)

10. Total (Measurement Type : Peak)

= Peak Measured Value

Total(Measurement Type : Average)

= Average Measured Value

- We apply to the offset in the range 1 GHz - 18 GHz.

- The offset = Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)

#Note : Used Average measurement method according to KDB 558074 Section11 Q3

7.7. 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 μ H/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dB μ V)	
	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.

Sample Calculation

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

7.8. Worst case configuration and mode

Conducted test

1. The EUT was configured with packet length of highest power.
 - All supported mode tested.
 - Worst Results refer to Notes for each test item
2. UTR 3.0, Additional Models were electrically identical. Therefore, UTR 3.0 was selected as the representative model.

Radiated Test

1. All modes of operation were investigated and the worst case configuration results are reported.
 - Mode : Stand alone, Stand alone + Dashcam Rear(UTR 3.0 Rear)
 - Worstcase : Stand alone
2. EUT Axis
 - Radiated Spurious Emissions : Z
 - Radiated Restricted Band Edge : Y
3. All packet lengths of operation were investigated and the worst-case packet lengths are reported.
(Worst case :1M Bit/s 37 Byte, 1M Bit/s 255 Byte)
4. 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
5. UTR 3.0, Additional Models were electrically identical. Therefore, UTR 3.0 was selected as the representative model.

AC Power line Conducted Emissions

1. We don't perform powerline conducted emission test. The device only employ battery power for operation.

8. SUMMARY TEST OF RESULTS

Test Item	FCC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	§ 15.247(a)(2)	> 500 kHz	Conducted	PASS
Conducted Maximum Output Power	§ 15.247(b)(3)	< 1 Watt		PASS
Power Spectral Density	§ 15.247(e)	< 8 dBm / 3 kHz Band		PASS
Band Edge (Out of Band Emissions)	§ 15.247(d)	Conducted > 20 dBc		PASS
AC Power line Conducted Emissions	§ 15.207	cf. Section 7.7		N/A (Note1)
Radiated Spurious Emissions	§ 15.247(d), 15.205, 15.209	cf. Section 7.6	Radiated	PASS
Radiated Restricted Band Edge	§ 15.247(d), 15.205, 15.209	cf. Section 7.6		PASS

Note

1. The device only employ battery power for operation.
2. The decision rule applies 'simple acceptance'

9. TEST RESULT

9.1 DUTY CYCLE

Data rate (Bit/s)	Packet length (Byte)	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
1M	37	0.399	0.617	0.647	1.892
	255	2.145	2.490	0.861	0.648

■ Test Plots

1 M Bit/s (37 Byte)



1 M Bit/s (255 Byte)



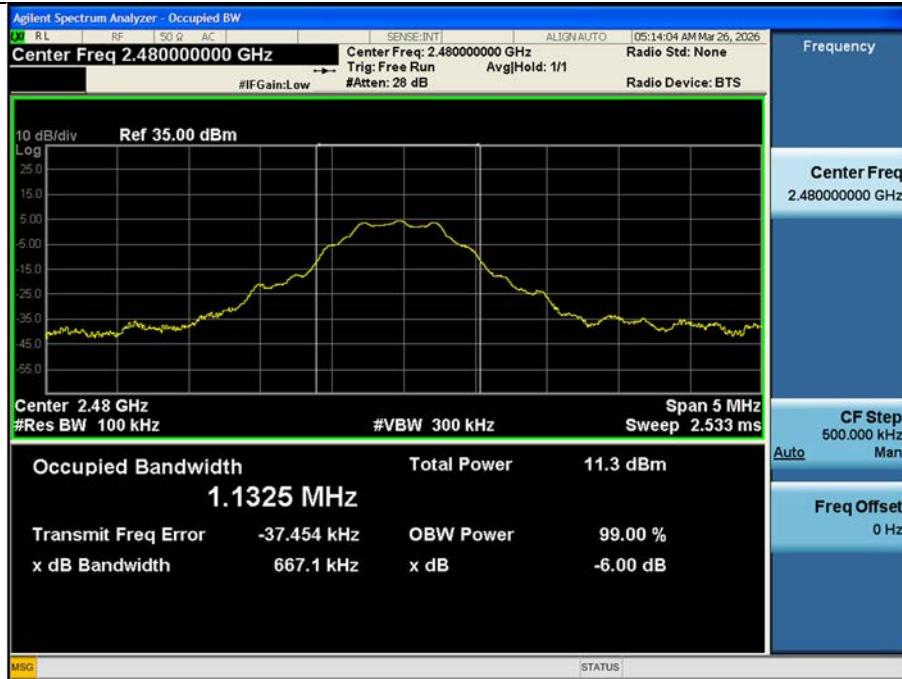
9.2 6 dB BANDWIDTH

Mode	Channel	Frequency [MHz]	6dB BW [kHz]	Limit [kHz]
1M 37Byte	0	2402	671.4	> 500
	19	2440	668.1	
	39	2480	667.1	
1M 255Byte	0	2402	676.8	
	19	2440	665.4	
	39	2480	670.8	

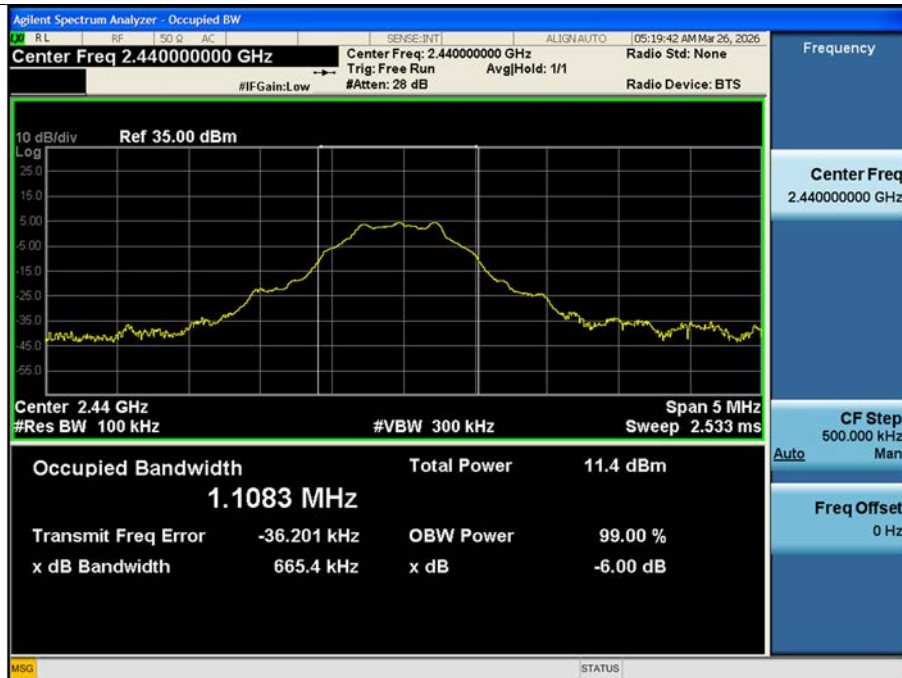
Test Plots(6 dB BANDWIDTH)

Note: In order to simplify the report, attached plots were only the narrowest 6 dB BW channel

1 MBit/s 37 Byte (CH 39)



1 MBit/s 255 Byte (CH 19)



9.3 OUTPUT POWER

Peak Power

Mode	Channel	Frequency [MHz]	Conducted Peak Power [dBm]	Limit [dBm]
1M 37Byte	0	2402	4.69	30
	19	2440	4.85	
	39	2480	4.90	
1M 255Byte	0	2402	4.71	
	19	2440	4.90	
	39	2480	4.91	

Average Power

Note :

Total Power [dBm] = Measured Power [dBm] + Duty Cycle Factor [dB]

Mode	Channel	Frequency [MHz]	Measured Power [dBm]	D.C.F [dB]	Total Power [dBm]	Limit [dBm]
1M 37Byte	0	2402	2.61	1.89	4.50	30
	19	2440	2.76	1.89	4.65	
	39	2480	2.81	1.89	4.70	
1M 255Byte	0	2402	3.89	0.65	4.54	
	19	2440	4.07	0.65	4.72	
	39	2480	4.11	0.65	4.76	

9.4 POWER SPECTRAL DENSITY

Mode	Channel	Frequency [MHz]	Total PSD [dBm/3 kHz]	Limit [dBm/3kHz]
1M 37Byte	0	2402	1.755	8
	19	2440	2.099	
	39	2480	2.440	
1M 255Byte	0	2402	1.612	
	19	2440	2.089	
	39	2480	2.454	

Test Plots(POWER SPECTRAL DENSITY)

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

1 MBit/s 37 Byte (CH 39)



1 MBit/s 255 Byte (CH 39)



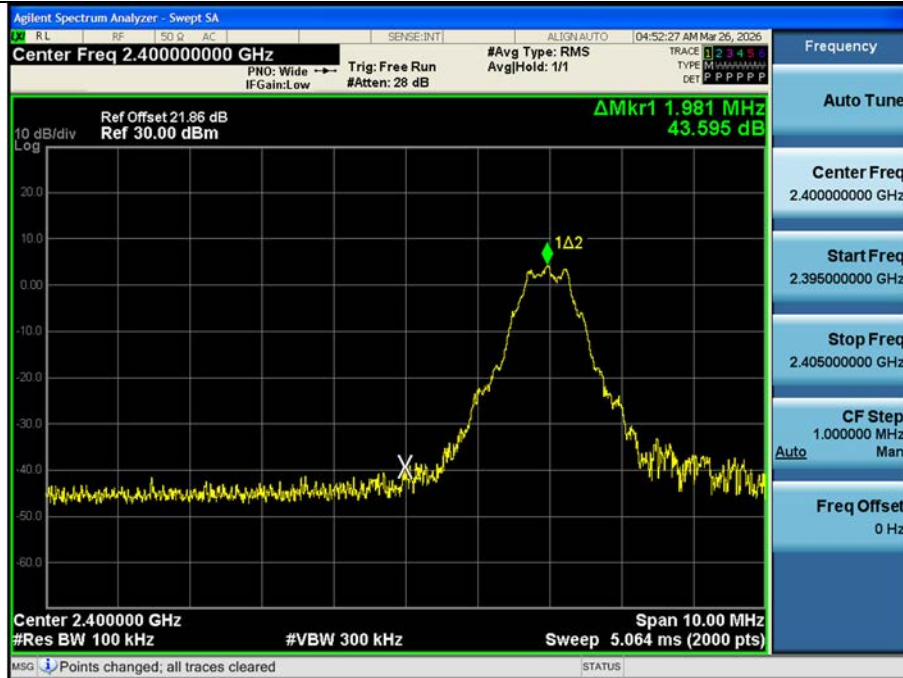
9.5 BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS

[BAND EDGE]

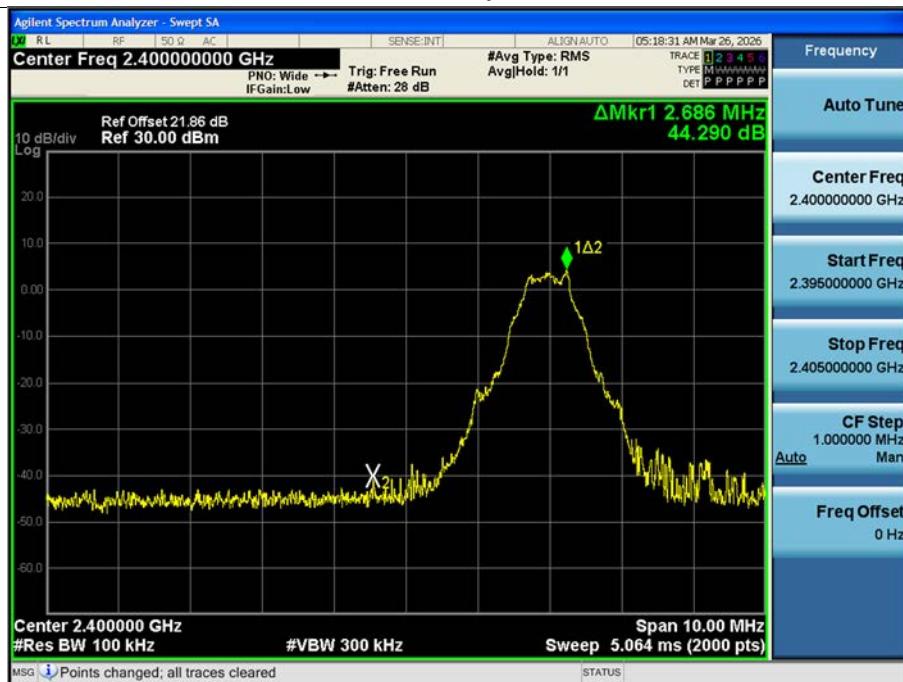
Mode	Channel	Frequency [MHz]	Position	Band Edge [dB]	Limit [dBc]
1M 37Byte	0	2402	Lower	43.595	20
	39	2480	Upper	44.445	
1M 255Byte	0	2402	Lower	44.290	
	39	2480	Upper	45.862	

■ Test Plot(BAND EDGE)

1 MBit/s 37 Byte (CH 0)



1 MBit/s 255 Byte (CH 0)



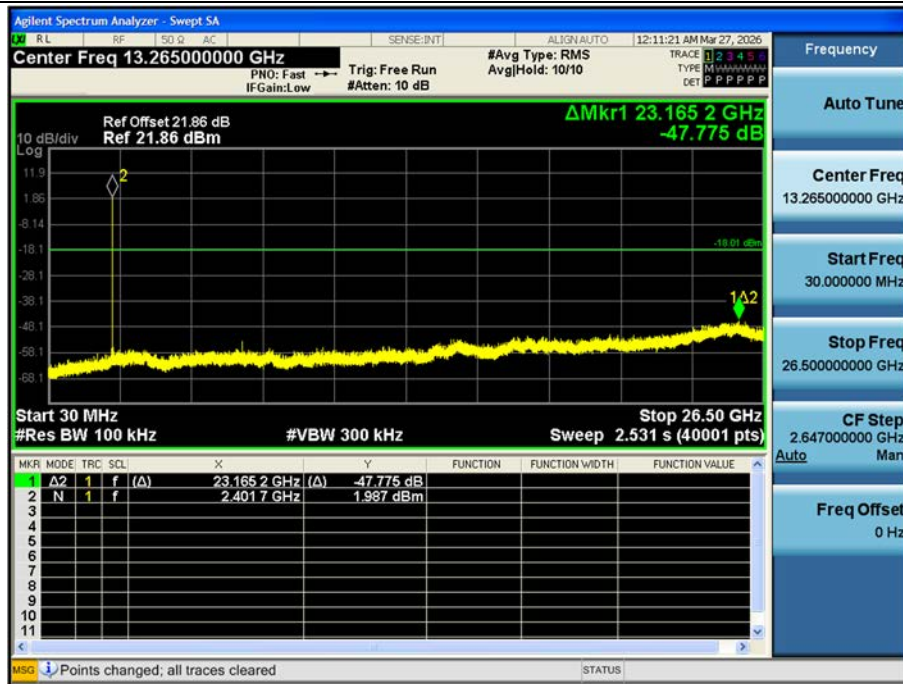
[CONDUCTED SPURIOUS EMISSIONS]

In order to simplify the report, attached plots were only the worst case channel and data rate.

- Worst case : 1M Bit/s 255 Byte Ch. 0(2402 MHz)

■ Test Plots(Conducted Spurious Emission (30 MHz – 26.5 GHz))

Conducted Spurious Emission



Note

Limit (dBm): -18.013

9.6 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 = $40 \log (\text{specific distance} / \text{test distance})$ (dB)
3. Limit line = specific Limits (dBμV) + Distance extrapolation factor

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.

Frequency Range : Above 1 GHz

CH 0		2402	MHz	Mode :		1 M Bit/s (37 Bytes)	
Frequency	Measured Value	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
4804	43.50	4.55	V	48.05	73.98	25.93	PK
4804	32.19	4.55	V	36.74	53.98	17.24	AV
7206	42.66	11.08	V	53.74	73.98	20.24	PK
7206	32.09	11.08	V	43.17	53.98	10.81	AV
12010	34.10	20.40	V	54.50	73.98	19.48	PK
12010	22.58	20.40	V	42.98	53.98	11.00	AV
4804	43.55	4.55	H	48.10	73.98	25.88	PK
4804	32.36	4.55	H	36.91	53.98	17.07	AV
7206	42.18	11.08	H	53.26	73.98	20.72	PK
7206	32.00	11.08	H	43.08	53.98	10.90	AV
12010	34.19	20.40	H	54.59	73.98	19.39	PK
12010	22.79	20.40	H	43.19	53.98	10.79	AV

CH 19		2440	MHz	Mode :		1 M Bit/s (37 Bytes)	
Frequency	Measured Value	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
4880	42.16	5.15	V	47.31	73.98	26.67	PK
4880	31.88	5.15	V	37.03	53.98	16.95	AV
7320	42.07	11.87	V	53.94	73.98	20.04	PK
7320	32.07	11.87	V	43.94	53.98	10.04	AV
12200	34.90	20.06	V	54.96	73.98	19.02	PK
12200	23.55	20.06	V	43.61	53.98	10.37	AV
4880	42.33	5.15	H	47.48	73.98	26.50	PK
4880	31.97	5.15	H	37.12	53.98	16.86	AV
7320	41.96	11.87	H	53.83	73.98	20.15	PK
7320	31.98	11.87	H	43.85	53.98	10.13	AV
12200	34.95	20.06	H	55.01	73.98	18.97	PK
12200	23.72	20.06	H	43.78	53.98	10.20	AV

CH 39		2480	MHz	Mode :		1 M Bit/s (37 Bytes)	
Frequency	Measured Value	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
4960	42.98	4.05	V	47.03	73.98	26.95	PK
4960	32.88	4.05	V	36.93	53.98	17.05	AV
7440	42.59	12.25	V	54.84	73.98	19.14	PK
7440	32.79	12.25	V	45.04	53.98	8.94	AV
12400	34.16	19.83	V	53.99	73.98	19.99	PK
12400	22.99	19.83	V	42.82	53.98	11.16	AV
4960	43.32	4.05	H	47.37	73.98	26.61	PK
4960	32.96	4.05	H	37.01	53.98	16.97	AV
7440	42.18	12.25	H	54.43	73.98	19.55	PK
7440	32.76	12.25	H	45.01	53.98	8.97	AV
12400	34.30	19.83	H	54.13	73.98	19.85	PK
12400	23.16	19.83	H	42.99	53.98	10.99	AV

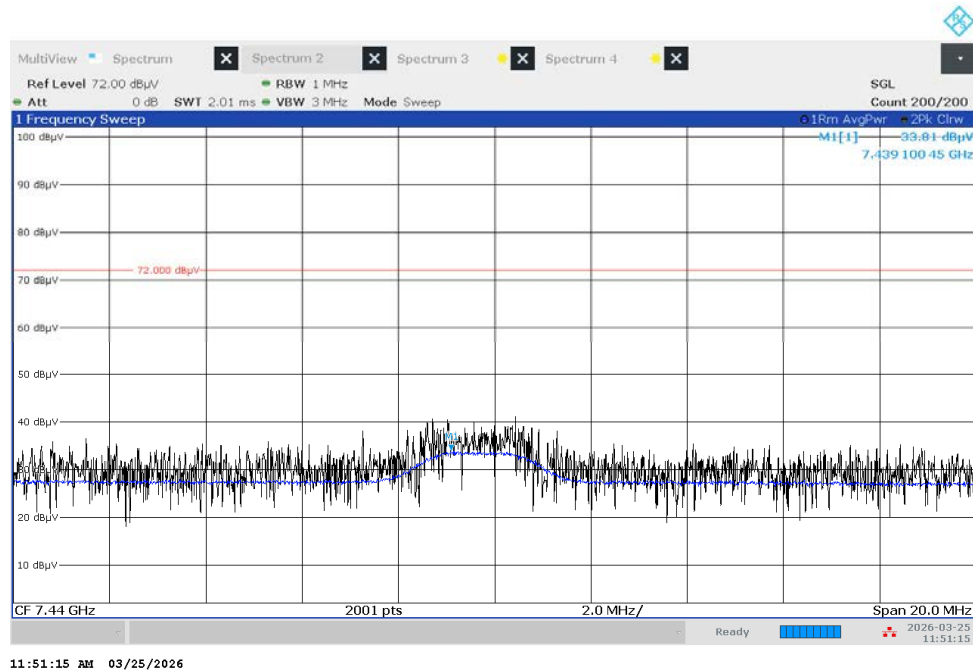
CH 0		2402	MHz	Mode :		1 M Bit/s (255 Bytes)	
Frequency	Measured Value	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
4804	43.19	4.55	V	47.74	73.98	26.24	PK
4804	32.62	4.55	V	37.17	53.98	16.81	AV
7206	42.25	11.08	V	53.33	73.98	20.65	PK
7206	33.08	11.08	V	44.16	53.98	9.82	AV
12010	34.50	20.40	V	54.90	73.98	19.08	PK
12010	22.77	20.40	V	43.17	53.98	10.81	AV
4804	43.35	4.55	H	47.90	73.98	26.08	PK
4804	32.76	4.55	H	37.31	53.98	16.67	AV
7206	41.99	11.08	H	53.07	73.98	20.91	PK
7206	33.03	11.08	H	44.11	53.98	9.87	AV
12010	34.52	20.40	H	54.92	73.98	19.06	PK
12010	22.83	20.40	H	43.23	53.98	10.75	AV

CH 19		2440	MHz	Mode :		1 M Bit/s (255 Bytes)	
Frequency	Measured Value	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
4880	41.89	5.15	V	47.04	73.98	26.94	PK
4880	32.16	5.15	V	37.31	53.98	16.67	AV
7320	42.34	11.87	V	54.21	73.98	19.77	PK
7320	32.81	11.87	V	44.68	53.98	9.30	AV
12200	35.28	20.06	V	55.34	73.98	18.64	PK
12200	23.82	20.06	V	43.88	53.98	10.10	AV
4880	42.15	5.15	H	47.30	73.98	26.68	PK
4880	32.37	5.15	H	37.52	53.98	16.46	AV
7320	0.00	11.87	H	11.87	73.98	62.11	PK
7320	0.00	11.87	H	11.87	53.98	42.11	AV
12200	35.55	20.06	H	55.61	73.98	18.37	PK
12200	24.03	20.06	H	44.09	53.98	9.89	AV

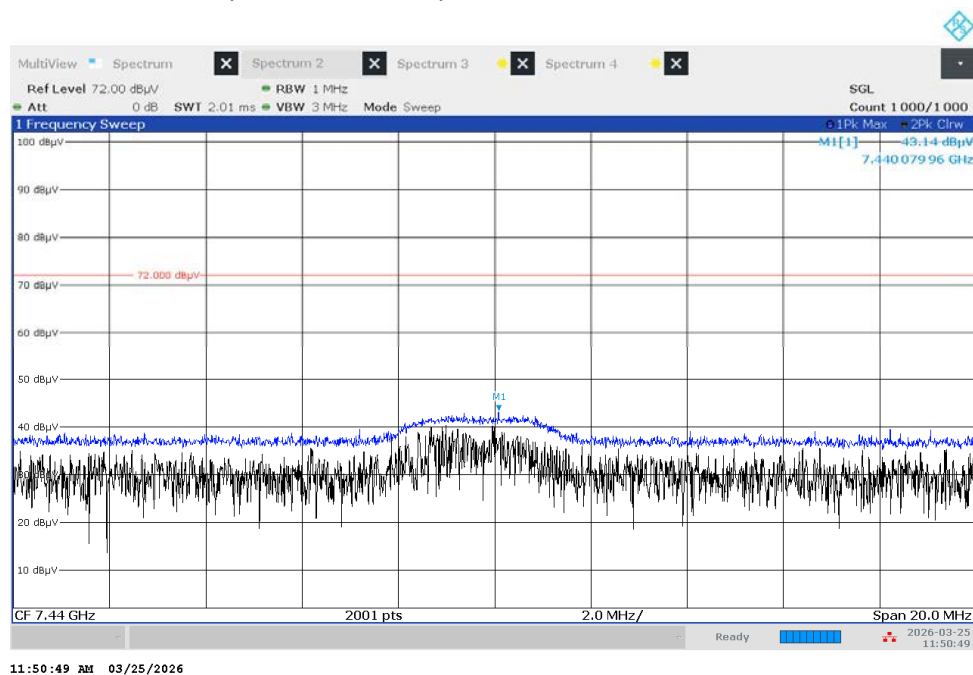
CH 39		2480	MHz	Mode :		1 M Bit/s (255 Bytes)	
Frequency	Measured Value	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
4960	42.86	4.05	V	46.91	73.98	27.07	PK
4960	33.86	4.05	V	37.91	53.98	16.07	AV
7440	43.14	12.25	V	55.39	73.98	18.59	PK
7440	33.81	12.25	V	46.06	53.98	7.92	AV
12400	33.90	19.83	V	53.73	73.98	20.25	PK
12400	23.16	19.83	V	42.99	53.98	10.99	AV
4960	43.13	4.05	H	47.18	73.98	26.80	PK
4960	33.97	4.05	H	38.02	53.98	15.96	AV
7440	42.81	12.25	H	55.06	73.98	18.92	PK
7440	33.75	12.25	H	46.00	53.98	7.98	AV
12400	34.86	19.83	H	54.69	73.98	19.29	PK
12400	23.38	19.83	H	43.21	53.98	10.77	AV

1 M Bit/s 255 Bytes Test Plots (Worst case : Z-V)

Radiated Spurious Emissions plot – Average Result (Ch.39 3rd Harmonic)



Radiated Spurious Emissions plot – Peak Result (Ch.39 3rd Harmonic)



Note:

Plots of worst case are only reported.

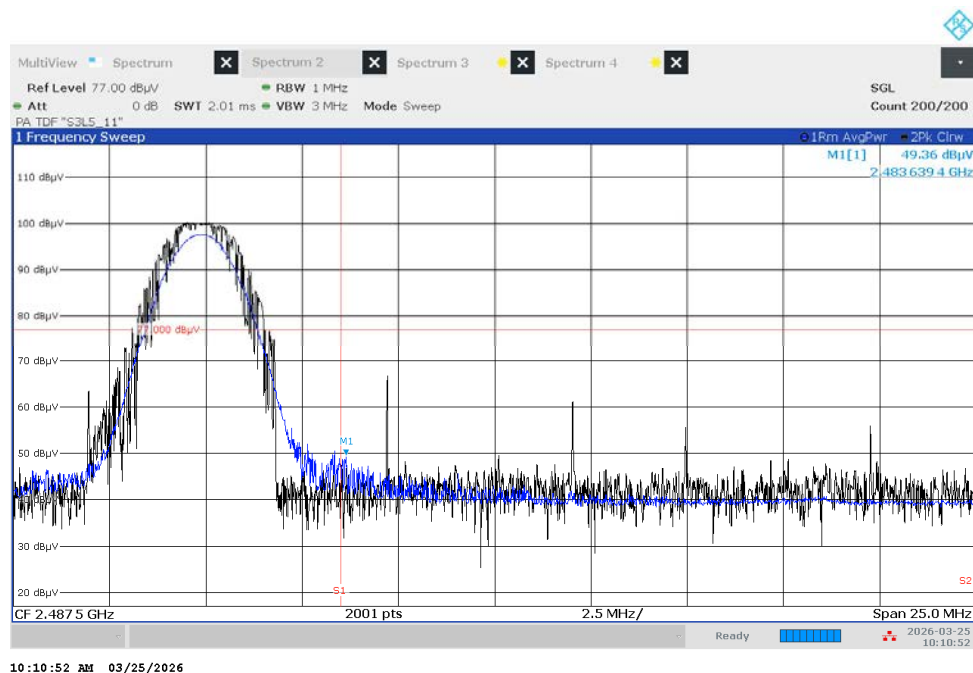
9.7 RADIATED RESTRICTED BAND EDGES

1 M Bit/s (37 Bytes)						
Channel	CH 0, CH 39	Channel Frequency		2402 MHz, 2480 MHz		
Frequency	Measured Value	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2310 - 2390	57.57	V	57.57	73.98	16.41	PK
2310 - 2390	41.08	V	41.08	53.98	12.90	AV
2483.5 - 2500	70.67	V	70.67	73.98	3.31	PK
2483.5 - 2500	49.36	V	49.36	53.98	4.62	AV

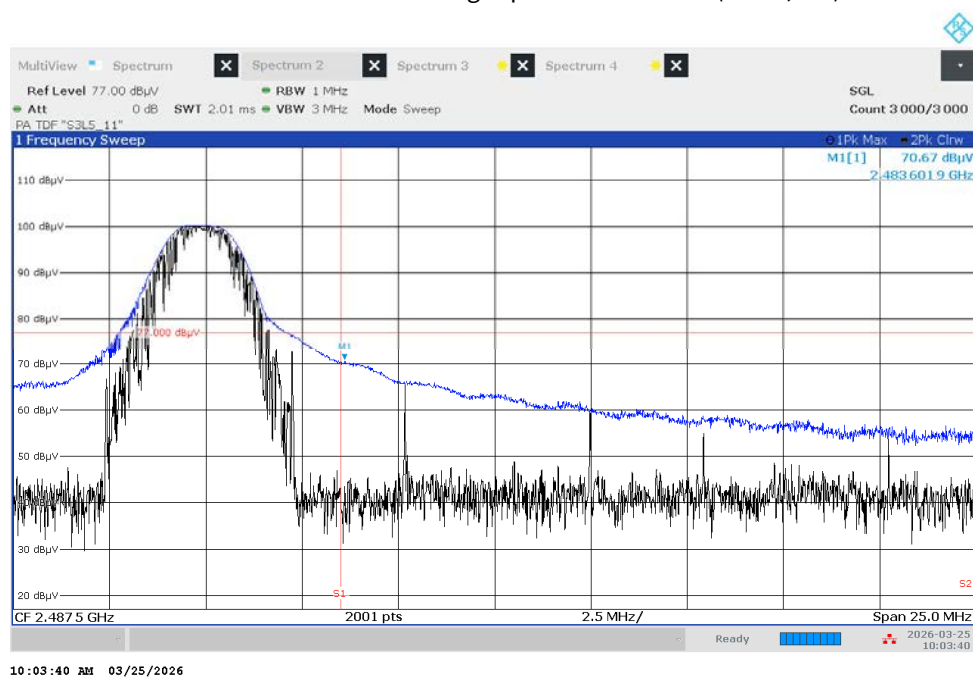
1 M Bit/s (255 Bytes)						
Channel	CH 0, CH 39	Channel Frequency		2402 MHz, 2480 MHz		
Frequency	Measured Value	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2310 - 2390	57.42	V	57.42	73.98	16.56	PK
2310 - 2390	41.17	V	41.17	53.98	12.81	AV
2483.5 - 2500	70.67	V	70.67	73.98	3.31	PK
2483.5 - 2500	47.76	V	47.76	53.98	6.22	AV

■ 1 M Bit/s 37 Bytes Test Plots

Radiated Restricted Band Edges plot – Average Result (Ch.39, Y-V)



Radiated Restricted Band Edges plot – Peak Result (Ch.39, Y-V)



Note:

In order to simplify the report, Plot of worst case are only reported.

10. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	07/15/2026	Annual
EMI Test Receiver	ESR7	Rohde & Schwarz	101910	08/20/2026	Annual
Chamber	SU-642	ESPEC	93008124	02/04/2027	Annual
PXA Signal Analyzer	N9030A	Agilent	MY49432108	02/09/2027	Annual
Open Switch and Control Platform	OSP 120	Rohde & Schwarz	100935	07/24/2026	Annual
Power Meter	N1911A	Agilent	MY45100523	02/13/2027	Annual
WIDEBAND POWER SENSOR	N1921A	Keysight	MY57820067	01/26/2027	Annual
Directional Coupler	87300B	Agilent	3116A03621	10/14/2026	Annual
Power Splitter	11667B	Hewlett Packard	10545	01/15/2027	Annual
DC Power Supply	E3632A	Hewlett Packard	KR40010370	07/07/2026	Annual
Attenuator	8493C-010	Keysight	07560	05/27/2026	Annual
Attenuator	8493C-010	HP	08285	05/19/2026	Annual
Attenuator	18N-20dB	Rohde & Schwarz	8	02/09/2027	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
Bluetooth Tester	CBT	Rohde & Schwarz	100752	12/22/2026	Annual
Automation Software	FCC WLAN Conducted	HCT CO., LTD	N/A	N/A	N/A
Automation Software	FCC Bluetooth Conducted	HCT CO., LTD	N/A	N/A	N/A

Note:

- Equipment whose calibration due date was updated during the test period was not used between the previous due date and the update.
All reported measurements were performed using equipment within valid calibration.
- Especially, all antenna for measurement is calibrated in accordance with the requirements of ANSI C63.5-2017.

Radiated Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Antenna Mast Controller	CO3000	Innco system GmbH	CO3000/842/35030115/L	N/A	N/A
Antenna Mast	MA4640/800-XP-EP	Innco system GmbH	S3AM	07/25/2026	Annual
Turn Table	DS1500-S-1t	Innco system GmbH	6290425	N/A	N/A
Loop Antenna	FMZB 1513	Schwarzbeck Mess-Elektronik OHG	1513-175	01/06/2027	Biennial
Trilog Broadband Antenna	VULB 9168	Schwarzbeck Mess-Elektronik OHG	01135	08/19/2026	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck Mess-Elektronik OHG	9120D-1191	10/21/2027	Biennial
Horn Antenna	BBHA 9170	Schwarzbeck Mess-Elektronik OHG	BBHA9170124	03/23/2027	Biennial
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments GmbH	2	12/11/2026	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments GmbH	5	05/27/2026	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments GmbH	6	05/27/2026	Annual
Band Reject Filter	WRCJV5100/5850-40/50-8EEK	Wainwright Instruments GmbH	1	01/07/2027	Annual
RF Switching System	FBSR-03A (3G HPF+LNA)	T&M SYSTEM	S3L1	10/20/2026	Annual
RF Switching System	FBSR-03A (10dB ATT+LNA)	T&M SYSTEM	S3L2	10/20/2026	Annual
RF Switching System	FBSR-03A (7G HPF+LNA)	T&M SYSTEM	S3L3	10/20/2026	Annual
RF Switching System	FBSR-03A (3dB ATT+LNA)	T&M SYSTEM	S3L4	10/20/2026	Annual
RF Switching System	FBSR-03A (Thru)	T&M SYSTEM	S3L5	10/20/2026	Annual
DC Power Supply	E3632A	Hewlett Packard	KR75305528	12/12/2026	Annual
Automation Software	FCC WLAN Radiated	HCT CO., LTD.	-	-	-
Broadband LNA	CBL18265035	CERNEX	22966	10/21/2026	Annual
Broadband LNA	CBL26405040	CERNEX	25956	02/09/2027	Annual
Bluetooth Tester	TC-3000C	TESCOM	3000C000175	03/03/2027	Annual
Spectrum Analyzer	FSW85	Rohde & Schwarz	101256	10/26/2026	Annual

Note:

- Equipment whose calibration due date was updated during the test period was not used between the previous due date and the update.
All reported measurements were performed using equipment within valid calibration.
- Especially, all antenna for measurement is calibrated in accordance with the requirements of ANSI C63.5-2017.

11. ANNEX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2604-FC003-P