S T S L A B

# RADIO TEST REPORT

Report No: STS1907052W01

Issued for

Shandong Bittel Intelligent Technology Co.,Ltd.

No.1 Rizhao N Rd, Rizhao, Shandong, P.R.China

| | |
|---|---|
| **Product Name:** | ModaMedia |
| **Brand Name:** | N/A |
| **Model Name:** | ModaMedia-W |
| **Series Model:** | N/A |
| **FCC ID:** | 2ASTD-MODAMEDIA-W |
| **Test Standard:** | Title 47 of the CFR, Part 15. Subpart D |

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# TEST RESULT CERTIFICATION

**Applicant's Name** ..... : Shandong Bittel Intelligent Technology Co.,Ltd.

Address ..... : No.1 Rizhao N Rd, Rizhao, Shandong, P.R.China

**Manufacture's Name** ..... : Shandong Bittel Intelligent Technology Co.,Ltd.

Address ..... : No.1 Rizhao N Rd, Rizhao, Shandong, P.R.China

**Product Description**

Product Name ..... : ModaMedia

Brand Name ..... : N/A

Model Name..... : ModaMedia-W

Series Model ..... : N/A

**Test Standards** ..... : Title 47 of the CFR, Part 15. Subpart D

Test procedure ..... : ANSI C63.17-2013

This device described above has been tested by STS and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
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**Date of Test** ..... :

Date of performance of tests ..... : 01 Nov. 2019 ~ 20 Nov. 2019

Date of Issue ..... : 20 Nov. 2019

Test Result ..... : **Pass**

Testing Engineer : Chris Chen

(Chris Chen)

Technical Manager : Sunday Hu

(Sunday Hu)

Authorized Signatory : Vita Li

(Vita Li)

TESTING CONSULTING SOLUTION CERTIFICATION STS APPROVAL

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## Revision History

| Rev. | Issue Date | Report NO. | Effect Page | Contents |
|---|---|---|---|---|
| 00 | 20 Nov. 2019 | STS1907052W01 | ALL | Initial Issue |
| | | | | |


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SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart D,

| Requirement | FCC Part | Test Procedure | Result |
|---|---|---|---|
| Emission Bandwidth | 15.323 (a) | 6.1.3 | Compliant |
| Labeling Requirements | 15.19(a)(3) | -- | Compliant |
| Conducted Emissions | 15.315 & 15.207 | ANSI C63.4 | Compliant |
| Antenna Requirements | 15.317 & 15.203 | Declaration | Compliant |
| Use digital modulation | 15.319 (b) | 6.1.4 | Compliant |
| Peak transmit power | 15.319 (c) | 6.1.2 | Compliant |
| Power spectral density | 15.319 (d) | 6.1.5 | Compliant |
| Power adjustment for antenna gain | 15.319 (e) | 4.3.1 | Compliant |
| Automatically discontinue transmission | 15.319 (f) | -- | Compliant |
| Spurious emissions conducted | 15.323 (d) (1) & 15.323 (d) (2) | 6.1.6 | Compliant |
| RF Exposure | 15.319 (i) & 1.1307(b), 2.1091 and 2.1093 | ANSI/IEEE C95.1 | Compliant (The test data please refer to RF exposure report) |
| Monitoring time | 15.323 (c)(1) | 7.3.4 | Compliant |
| Monitoring threshold | 15.323 (c)(2) | 7.3 | Compliant |
| Duration of transmission | 15.323 (c)(3) | 8.2.2 | Not Applicable |
| System acknowledgement test | 15.323(c)(4) | 8.2.1 | Compliant |
| Channel confirmation, Power accuracy, Segment occupancy | 15.323 (c)(5) | 7.3.3 & 7.3.4 | Compliant |
| Random waiting | 15.323 (c)(6) | 8.1.3 | Not Applicable |
| Monitoring bandwidth | 15.323 (c)(7) | 7.4 | Compliant |

| | | | |
|---|---|---|---|
| Monitoring reaction time | 15.323 (c)(1 ) | 7.5 | Compliant |
| Monitoring antenna | 15.323 (c)(8) | 4 | Compliant |
| Monitoring threshold relaxation | 15.323 (c)(9) | 4 | Compliant |
| Duplex connections | 15.323 (c)(10) | 8.3 | Not Applicable |
| Alternate monitoring interval | 15.323 (c)(11) | 8.4 | Not Applicable |
| Fair access | 15.323 (c)(12) | Declaration | Not Applicable |
| Frame period | 15.323 (e) | 6.2.2 & 6.2.3 | Compliant |
| Frequency stability | 15.323 (f) | 6.2.1 | Compliant |
| Radiated Out of Band Emissions | 15.319 (g), 15.309 (b) & FCC Part 15 Subpart B, 15.109 and 15.209 | -- | Compliant |
| Fair access | 15.323 (c)(12) | Declaration | Not Applicable |

# 1 INTRODUCTION

## 1.1 TEST FACTORY

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FCC test Firm Registration Number: 625569
IC test Firm Registration Number: 12108A
A2LA Certificate No.: 4338.01

## 1.2 MEASUREMENT UNCERTAINTY

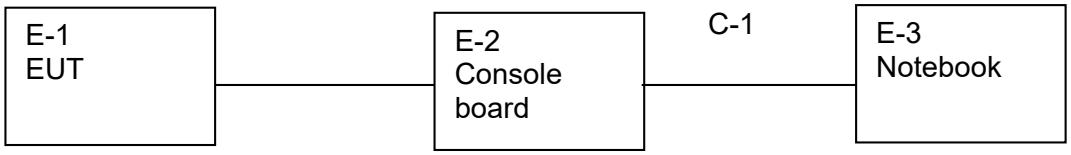
The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

| No. | Item | Uncertainty |
|---|---|---|
| 1 | RF output power, conducted | ±0.71dB |
| 2 | Unwanted Emissions, conducted | ±0.63dB |
| 3 | All emissions, radiated 30-200MHz | ±3.43dB |
| 4 | All emissions, radiated 200MHz-1GHz | ±3.57dB |
| 5 | All emissions, radiated>1G | ±4.13dB |
| 6 | Conducted Emission (9KHz-150KHz) | ±3.18dB |
| 7 | Conducted Emission (150KHz-30MHz) | ±2.70dB |

## 2 PRODUCT INFORMATION

| | |
|---|---|
| Product Name | ModaMedia |
| Brand Name | N/A |
| Model Name | ModaMedia-W |
| Series Model | N/A |
| Product Differences | N/A |
| Hardware version number | V1.0 |
| Software version number | IC717_20 |
| EUT Frequency Ranges | 1921.536-1928.448MHz |
| EUT power: | 9.396dBm |
| Type of Modulations | GFSK |
| Number of Channels | 5 CH |
| | 1921.536MHz, 1923.264MHz, 1924.992MHz, 1926.720MHz, 1928.448MHz |
| Antenna Type | Internal antenna |
| Antenna Gain | 0dBi |
| Power Rating | DC12V 4000mA |
| Adapter Information: | Input: AC 100-240V 50/60Hz 1.2A Max<br>Output: DC12V 4000mA |
| Extreme Temp. Tolerance: | -20℃ to +50℃ |

# 3 TEST CONFIGURATION OF EQUIPMENT UNDER TEST




## 3.1 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Necessary accessories

| Item | Equipment | Mfr/Brand | Model/Type No. | Serial No. | Note |
|---|---|---|---|---|---|
| N/A | N/A | N/A | N/A | N/A | N/A |
| | | | | | |
| | | | | | |
| | | | | | |

Support units

| Item | Equipment | Mfr/Brand | Model/Type No. | Serial No. | Note |
|---|---|---|---|---|---|
| E-2 | Console board | Bittel | MODA-W | N/A | N/A |
| E-3 | Notebook | HP | 500-320cx | N/A | N/A |
| C-1 | USB Cable | N/A | 100cm | N/A | N/A |
| | | | | | |
| | | | | | |

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
(3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

## 4 MEASUREMENT INSTRUMENTS

| Kind of Equipment | Manufacturer | Type No. | Serial No. | Last Calibra-tion | Calibrated Until |
|---|---|---|---|---|---|
| Signal Analyzer | Agilent | N9020A | MY51110105 | 2019.03.02 | 2020.03.01 |
| Active loop Antenna | ZHINAN | ZN30900C | 16035 | 2018.03.11 | 2021.03.10 |
| Test Receiver | R&S | ESCI | 101427 | 2019.7.29 | 2020.7.28 |
| RF Test Platform for DECT | RTX | RTX 2012 HS | 1138-6122 | 2019.03.02 | 2020.03.01 |
| Bilog Antenna | TESEQ | CBL6111D | 34678 | 2017.11.02 | 2020.11.1 |
| Horn Antenna | SCHWARZBECK | BBHA 9120D(1201) | 9120D-1343 | 2018.10.19 | 2021.10.18 |
| SHF-EHF Horn Antenna (18G-40GHz) | A-INFO | LB-180400-KF | J211020657 | 2018.03.11 | 2021.03.10 |
| Temperature& Humidity test chamber | Safety test | AG80L | 171200018 | 2019.03.02 | 2020.03.01 |
| turn table | EM | SC100_1 | 60531 | N/A | N/A |
| Antenna mast | EM | SC100 | N/A | N/A | N/A |
| AC Power Source | APC | KDF-11010G | F214050035 | N.C.R | N.C.R |
| programmable power supply | Agilent | E3642A | MY40002025 | 2019.10.11 | 2020.10.10 |
| Temperature & Humidity | HH660 | Mieo | N/A | 2019.10.12 | 2020.10.11 |
| Attenuator | HP | 8494B | DC-18G | 2019.05.06 | 2020.05.05 |

Equipment with a calibration date of “NCR” shown in this list was not used to make direct calibrated measurements.

# 5 TEST ITEMS

## 5.1 ANTENNA REQUIREMENT

Test overview

§ 15.203: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.
The structure and application of the EUT were analyzed to determine compliance with Section 15.203 of the Rules. Section 15.203 states that the subject device must meet at least one of the following criteria:
a.) Antenna must be permanently attached to the unit.
b.) Antenna must use a unique type of connector to attach to the EUT.
c.) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

Test Result

The EUT as tested is compliant the criteria of §15.203. The antenna is permanently attached to the unit.

## 5.2 MODULATION TECHNIQUES

Test Requirement

All transmissions must use only digital modulation techniques.

TEST PROCEDURES

Attestation of manufacturer supported by reference to relevant DECT specifications.

ATTESTATION

This device is compliant with the DECT standards described in European Standards EN 300 175-2 and EN 300 175-3. DECT transmissions are MC/TDMA/TDD (Multi carrier / Time Division Multiple Access / Time Division Duplex) using Digital GFSK modulation. For further details see operational description or relevant portions of the DECT standards.

Test Results
The EUT as tested is compliant the criteria of §15.319(b).

5.3 EMISSION BANDWIDTH

TEST OVERVIEW

§ 15.323(a): For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Compliance with the emissions limits is based on the use of measurement instrumentation employing a peak detector function with an instrument resolutions bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

TEST PROCEDURE

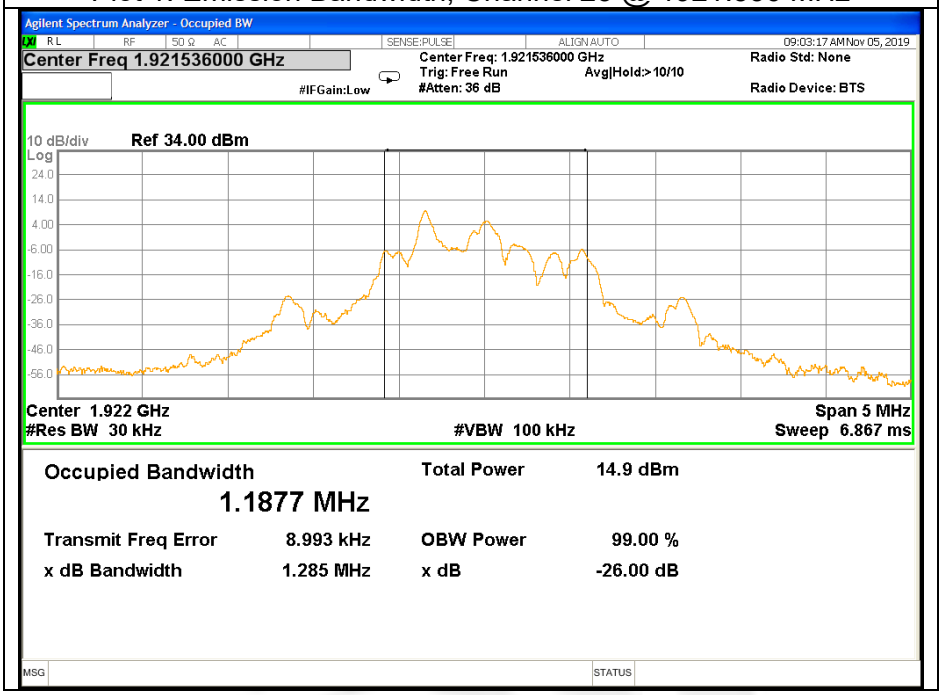
Operation shall be contained within the 1920-1930 MHz band. The emission bandwidth shall be less than 2.5 MHz. The power level shall be as specified in §15.319(c), but in no event shall the emission bandwidth be less than 50 kHz.

Test Results

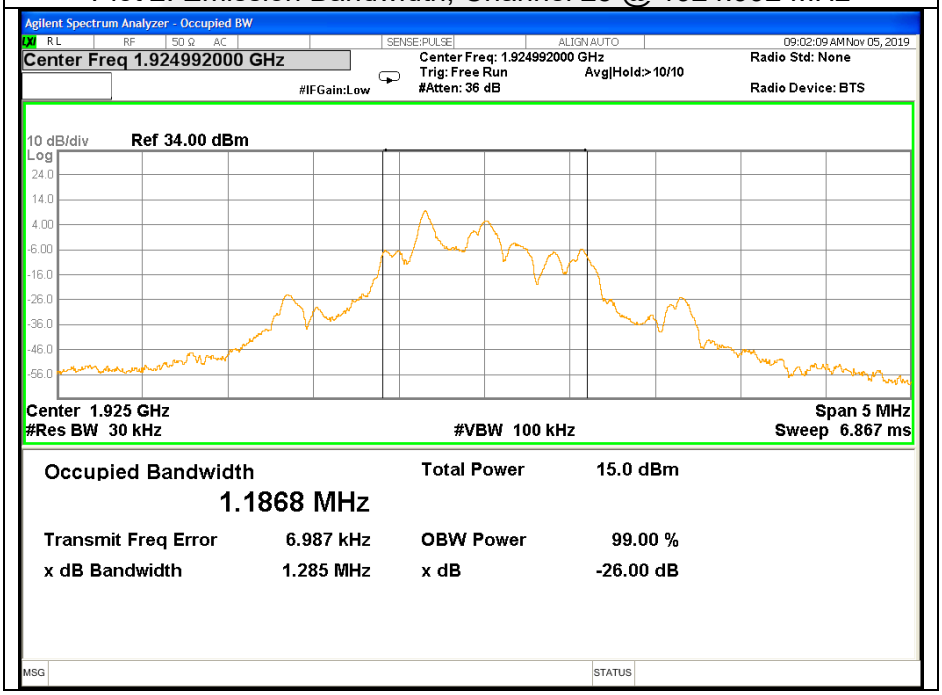
The Eut was compliant with this requirement.

| Channel | BW(MHz) | Limit |
|---|---|---|
| LOW(23) | 1.285 | ＜2.5MHz |
| MID(25) | 1.285 | |
| HIGH(27) | 1.300 | |
| AVG | 1.290000 | |

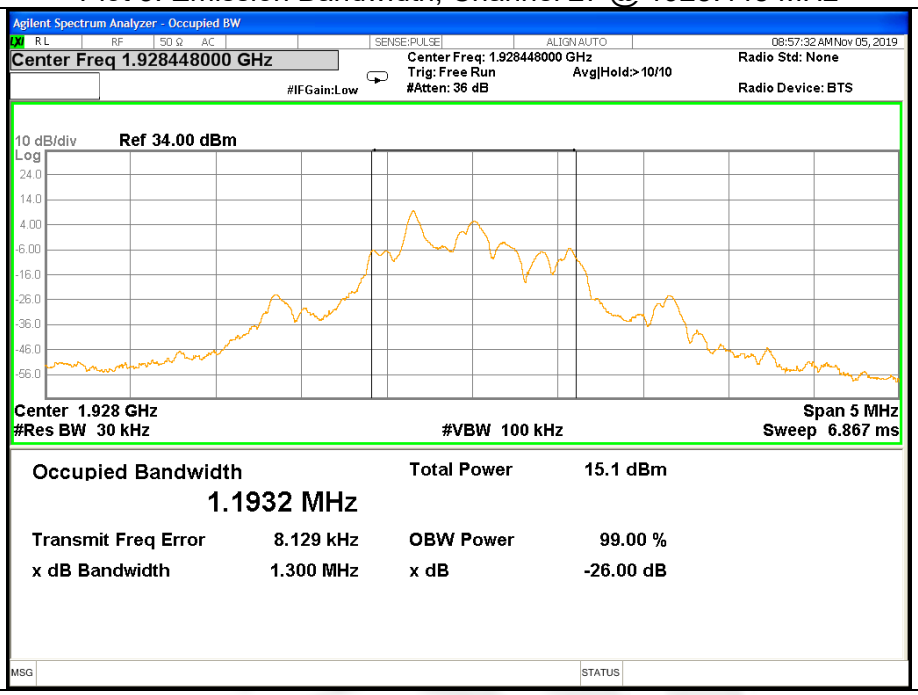
Plot 1. Emission Bandwidth, Channel 23 @ 1921.536 MHz




Plot 2. Emission Bandwidth, Channel 25 @ 1924.992 MHz



Plot 3. Emission Bandwidth, Channel 27 @ 1928.448 MHz



## 5.4 PEAK TRANSMIT POWER

### TEST OVERVIEW

§15.319(c): The peak transmit power shall not exceed 100 microwatts multiplied by the square root of the emission bandwidth in hertz. Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

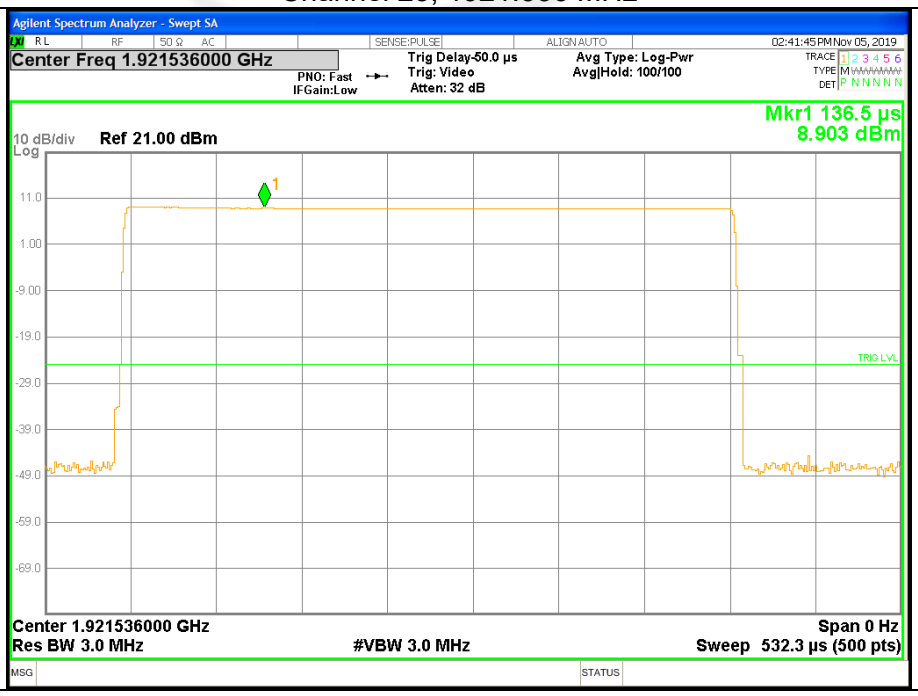
### TEST PROCEDURE

Testing to ANSI C63.17-2013 Clause 6.1.2, which provides the test methodology for this provision. The EUT is controlled from a personal computer and set into continuous transmission mode.

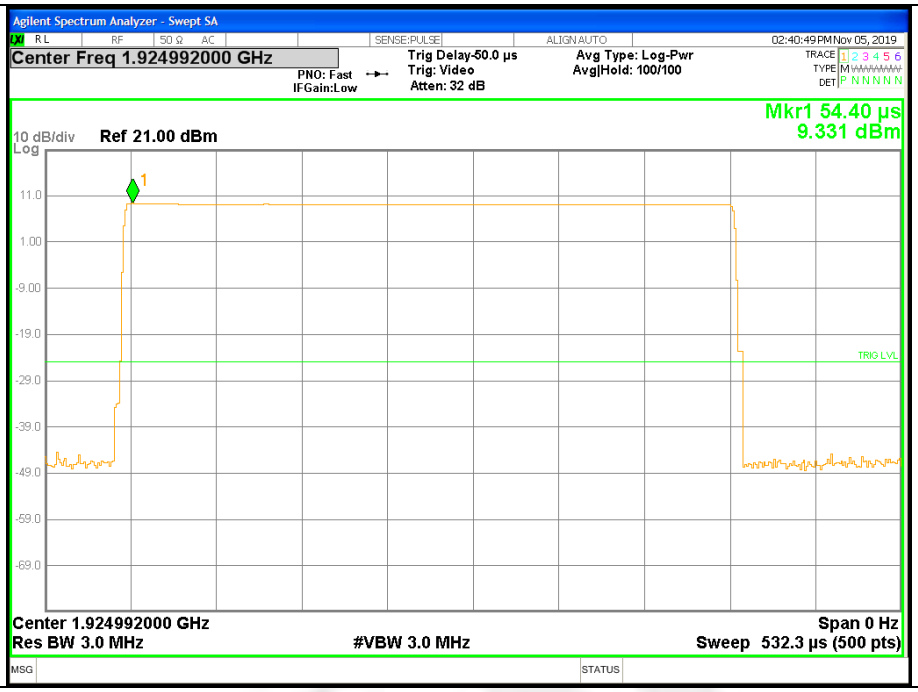
### Test Results

| Carrier Channel | Frequency (MHz) | Measured Peak Output Power（dBm） | Limit（uw） | Limit（dBm） |
|---|---|---|---|---|
| Low(23) | 1921.536 | 8.903 | 113358 | 20.54 |
| Mid(25) | 1924.992 | 9.331 | 113358 | 20.54 |
| High(27) | 1928.448 | 9.396 | 114018 | 20.57 |
| EBWLow Channel=1285000 Hz, EBWMid Channel=1285000 Hz, EBWHigh Channel=1300000 Hz<br>Peak Transmitter Power Limit=100（EBW）1/2μW | | | | |

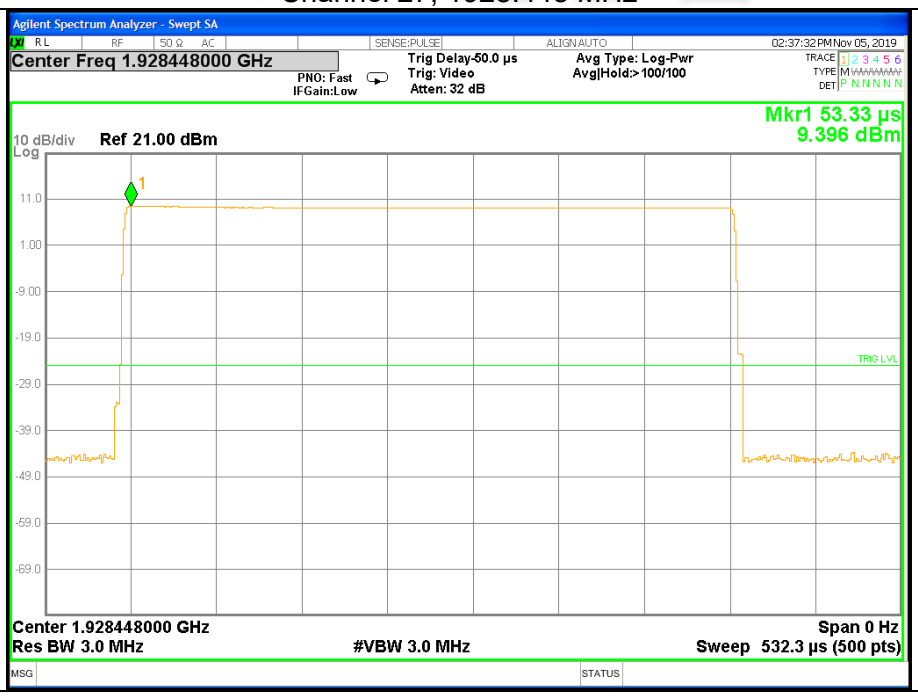
Channel 23, 1921.536 MHz




Channel 25, 1924.992 MHz




Channel 27, 1928.448 MHz



## 5.5 POWER SPECTRAL DENSITY

### Test Overview

§15.319(d): Power spectral density shall not exceed 3 milliwatts in any 3 kHz bandwidth as measured with a spectrum analyzer having a resolution bandwidth of 3 kHz.

### Test Procedure

Testing to ANSI C63.17-2013 Clause 6.1.5, which provides the test methodology for this provision.

### Test Results

| Carrier Channel | Frequency (MHz) | Measured Peak Power Spectral Density (dBm) | Limit(mw) | Limit(dBm) |
|---|---|---|---|---|
| Low(23) | 1921.536 | 3.38 | 3 | 4.77 |
| Mid(25) | 1924.992 | 2.05 | | |
| High(27) | 1928.448 | 4.45 | | |

Channel 23, 1921.536 MHz

Channel 25, 1924.992 MHz

Channel 27, 1928.448 MHz

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
09:27:32 AM Nov 20, 2019
Center Freq 1.928103000 GHz
PNO: Close
IFGain:Low
Trig Delay: -500.0 µs
Trig: Video
Atten: 30 dB
Avg Type: RMS
TRACE 1 2 3 4 5 6
TYPE W
DET A N N N N N
Mkr1 860.8 µs
4.45 dBm
12 dB/div
Log
Ref 17.40 dBm
5.40
-6.60
-18.6
-30.6
-42.6
-54.6
-66.6
-78.6
-90.6
TRIG LVL
Center 1.928103000 GHz
Res BW 3.0 kHz
#VBW 10 kHz
Span 0 Hz
Sweep 1.600 ms (1001 pts)
MSG
STATUS

## 5.6 POWER ADJUSTMENT FOR ANTENNA GAIN

Test Overview

§15.319(e): The peak transmit power shall be reduced by the amount in decibels that the maximum directional gain of the antenna exceeds 3 dBi.

Test procedure

Testing to ANSI C63.17-2013 Clause 4.3.1, which provides the test methodology for this provision.

Test Result

Equipment Employs a 0 dBi Antenna. Max output power allowed with this gain by the EUT is 9.396dBm.

The Max output power does not need to be reduced.

The Output Power complies with the Power Adjustment for Antenna Gain requirements of §15.319(e).

## 5.7 AUTOMATICALLY DISCONTINUE TRANSMISSION

OVERVIEW

§15.319(f): The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude transmission of control and signaling information or use of repetitive codes used by certain digital technologies to complete frame or burst intervals.

TEST RESULTS

| | Test | Reaction of EUT | Result |
|---|---|---|---|
| 1 | Remove Power from Companion Device | A | Pass |
| 2 | Switch off the companion device | A | Pass |
| 3 | Terminate call at the companion device | NA1 | Pass |
| 4 | Switch off the EUT | NA2 | Pass |
| 5 | Terminate call at the EUT | NA3 | Pass |

A - Connection was terminated and transmission ceased.

B - Connection was terminated but the EUT transmits control or signaling information.

C - Connection was terminated but the companion device transmits control or signaling information.

NA 1 - Companion Device does not have an on/off switch for terminate call.

NA 2 - EUT does not have an on/off switch.

NA 3 – EUT does not have a switch for terminate call.

5.8 SYSTEM ACKNOWLEDGE-MENT TEST

Test overview

§15.323(c)(4): Once access to specific combined time and spectrum windows is obtained an acknowledgment from a system participant must be received by the initiating transmitter within one second or transmission must cease. Periodic acknowledgments must be received at least every 30 seconds or transmission must cease. Channels used exclusively for control and signaling information may transmit continuously for 30 seconds without receiving an acknowledgment, at which time the access criteria must be repeated.

TEST PROCEDURE

Measurement method according to ANSI C63.17 2013 clause 8.2.1

During testing initial transmission without acknowledgement, the signal from the EUT to the companion device is blocked by the circulator.

The test of the transmission time after loss of acknowledgements is performed by cutting off the signal from the companion device by a RF switch and measuring the time until the EUT stops transmitting.

TEST RESULTS

| Test | Time taken (second) | Limit (second) | Result |
|---|---|---|---|
| Initial Connection acknowledgement | 0.36 | 1 | Pass |
| Change of access criteria for control information | N/A | 30 | N/A |
| Transmission cease time after loss of acknowledgement | 4.16 | 30 | Pass |

5.9 MONITORING THRESHOLD

Test overview

§15.323 (c)(2). The monitoring threshold must not be more than 30 dB above the thermal noise power for a bandwidth equivalent to the emission bandwidth used by the device.

§15.323 (c)(9). Devices that have a power output lower than the maximum permitted under this sub-part may increase their monitoring detection threshold by one decibel for each one decibel that the transmitter power is below the maximum permitted.

Test Procedure

Testing to ANSI C63.17-2013 Clause 7.3, which provides the test methodology for this provision. The Clause states that the lower threshold is for devices that do not use the LIC procedure. The equation for the lower monitoring threshold is given in ANSI C63.17 Clause 4.3.4.

TEST RESULTS

| Upper Threshold | | |
|---|---|---|
| B | 1189233 | MHz |
| Mu | 50 | dB |
| Peut | 10 | dBm |
| TU | -52.871 | dBm |
| Lower Threshold | | |
| B | 1189233 | MHz |
| Ml | 30 | dB |
| Peut | 8.903 | dBm |
| TL | -71.774 | dBm |

Attestation

The sensor will go into hibernation after a few minutes. It is not possible to keep a connection running very long. Therefore, this requirement is not applicable.

5.10 DURATION OF TRANSMISSION

Test overview

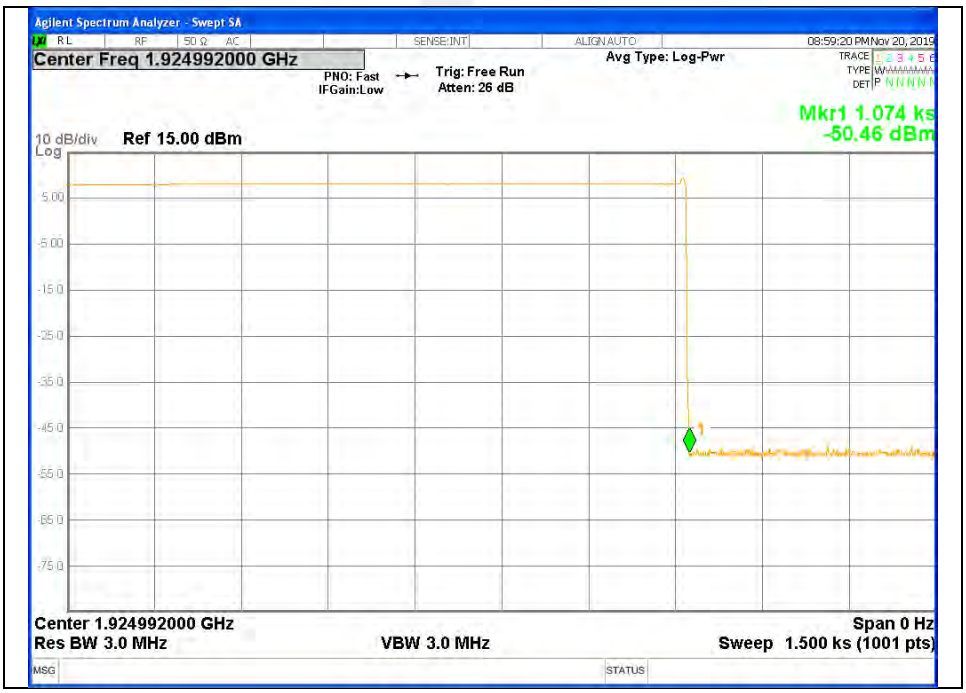
§15.323 (c)(3) If no signal above the threshold level is detected, transmission may commence and continue with the same emission bandwidth in the monitored time and spectrum windows without further monitoring. However, occupation of the same combined time and spectrum windows by a device or group of cooperating devices continuously over a period of time longer than 8 hours is not permitted without repeating the access criteria.

Test Procedure

Testing to ANSI C63.17-2013 Clause 4, which provides the test methodology for this provision. A communication link is established between BS and MS in a conducted mode and in a room without other US DECT devices to prevent influence from other transmissions. According to FCC Part 15.323(c)(3), the access criteria have to be verified at least every 8 hours. The following test is performed:

Test Result

| Test ref. to ANSI C63.17:2013 clause 8.2.2 | Observation result(H) | Limit(H) | Verdict |
|---|---|---|---|
| Transmission duration on same time and frequency window | 0.298 | 8 | Pass |



## 5.11 SELECTED CHANNEL CONFIRMATION, POWER ACCURACY, SEGMENT OCCUPANCY

Test overview

§15.323 (c)(5) If access to spectrum is not available as determined by the above, and a minimum of 40 duplex system access channels are defined for the system, the time and spectrum windows with the lowest power level below a monitoring threshold of 50 dB above the thermal noise power determined for the emission bandwidth may be accessed. A device utilizing the provisions of this paragraph must have monitored all access channels defined for its system within the last 10 seconds and must verify, within the 20 milliseconds (40 milliseconds for devices designed to use a 20 milliseconds frame period) immediately preceding actual channel access that the detected power of the selected time and spectrum windows is no higher than the previously detected value. The power measurement resolution for this comparison must be accurate to within 6 dB. No device or group of co-operating devices located within 1 meter of each other shall during any frame period occupy more than 6 MHz of aggregate bandwidth, or alternatively, more than one third of the time and spectrum windows defined by the system.

Test Procedure

Testing to ANSI C63.17-2013 Clause 7.3.2. & 7.3.3, which provides the test methodology for this provision. The current product offers 12 duplex channels per frequency channel and therefore 12x5=60 duplex channels in total. Hence Part §15.323(c)(5) applies. The equation for the upper monitoring threshold is given in ANSI C63.17 Clause 4.3.3. Max measured interference level (dBm) = -85.02 dBm

Monitoring limit threshold

The EUT's monitoring limit threshold power at the monitoring antenna terminals shall be less than a maximum, shown in Equation (3):

$T_L \leq (-174+10\log B+M_L+P_{MAX}-P_{EUT})$dBm

$M_L$ is a level specified by the manufacturer and is the maximum amount in decibels by which the limiting threshold may exceed thermal noise for an EUT transmitting the maximum allowed power.

Calculation of monitoring threshold limits for isochroous devices:

Lower threshold: $T_L=-174+10\log_{10}B+M_L+P_{MAX}-P_{EUT}$ (dBm)

Where: B= Emission bandwidth (Hz)

$M_L$= dB the threshold may exceed thermal noise (30 for $T_L$)

$P_{MAX}=5\mathrm{Log}_{10}B-10$(dBm)

$P_{EUT}$=Transmitted power (dBm)

| Monitor Threshold | B(MHz) | $M_L$(dB) | $P_{MAX}$(dBm) | $P_{EUT}$(dBm) | Threshold(dBm) |
|---|---|---|---|---|---|
| Lower threshold | 1.300 | 30 | 20.57 | 9.396 | -71.69 |

Note: 1.The upper threshold is applicable as the EUT utilizes more than 20duplex system channels

Test Results

1) LIC procedure test:

| Interference (Refer to ANSI C63.17 clause 7.3.3) | Reaction fo EUT | Results |
|---|---|---|
| a) Apply the interference on f1 at level $T_L+U_M$+7dB and the interference on $f_2$ at level $T_L+U_{M-}$ Initiate transmission and verify the transmission only on $f_2$.Repeat 5 times. | EUT transmits on f2 | Pass |
| b) Apply the interference on $f_1$ at level $T_L+U_M$ and the interference on $f_2$ at level $T_L+U_M$+7dB. Initiate transmission and verify the transmission only on $f_1$.Repeat 5 times. | EUT transmits on f1 | Pass |
| c) Apply the interference on $f_1$ at level $T_L+U_M$+1dB and the interference on $f_2$ at level $T_L+U_M$-6dB. Initiate transmission and verify the transmission only on $f_2$.Repeat 5 times. | EUT transmits on f2 | Pass |
| d) Apply the interference on $f_1$ at level $T_L+U_M$-6dB and the interference on $f_2$ at level $T_L+U_M$+1dB. Initiate transmission and verify the transmission only on $f_2$.Repeat 5 times. | EUT transmits on f1 | Pass |

2) Selected channel confirmation:

| Interference (Refer to ANSI C63.17 clause 7.3.4) | Reaction fo EUT | Results |
|---|---|---|
| a) Apply the interference on $f_1$ at level $T_L+U_M$ and no interference on $f_{2-}$ Initiate transmission and verify the transmission only on $f_2$.Then terminate it. | EUT transmits on f2 | Pass |
| b) Apply the interference on $f_2$ at level $T_L+U_M$ and immediately remove all interference from $f_1$. The EUT should immediately attempt transmission $f_1$(but at least 20ms after the interference on $f_2$ is applied), verify the transmission only on $f_1$. | EUT transmits on f1 | Pass |

5.12 RANDOM WAITING

Test Criteria

§15.323 (c)(6) ) if the selected combined time and spectrum windows are unavailable, the device may either monitor and select different windows or seek to use the same windows after waiting an amount of time, randomly chosen from a uniform random distribution between 10 and 150 milliseconds, commencing when the channel becomes available.

Test Procedure

Testing to ANSI C63.17-2013 Clause 8.1.3, which provides the test methodology for this provision.

Attestation

The Manufacturer declared that this provision is not utilized by the EUT.

5.13 MONITORING REQUIREMENTS

Test Criteria

§15.323 (c)(7) The monitoring system bandwidth must be equal to or greater than the emission bandwidth of the intended transmission and have a maximum reaction time less than 50xSQRT (1.25/ emission bandwidth in MHz) microseconds for signals at the applicable threshold level but shall not be required to be less than 50 microseconds. If a signal is detected that is 6 dB or more above the applicable threshold level, the maximum reaction time shall be 35xSQRT (1.25/emission bandwidth in MHz) microseconds but shall not be required to be less than 35 microseconds.

Test Procedure

Measurement method according to ANXI C63.17 2013 clause 7.5

a) Restrict the EUT to a single transmit carrier frequency f1, and verify that the EUT can establish a connection with no interference applied on f1.
b) Apply time-synchronized, pulsed interference on f1 at the pulsed level TL+UM, veify that the EUT does not establish a connection when the width of the interference pulse exceeds the largest of 50μs and 50 √1.25 / B μs,where B is the emission bandwidth of the EUT in megahertz.
c) With the channel interference level 6dB above TL+UM, verify that the EUT does not eatablish a connection when the width of the interference pulse exceeds the largest of 35μs and 35√1.25/Bμs, where B is the emission bandwidth of the EUT in megahertz.

| Test pulse width Equation(μs) | B(bandwidth)(MHz) | Pulse width(μs) | Limit(Largest)(μs) |
|---|---|---|---|
| $50(1.25/B)^{1/2}$ | 1.300 | 49.03 | 50 |
| $35(1.25/B)^{1/2}$ | 1.300 | 34.32 | 35 |

Test Results

1) Monitoring Bandwidth:

The antenna of the EUT used for monitoring is the same interior antenna that used for transmission, so the monitorting system bandwidth is equall to the emission bandwidth of the intended transmission.

2) Reaction Time Test:

| No. | Interference Pulse width(μs) | Reaction of EUT | Observing time(μs) | Result |
|---|---|---|---|---|
| 1 | 50 μ s with level $T_L+U_m$ | No transmission | 25.2 | Pass |
| 2 | 35 μ s with level $T_L+U_M$ +6dB | No transmission | 18.71 | Pass |

5.14 MONITORING ANTENNA

Test Criteri

§15.323 (c)(8) ) Transmission is intended to occupy. The following criteria must be met: (8) The monitoring system shall use the same antenna used for transmission, or an antenna that yields equivalent reception at that location.

Test Procedure

Testing to ANSI C63.17-2013 Clause 4, which provides the test methodology for this provision.

Attestation

The EUT uses the same antennas for transmission and reception as for monitoring

5.15 DUPLEX CONNECTIONS

Test Criteria

§15.323 (c)(10) An initiating device may attempt to establish a duplex connection bymonitoring both its intended transmit and receive time and spectrum windows. If both the intended transmit and receive time and spectrum windows meet the access criteria, then the initiating device can initiate a transmission in the intended transmit time and spectrum window. If the power detected by the responding device can be decoded as a duplex connection signal from the initiating device, then the responding device may immediately begin transmitting on the receive time and spectrum window monitored by the initiating device.

Test Procedure

Testing to ANSI C63.17-2013 Clause 8.3, which provides the test methodology for this provision. The MS is the initiating device and the BS is the companion device.

Test Results

The Manufacturer declares that this provision is not utilized by the EUT.

## 5.16 ALTERNATIVE MONITORING INTERVAL FOR CO-LOCATED DEVICES

Test Criteria

§15.323 (c)(11) an initiating device that is prevented from monitoring during its intended transmit window due to monitoring system blocking from the transmissions of a co-located (within one meter) transmitter of the same system, may monitor the portions of the time and spectrum windows in which they intend to receive over a period of at least 10 milliseconds. The Monitored time and spectrum window must total at least 50 percent of the 10 millisecond frame interval and the monitored spectrum must be within the 1.25 mhz frequency channel(s) already occupied by that device or co-located co-operating devices. If the access criteria is met for the intended receive time and spectrum window under the above conditions, then transmission in The intended transmit window by the initiating device may commence.

Test Procedure

Testing to ANSI C63.17-2013 Clause 8.4, which provides the test methodology for this provision. The MS is initiating device and the BS is the companion device.

Test Results

The Manufacturer declares that this provision is not utilized by the EUT.

## 5.17 FAIR ACCESS

Test Criteria

§15.323 (c)(12) The provisions of (c)(10) or (c)(11) of this section shall not be used to extend the range of spectrum occupied over space or time for the purpose of denying fair access to spectrum to other devices.

Test Procedure

The manufacturer supplies an attestation.

Attestation

The manufacturer declares that the EUT does not work in a mode which denies fair access to spectrum for other devices.

5.18 SPURIOUS EMISSIONS

Test Criteria

§15.323(d)(1): Out of Band Emissions

Emissions shall be attenuated below a reference power of 112 milliwatts as follows: 30 dB between the band edge and 1.25 MHz above or below the band; 50 dB between 1.25 and 2.5 MHz above or below the band; and 60 dB at 2.5 MHz or greater above or below the band.

§15.323(d)(2): In-Band Emissions

Emissions inside the band must comply with the following emission mask: In the bands between 1B and 2B measured from the center of the emission bandwidth, the total power emitted by the device shall be at least 30 dB below the transmit power permitted for that device; in the bands between 2B and 3B measured from the center of the emission bandwidth, the total power emitted by an intentional radiator shall be at least 50 dB below the transmit power permitted for that radiator; in the bands between 3B and the band edge, the total power emitted by an intentional radiator in the measurement bandwidth shall be at least 60 dB below the transmit power permitted for that radiator. “B” is defined as the emission bandwidth of the device in hertz. Compliance with the emission limits is based on the use of measurement instrumentation employing peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

Test Procedure

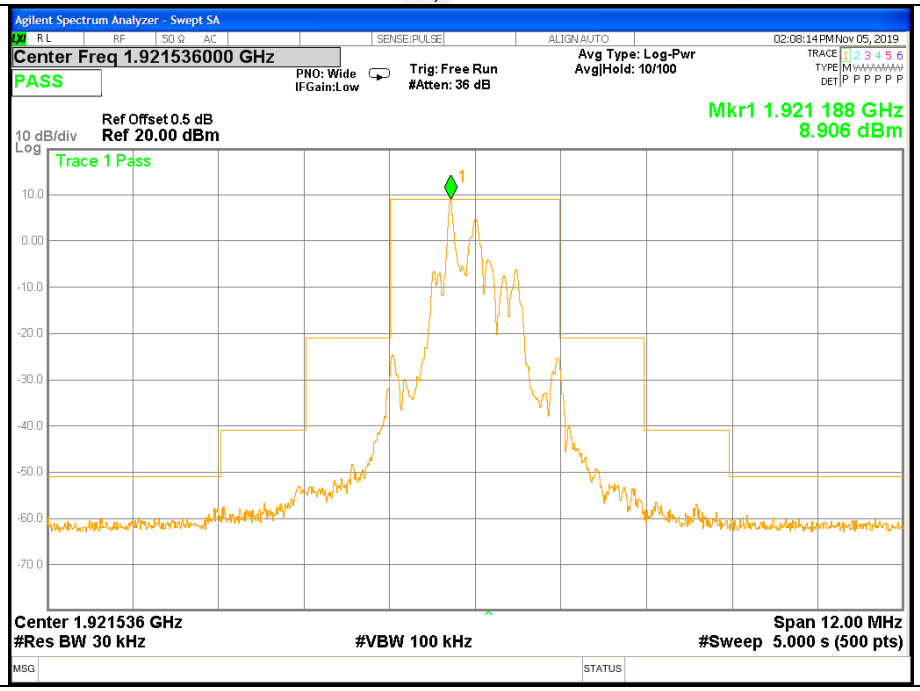
For both in and out of band emissions the EUT was connected directly to a spectrum analyzer.
The RBW of the spectrum analyzer was set to a minimum 1% of the emission band width.

Test Results

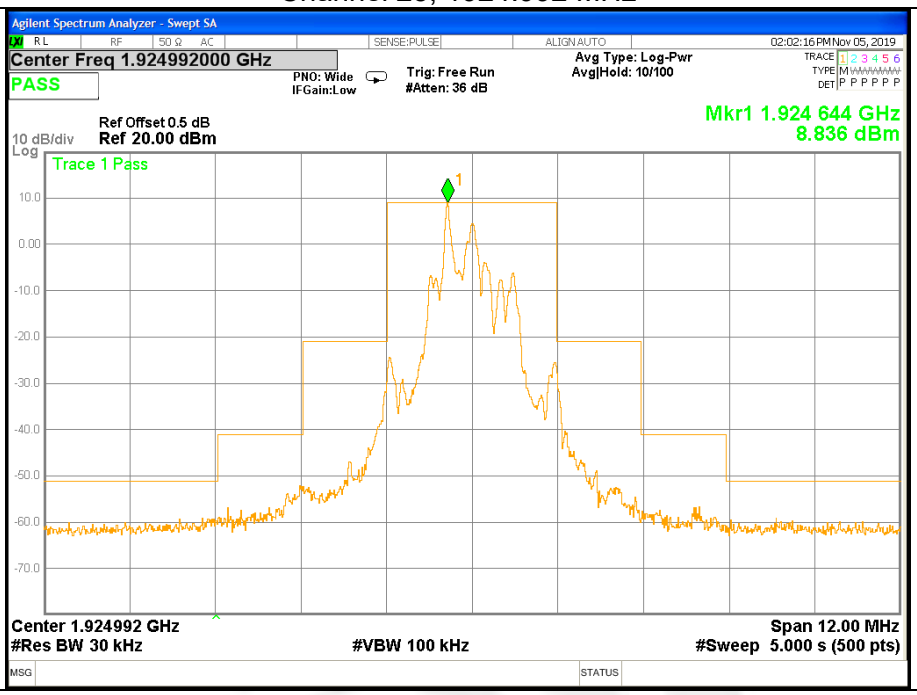
Equipment complies with the Spurious Emission limits of § 15.323(d)(1).

In-Band Emissions

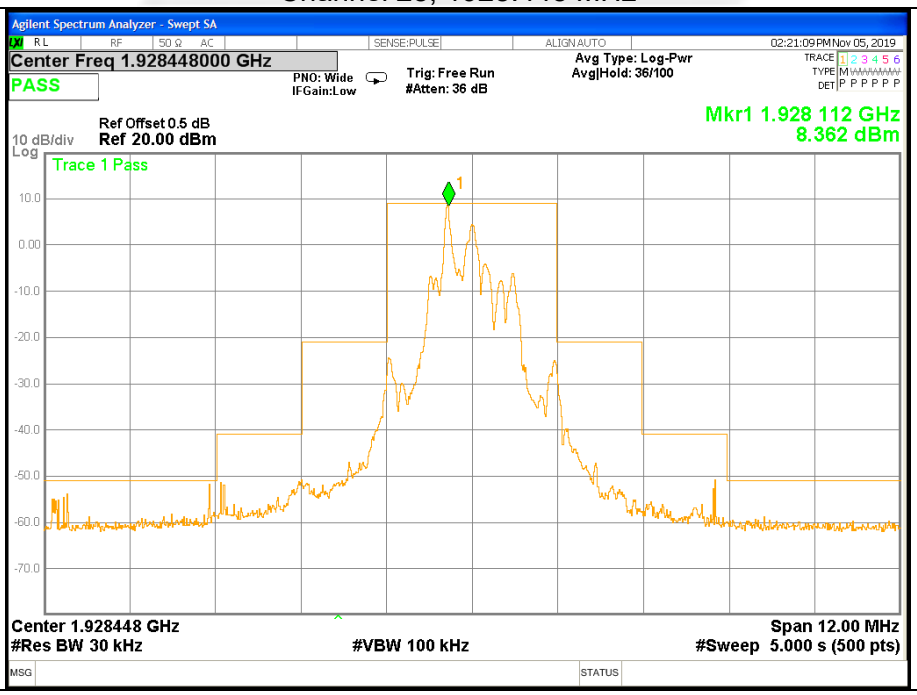
Channel 23, 1921.536 MHz



Channel 25, 1924.992 MHz

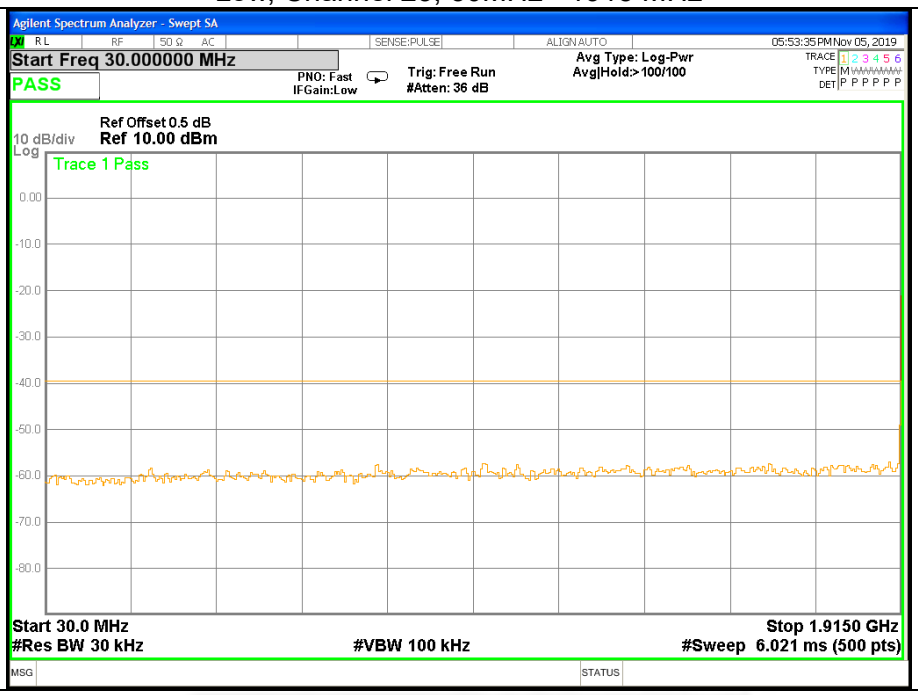



Channel 28, 1928.448 MHz

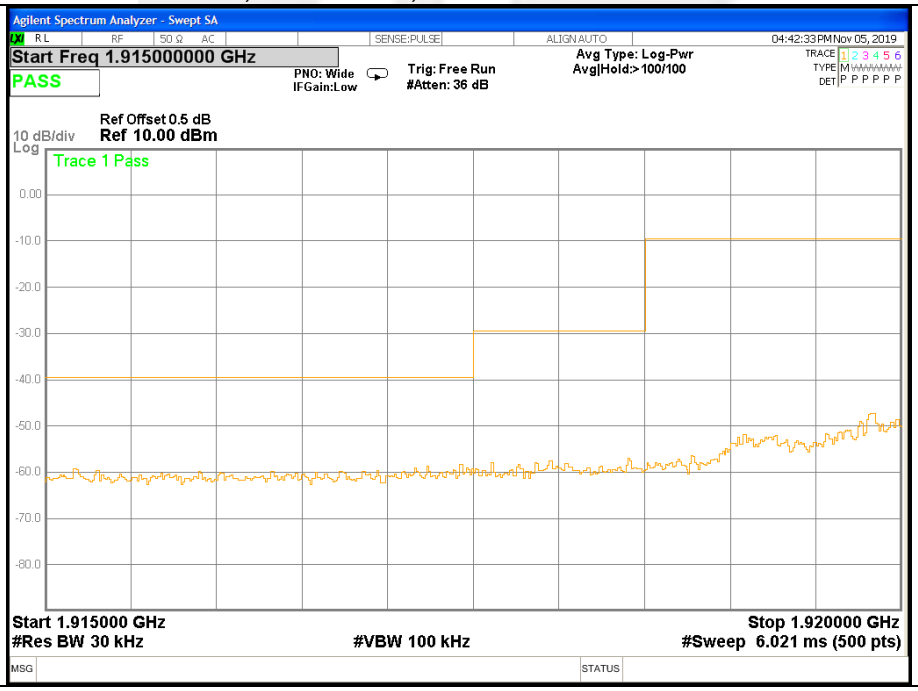


Out of Band Emissions

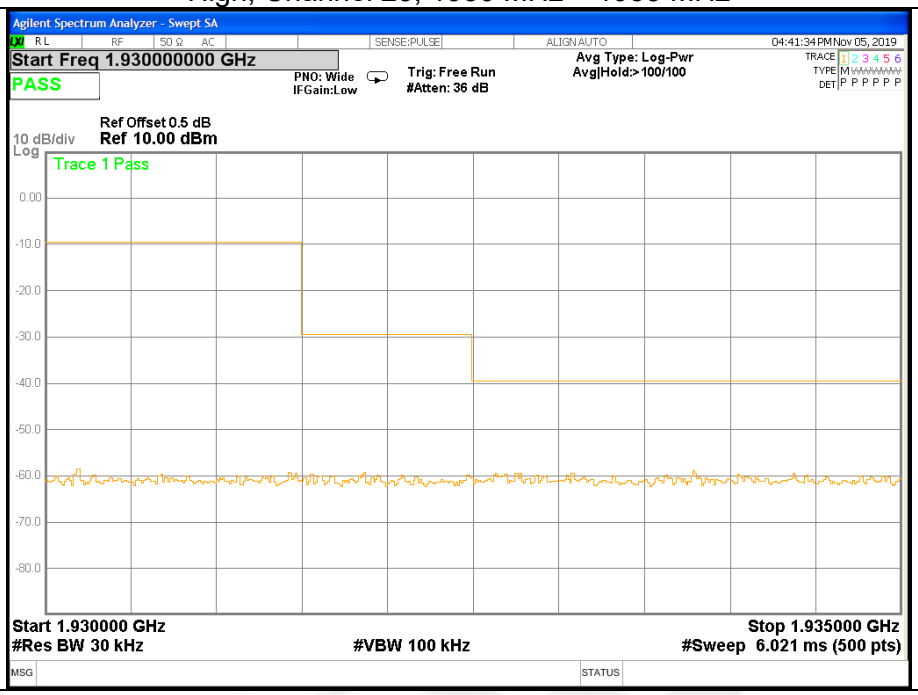
Low, Channel 23, 30MHz - 1915 MHz



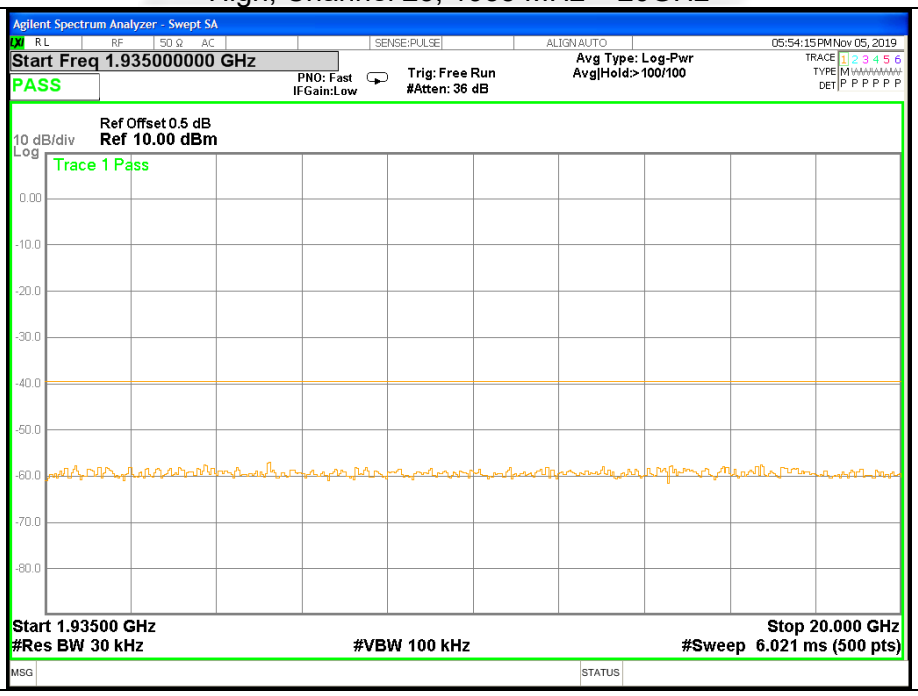

Low, Channel 23, 1915 MHz – 1920 MHz



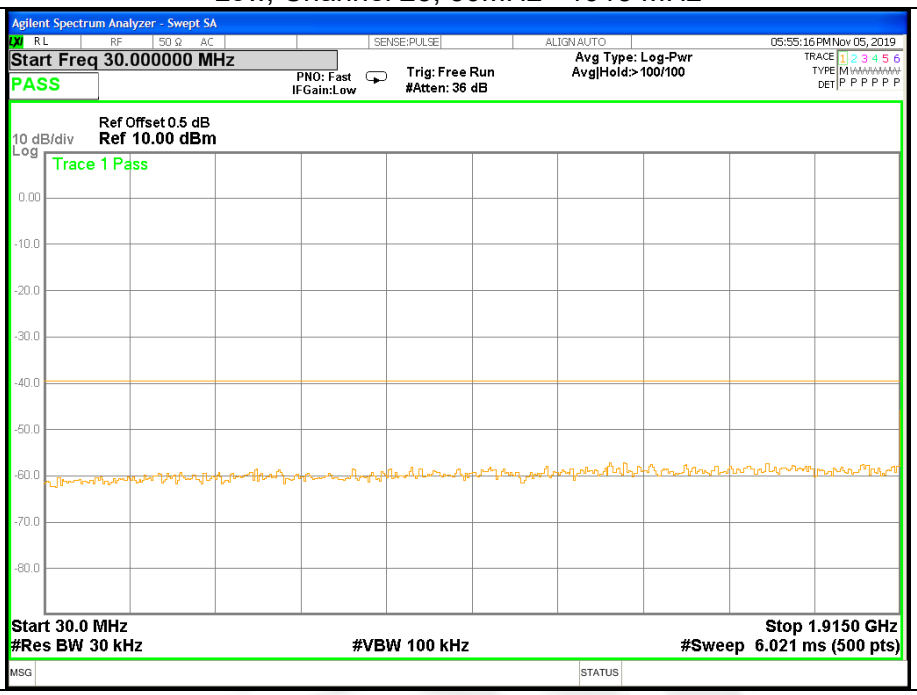
High, Channel 23, 1930 MHz – 1935 MHz



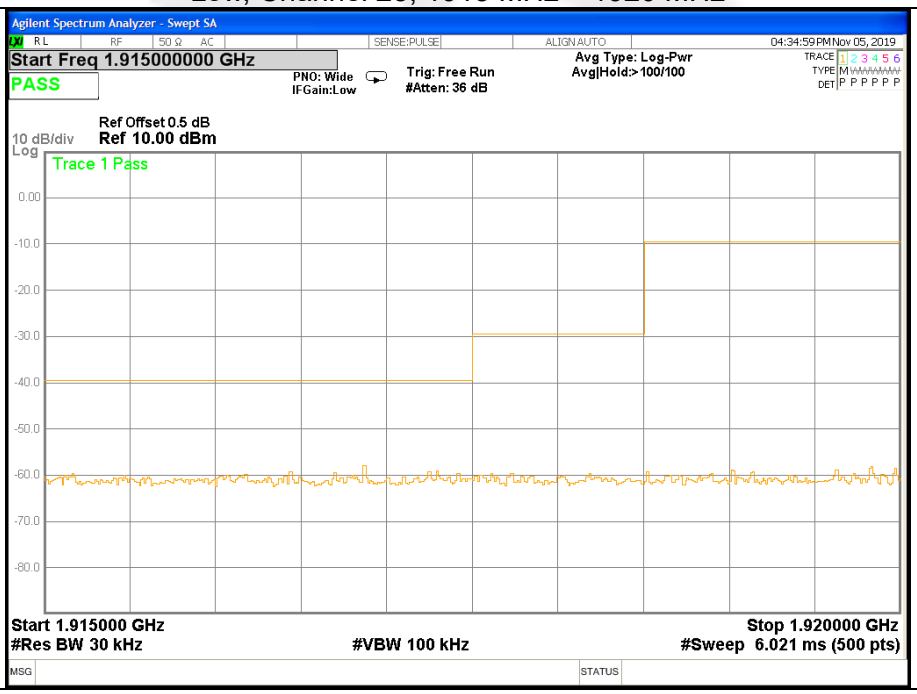

High, Channel 23, 1935 MHz – 20GHz



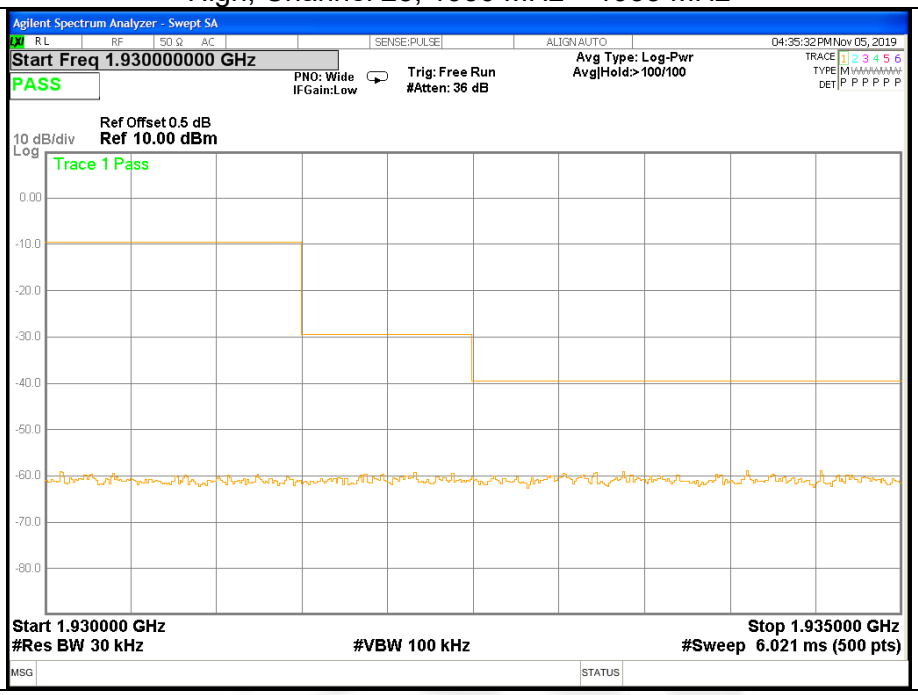
Low, Channel 25, 30MHz - 1915 MHz



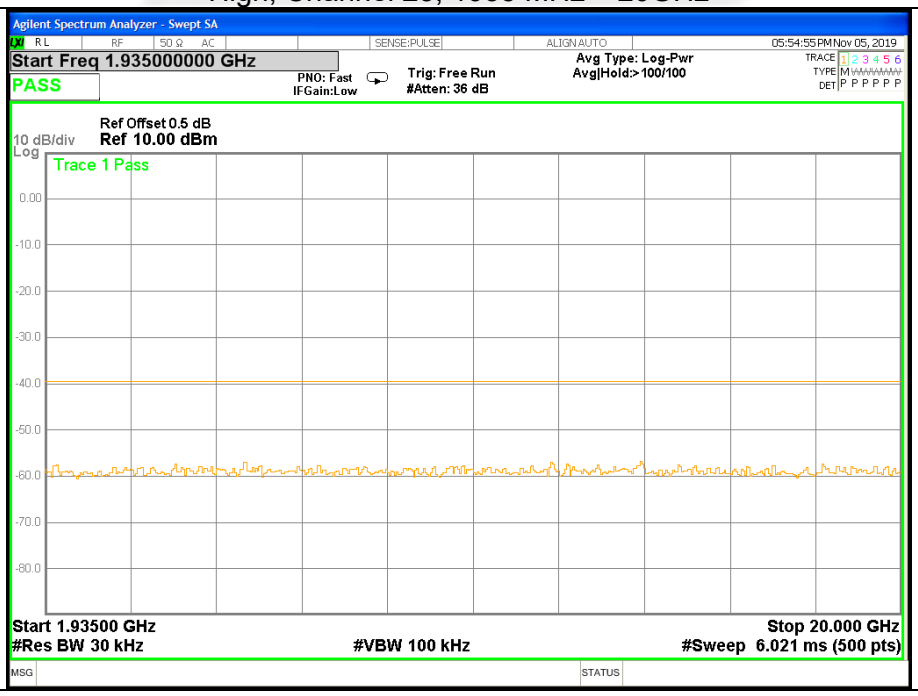

Low, Channel 25, 1915 MHz – 1920 MHz



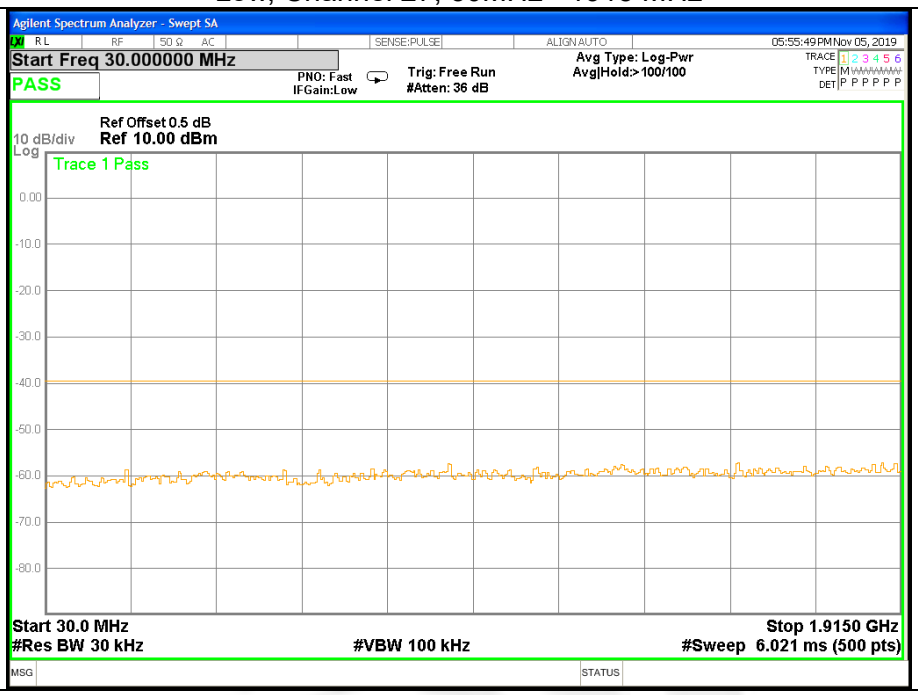
High, Channel 25, 1930 MHz – 1935 MHz




High, Channel 25, 1935 MHz – 20GHz

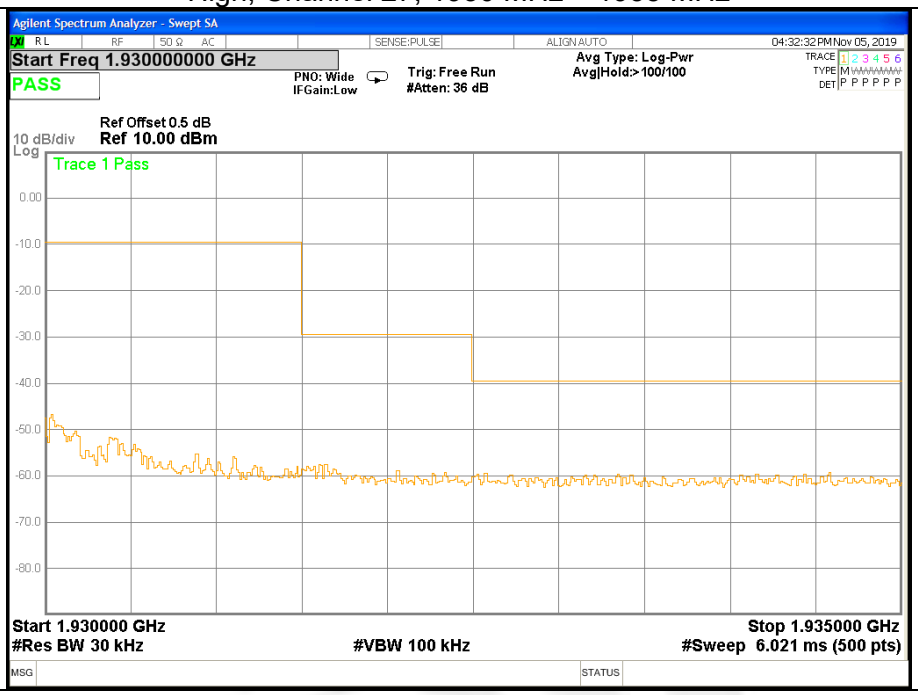


Low, Channel 27, 30MHz - 1915 MHz

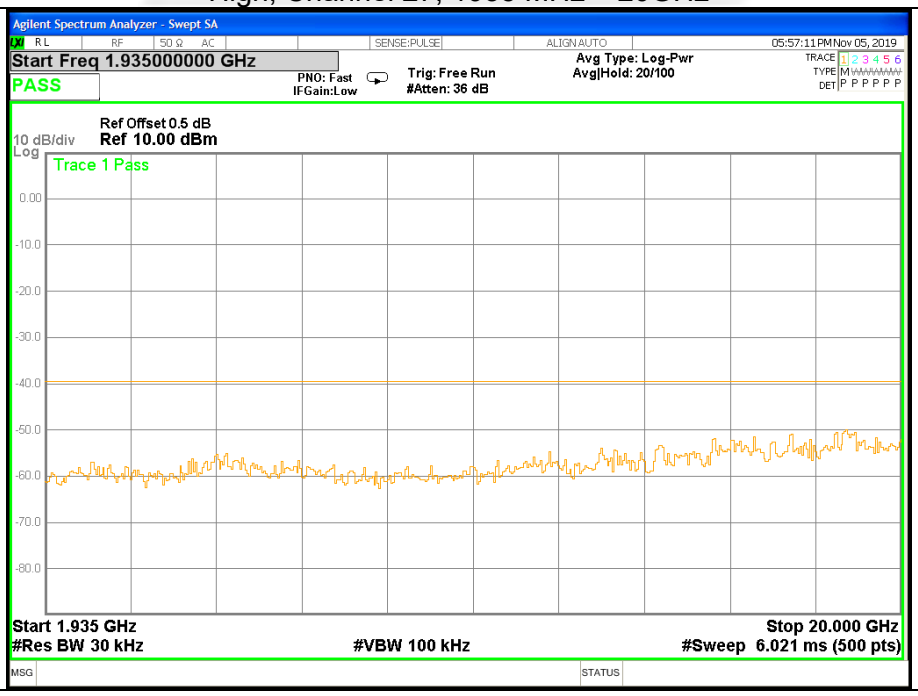



Low, Channel 27, 1915 MHz – 1920 MHz

High, Channel 27, 1930 MHz – 1935 MHz




High, Channel 27, 1935 MHz – 20GHz



5.19 FRAME PERIOD

Test Criteria

§15.323 (e) The frame period (a set of consecutive time slots in which the position of each time slot can be identified by reference to a synchronizing source) of an intentional radiator operating in these sub-bands shall be 20 milliseconds or 10 milliseconds/X where X is a positive whole number. Each device that implements time division for the purposes of maintaining a duplex connection on a given frequency carrier shall maintain a frame repetition rate with a frequency stability of at least 50 parts per million (ppm). Each device which further divides access in time in order to support multiple communication links on a given frequency carrier shall maintain a frame repetition rate with a frequency stability of at least 10 ppm.

Timing Jitter

§ 15.323 (e) Specific requirements for isochronous devices operating in the 1920–1930 MHz sub-band. The jitter (time-related, abrupt, spurious variations in the duration of the frame interval) introduced at the two ends of such a communication link shall not exceed 25 microseconds for any two consecutive transmissions. Transmissions shall be continuous in every time and spectrum window during the frame period defined for the device.

Test Limit

| | |
|---|---|
| Frame Period | 20 or 10ms |
| Max Jitter | 25 $\mu$s |
| 3 times St.Dev of Jitter | 12.5 $\mu$s |

Test Procedure

The manufacturer supplies an attestation

Test Results

The Frame Repetition Stability is measured with the RF Test Platform for DECT. The Frame Repetition Stability is 3 times the standard deviation.

| Channel | Standard Deviation(ppm) | Frame Repetition | The limit of Frame Repetition Stability(ppm) | Verdict |
|---|---|---|---|---|
| Middle | 0.2000 | 0.6000 | ±10 | Pass |

| Channel | Frame Period(ms) | Max Jitter(μs) | 3xStandard Deviation of Jitter(μs) | Limit(μs) | | Verdict |
|---|---|---|---|---|---|---|
| | | | | Max Jitter | 3 times St.Dev.of Jitter | |
| Middle | 10.0000 | 0.0070 | 0.006 | 25 | 12.5 | Pass |

Max Jitter= (1/(Frame Period+Pk-Pk)/2)-(1/Frame Period). When Pk-Pk and Frame period are in Hz.

3x St.Dev. Jitter 3 x(1/(Frame Period +St. Dev))-(1/St.Dev)) x$10^6$


1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road, Fuyong Street, Bao'an District, Shenzhen, Guangdong, China
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5.20 FREQUENCY STABILITY

Test Criteria

§15.323 (f) The frequency stability of the carrier frequency of the intentional radiator shall be maintained within ±10ppm over 1hour or the interval between channel access monitoring, whichever is shorter. The frequency stability shall be maintained over a temperature variation of -20º to +50º C at normal supply voltage and over a variation in the primary supply voltage of 85% to 115% of the rated supply voltage at a temperature of 200 C. For equipment that is capable only of operating from a battery, the frequency stability tests shall be performed using a new battery without any further requirement to vary supply voltage.

Test Procedure

The EUT was placed in the Environmental Chamber and support equipment are outside the chamber on a table. A CW signal was injected into the EUT at the appropriate RF level. The frequency counter option on the Spectrum Analyzer was used to measure frequency deviations.

The frequency drift was investigated for every 10º C increment until the unit is stabilized then recorded the reading in tabular format with the temperature range of -20º to +50º C.

Voltage supplied to EUT is 3 VDC reference temperature was done at 20º C. The voltage was varied by ± 15 % of nominal

Test Results

The EUT was compliant with this requirement

| (Low Channel) | | | | | |
|---|---|---|---|---|---|
| Reference Frequency (MHz) | Voltage (DC) | Temperature ( C ) | Frequency (MHz) | Deviation (ppm) | Limit (ppm) |
| 1921.536 | 3.33 | 50 | 1921.52721 | 4.57 | ±10 |
| | 3.7 | 50 | 1921.52651 | 4.94 | |
| | 4.07 | 50 | 1921.52714 | 4.61 | |
| | 3.33 | 20 | 1921.53819 | -1.14 | |
| | 3.7 | 20 | 1921.53599 | 0.01 | |
| | 4.07 | 20 | 1921.53348 | 1.31 | |
| | 3.33 | -20 | 1921.54731 | -5.89 | |
| | 3.7 | -20 | 1921.54919 | -6.86 | |
| | 4.07 | -20 | 1921.54699 | -5.72 | |

| (Mid Channel) | | | | | |
|---|---|---|---|---|---|
| Reference Frequency (MHz) | Voltage (DC) | Temperature ( C ) | Frequency (MHz) | Deviation (ppm) | Limit (ppm) |
| 1924.992 | 3.33 | 50 | 1924.99622 | -2.19 | ±10 |
| | 3.7 | 50 | 1924.99777 | -3.00 | |
| | 4.07 | 50 | 1924.99464 | -1.37 | |
| | 3.33 | 20 | 1925.00072 | -4.53 | |
| | 3.7 | 20 | 1925.00120 | -4.78 | |
| | 4.07 | 20 | 1925.00135 | -4.86 | |
| | 3.33 | -20 | 1924.98399 | 4.16 | |
| | 3.7 | -20 | 1924.98589 | 3.17 | |
| | 4.07 | -20 | 1924.98614 | 3.04 | |

| (High Channel) | | | | | |
|---|---|---|---|---|---|
| Reference Frequency (MHz) | Voltage (DC) | Temperature ( C ) | Frequency (MHz) | Deviation (ppm) | Limit (ppm) |
| 1928.448 | 3.33 | 50 | 1928.44260 | 2.80 | ±10 |
| | 3.7 | 50 | 1928.44536 | 1.37 | |
| | 4.07 | 50 | 1928.44484 | 1.64 | |
| | 3.33 | 20 | 1928.44996 | -1.02 | |
| | 3.7 | 20 | 1928.44776 | 0.12 | |
| | 4.07 | 20 | 1928.44917 | -0.61 | |
| | 3.33 | -20 | 1928.44771 | 0.15 | |
| | 3.7 | -20 | 1928.44792 | 0.04 | |
| | 4.07 | -20 | 1928.45099 | -1.55 | |

## 5.21 CONDUCTED EMISSION MEASUREMENT

POWER LINE CONDUCTED EMISSION LIMITS

Operating frequency band. In case the emission fall within the restricted band specified on Part 207(a) limit in the table below has to be followed.

| FREQUENCY (MHz) | Conducted Emission limit (dBuV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 -0.5 | 66 - 56 * | 56 - 46 * |
| 0.50 -5.0 | 56.00 | 46.00 |
| 5.0 -30.0 | 60.00 | 50.00 |

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

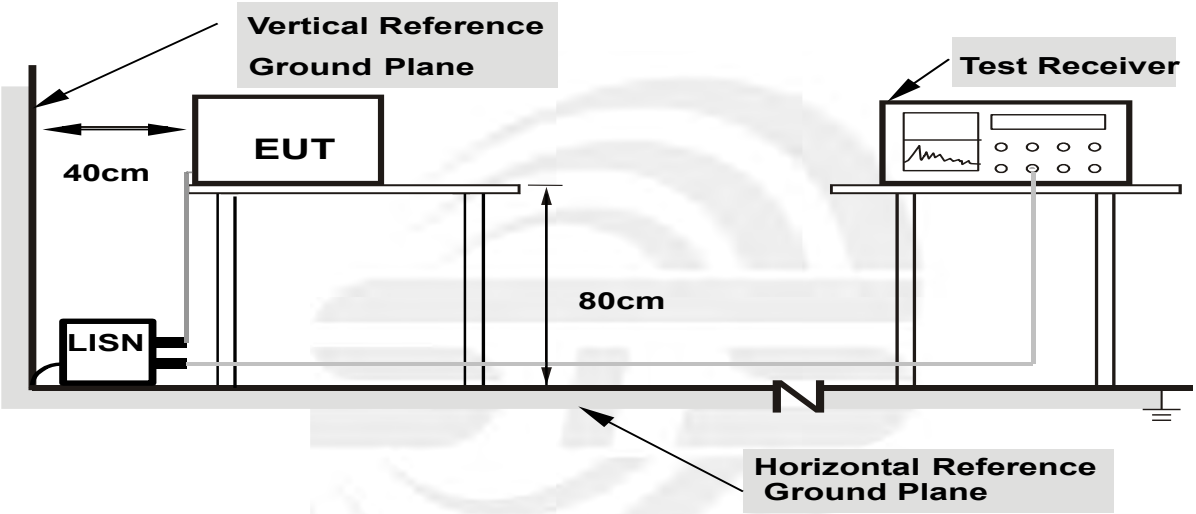
The following table is the setting of the receiver

| **Receiver Parameters** | **Setting** |
|---|---|
| Attenuation | 10 dB |
| Start Frequency | 0.15 MHz |
| Stop Frequency | 30 MHz |
| IF Bandwidth | 9 kHz |

TEST PROCEDURE

a. The EUT was 0.8 meters from the horizontal ground plane and 0.4 meters from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

TEST SETUP



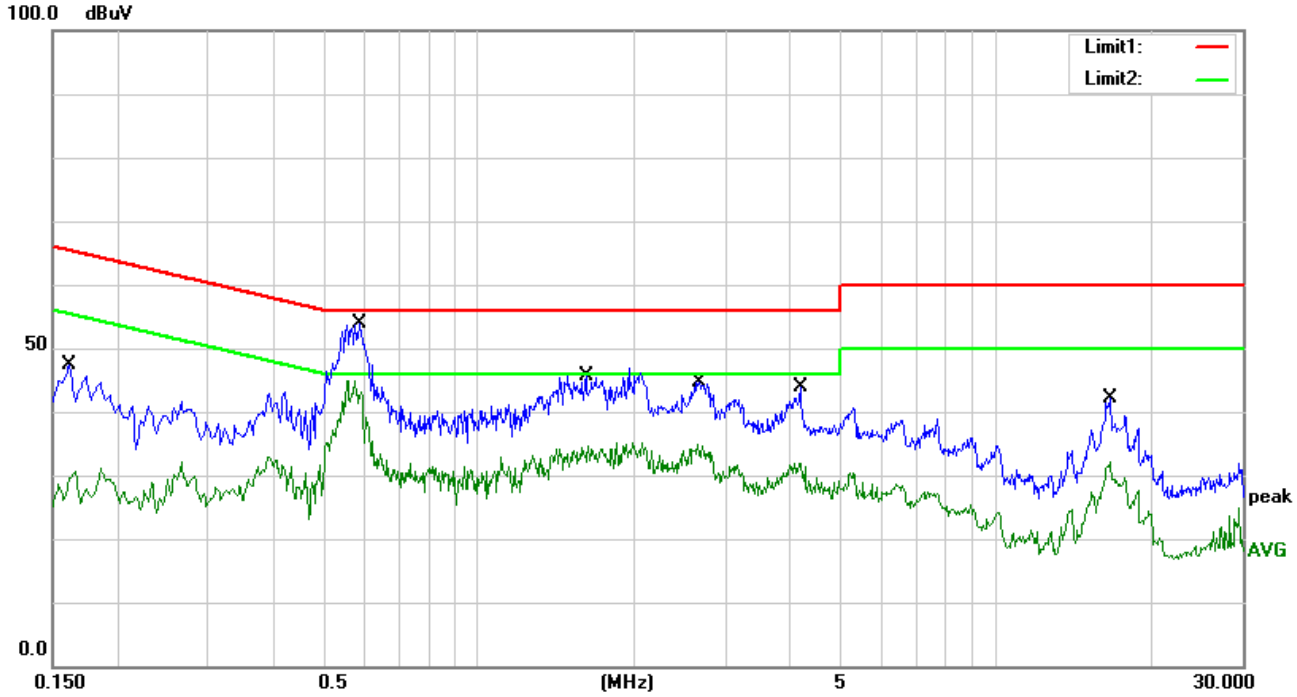

**Note: 1.Support units were connected to second LISN.**
**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

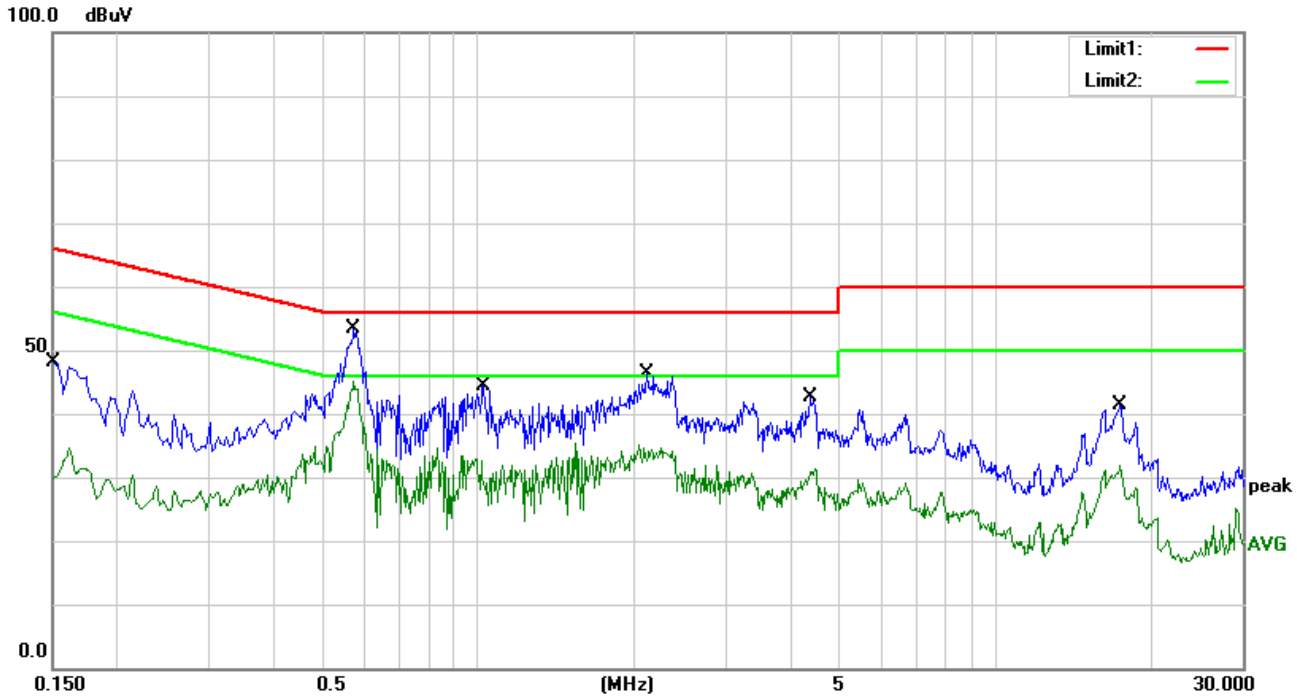
TEST RESULTS

| | | | |
|---|---|---|---|
| Temperature: | 26(C) | Relative Humidity: | 60%RH |
| Test Voltage: | AC 120V/60Hz | Phase: | L |
| Test Mode: | TX Mode | | |




| No. | Frequency (MHz) | Reading (dBuV) | Correct Factor(dB) | Result (dBuV) | Limit (dBuV) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 0.1620 | 26.71 | 20.58 | 47.29 | 65.36 | -18.07 | QP |
| 2 | 0.1620 | 10.58 | 20.58 | 31.16 | 55.36 | -24.20 | AVG |
| 3 | 0.5900 | 30.52 | 20.07 | 50.59 | 56.00 | -5.41 | QP |
| 4 | 0.5900 | 21.22 | 20.07 | 41.29 | 46.00 | -4.71 | AVG |
| 5 | 1.6140 | 25.96 | 19.73 | 45.69 | 56.00 | -10.31 | QP |
| 6 | 1.6140 | 15.29 | 19.73 | 35.02 | 46.00 | -10.98 | AVG |
| 7 | 2.6740 | 24.50 | 20.09 | 44.59 | 56.00 | -11.41 | QP |
| 8 | 2.6740 | 14.72 | 20.09 | 34.81 | 46.00 | -11.19 | AVG |
| 9 | 4.1860 | 23.52 | 20.31 | 43.83 | 56.00 | -12.17 | QP |
| 10 | 4.1860 | 11.67 | 20.31 | 31.98 | 46.00 | -14.02 | AVG |
| 11 | 16.6380 | 21.22 | 20.98 | 42.20 | 60.00 | -17.80 | QP |
| 12 | 16.6380 | 11.09 | 20.98 | 32.07 | 50.00 | -17.93 | AVG |

| | | | |
|---|---|---|---|
| Temperature: | 26(C) | Relative Humidity: | 60%RH |
| Test Voltage: | AC 120V/60Hz | Phase: | N |
| Test Mode: | TX Mode | | |




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB) | (dBuV) | (dBuV) | (dB) | |
| 1 | 0.1500 | 27.56 | 20.59 | 48.15 | 66.00 | -17.85 | QP |
| 2 | 0.1500 | 13.91 | 20.59 | 34.50 | 56.00 | -21.50 | AVG |
| 3 | 0.5740 | 31.50 | 20.05 | 51.55 | 56.00 | -4.45 | QP |
| 4 | 0.5740 | 23.55 | 20.05 | 43.60 | 46.00 | -2.40 | AVG |
| 5 | 1.0260 | 25.04 | 19.42 | 44.46 | 56.00 | -11.54 | QP |
| 6 | 1.0260 | 14.05 | 19.42 | 33.47 | 46.00 | -12.53 | AVG |
| 7 | 2.1140 | 26.29 | 19.96 | 46.25 | 56.00 | -9.75 | QP |
| 8 | 2.1140 | 15.10 | 19.96 | 35.06 | 46.00 | -10.94 | AVG |
| 9 | 4.3780 | 22.32 | 20.34 | 42.66 | 56.00 | -13.34 | QP |
| 10 | 4.3780 | 11.10 | 20.34 | 31.44 | 46.00 | -14.56 | AVG |
| 11 | 17.4260 | 20.28 | 21.07 | 41.35 | 60.00 | -18.65 | QP |
| 12 | 17.4260 | 10.87 | 21.07 | 31.94 | 50.00 | -18.06 | AVG |

## 5.22 RADIATED SPURIOUS EMISSION

Radiated Emission Limits

in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205(a)&209(a) limit in the table and according to ANSI C63.10-2013 below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (Frequency Range 9kHz-1000MHz)

| Frequencies (MHz) | Field Strength (micorvolts/meter) | Measurement Distance (meters) |
|---|---|---|
| 0.009~0.490 | 2400/F(KHz) | 300 |
| 0.490~1.705 | 24000/F(KHz) | 30 |
| 1.705~30.0 | 30 | 30 |
| 30~88 | 100 | 3 |
| 88~216 | 150 | 3 |
| 216~960 | 200 | 3 |
| Above 960 | 500 | 3 |

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

| FREQUENCY (MHz) | (dBuV/m) (at 3M) | |
|---|---|---|
| | PEAK | AVERAGE |
| Above 1000 | 74 | 54 |

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

For Radiated Emission

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Detector | Peak/AV |
| Start Frequency | 1000 MHz(Peak/AV) |
| Stop Frequency | 10th carrier hamonic(Peak/AV) |
| RB / VB (emission in restricted band) | 1 MHz / 3 MHz |

For Band edge

| Spectrum Parameter | Setting |
|---|---|
| Detector | Peak/AV |
| Start/Stop Frequency | Lower Band Edge: 2300 to 2403 MHz<br>Upper Band Edge: 2479 to 2500 MHz |
| RB / VB (emission in restricted band) | 1 MHz / 3 MHz |

| Receiver Parameter | Setting |
|---|---|
| Start ~ Stop Frequency | 9kHz~90kHz / RB 200Hz for PK & AV |
| Start ~ Stop Frequency | 90kHz~110kHz / RB 200Hz for QP |
| Start ~ Stop Frequency | 110kHz~490kHz / RB 200Hz for PK & AV |
| Start ~ Stop Frequency | 490kHz~30MHz / RB 9kHz for QP |
| Start ~ Stop Frequency | 30MHz~1000MHz / RB 120kHz for QP |

TEST PROCEDURE

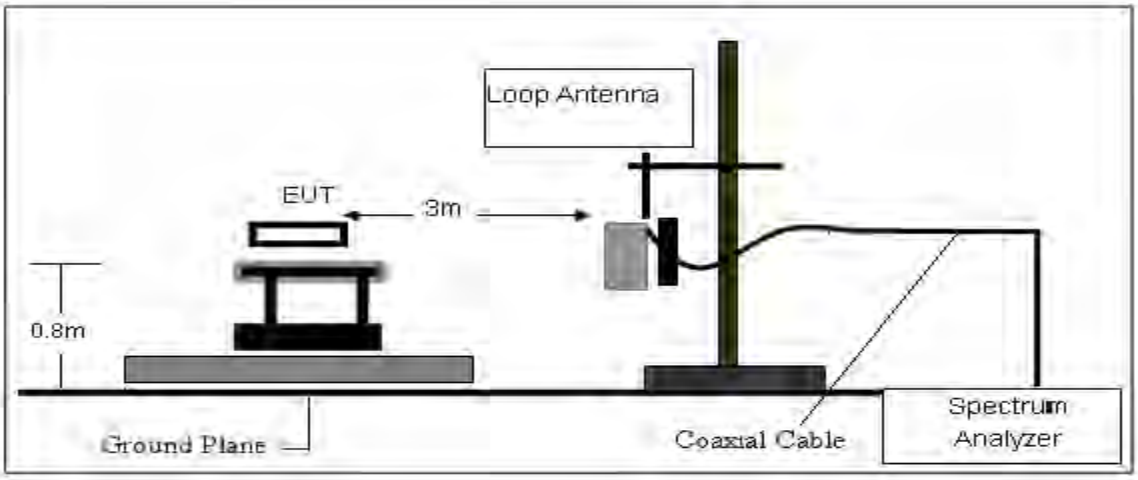
a. The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
b. The EUT was placed on the top of a rotating table 0.8 meters(above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment shall be 0.8 m(above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. Horizontal and vertical polarizations of the antenna are set to make the measurement
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

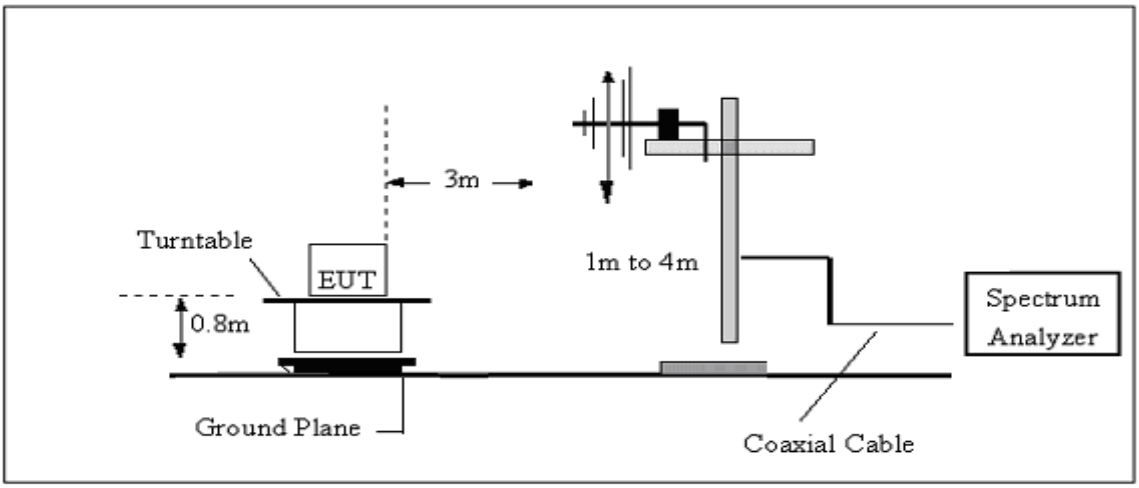
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

TEST SETUP

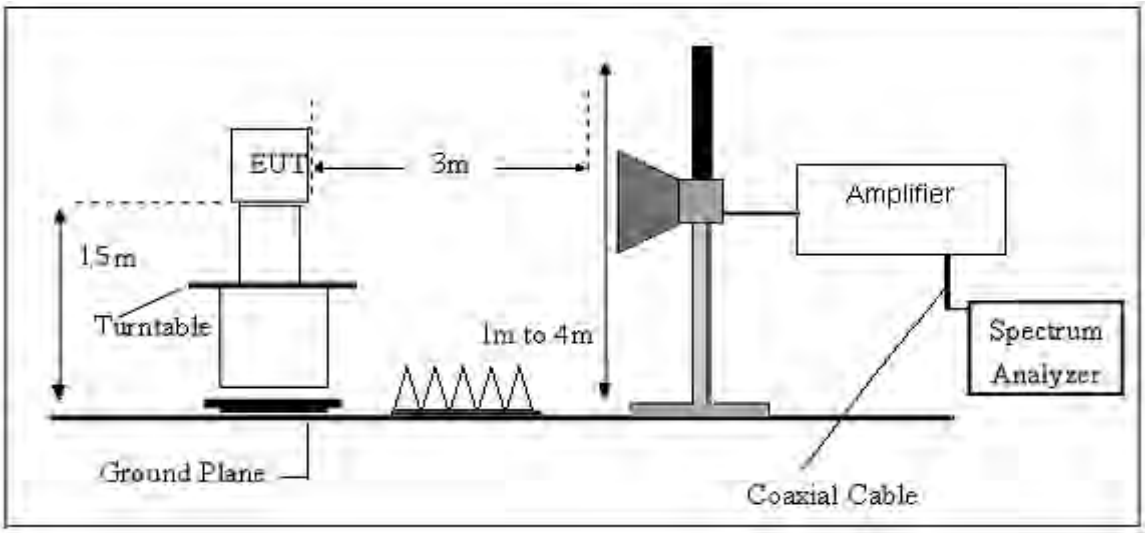
（A）Radiated Emission Test-Up Frequency Below 30MHz




（B）Radiated Emission Test-Up Frequency 30MHz~1GHz




（C）Radiated Emission Test-Up Frequency Above 1GHz




EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

Margin=PL-PK L or AL- AV L; Margin only shown the worst case.

Where

PR = Peak Reading

AR = Average Reading

PL = Peak Level

AL = Average Level

AF = Antenna Factor

PK L = Peak Limit

AV L = AV Limit

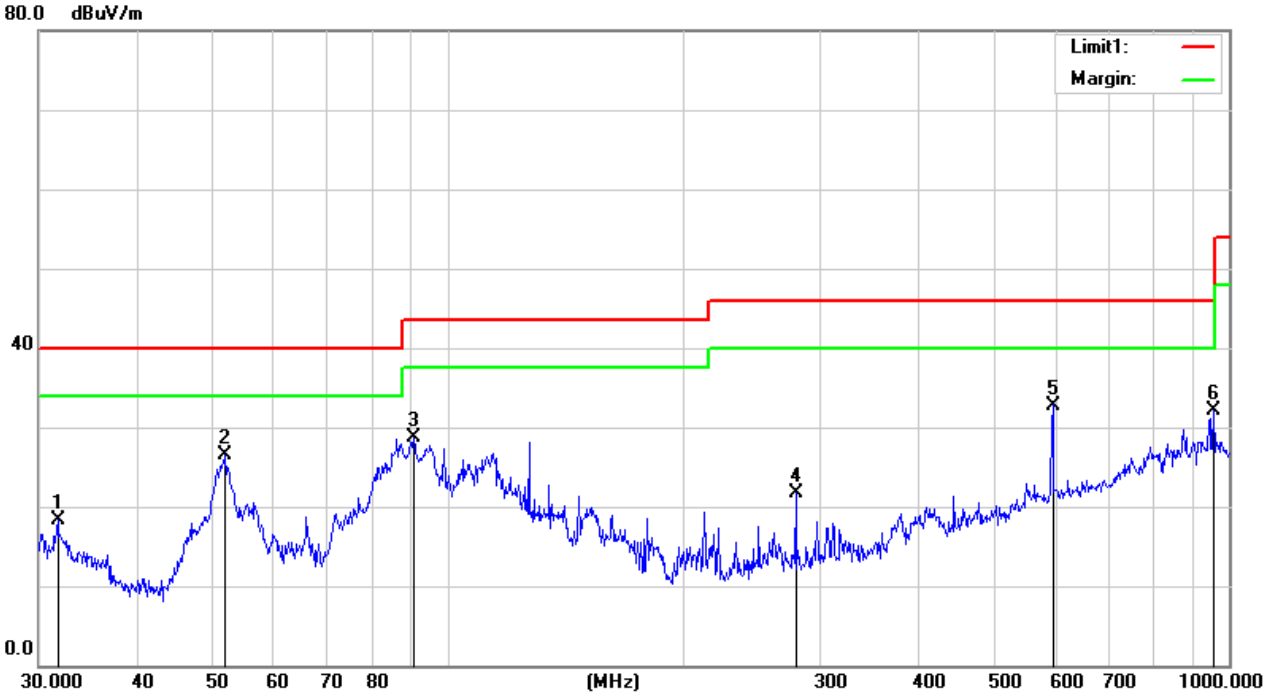
For example

| Frequency | PR | AR | AF | PL | AL | PK L | AV L | Margin |
|---|---|---|---|---|---|---|---|---|
| (MHz) | (dBμV/m) | (dBμV/m) | (dB) | (dBμV/m) | (dBμV/m) | (dBμV/m) | (dBμV/m) | (dB) |
| 2178 | 40.23 | 30.31 | 9.83 | 50.06 | 40.14 | 74.00 | 54.00 | -13.86 |

Factor=AF+CL-AG

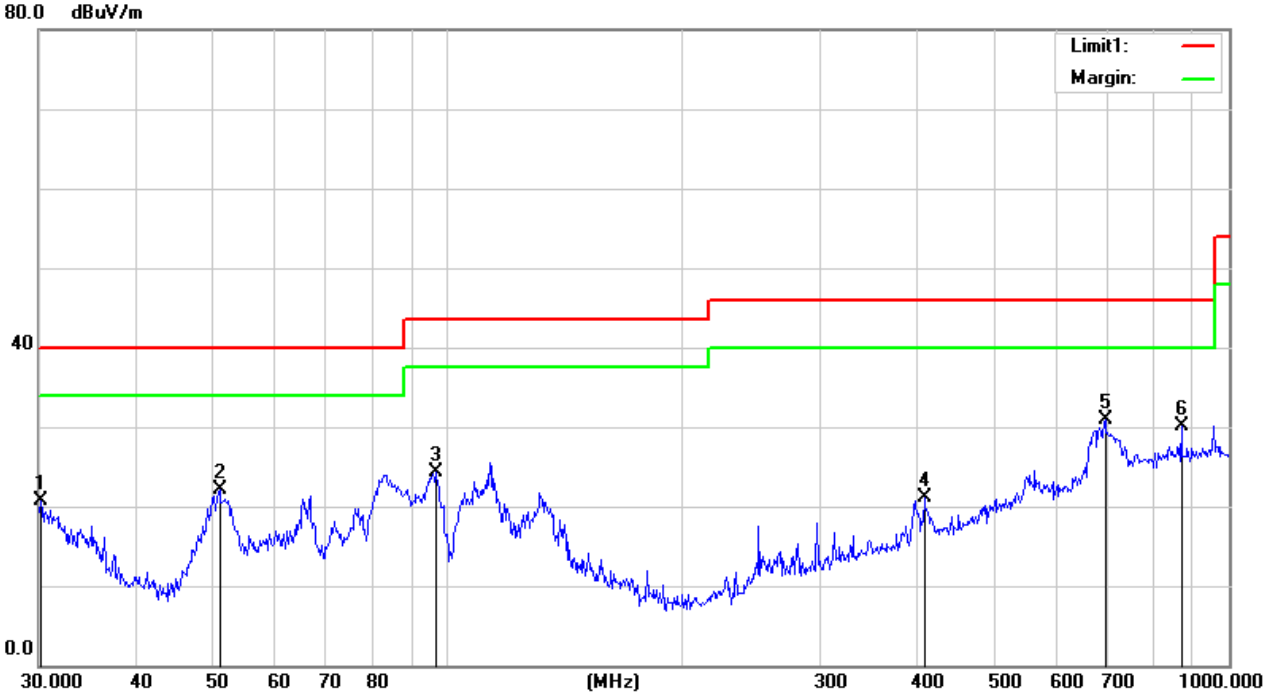
TEST RESULTS(30MHz – 1GHz)

| | | | |
|---|---|---|---|
| Temperature: | 26.1(C) | Relative Humidity: | 66%RH |
| Test Voltage: | DC 3.7V | Phase: | L |
| Test Mode: | TX Mode | | |




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 31.7313 | 32.01 | -13.75 | 18.26 | 40.00 | -21.74 | QP |
| 2 | 52.0251 | 50.57 | -24.11 | 26.46 | 40.00 | -13.54 | QP |
| 3 | 90.5374 | 50.12 | -21.38 | 28.74 | 43.50 | -14.76 | QP |
| 4 | 279.0436 | 37.37 | -15.57 | 21.80 | 46.00 | -24.20 | QP |
| 5 | 595.1327 | 38.64 | -5.84 | 32.80 | 46.00 | -13.20 | QP |
| 6 | 955.4380 | 30.44 | 1.68 | 32.12 | 46.00 | -13.88 | QP |

| | | | |
|---|---|---|---|
| Temperature: | 26.1(C) | Relative Humidity: | 66%RH |
| Test Voltage: | AC 120V/60Hz | Phase: | N |
| Test Mode: | TX Mode | | |




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 30.2110 | 33.60 | -12.95 | 20.65 | 40.00 | -19.35 | QP |
| 2 | 51.1208 | 45.80 | -23.73 | 22.07 | 40.00 | -17.93 | QP |
| 3 | 96.7750 | 44.87 | -20.58 | 24.29 | 43.50 | -19.21 | QP |
| 4 | 407.5144 | 31.89 | -10.70 | 21.19 | 46.00 | -24.81 | QP |
| 5 | 694.4174 | 35.08 | -4.26 | 30.82 | 46.00 | -15.18 | QP |
| 6 | 869.1301 | 30.63 | -0.52 | 30.11 | 46.00 | -15.89 | QP |

TEST RESULTS(Above 1GHz)

**GFSK-Low**

Horizontal

| Frequency (MHz) | Peak Reading (dBuV/m) | Average Reading (dBuV/m) | Factor (dB) | Peak Level (dBuV/m) | Average Level (dBuV/m) | PK Limit (dBuV/m) | AV Limit (dBuV/m) | Margin(dB) | ANT |
|---|---|---|---|---|---|---|---|---|---|
| 1014 | 38.47 | 29.95 | -1.66 | 36.81 | 28.29 | 74.00 | 54.00 | -25.71 | Horizontal |
| 2203 | 40.16 | 30.22 | 10.02 | 50.18 | 40.24 | 74.00 | 54.00 | -13.76 | Horizontal |
| 4295 | 51.27 | 40.09 | -6.86 | 44.41 | 33.23 | 74.00 | 54.00 | -20.77 | Horizontal |
| 7340 | 50.32 | 38.93 | 3.61 | 53.93 | 42.54 | 74.00 | 54.00 | -11.46 | Horizontal |
| 11035 | 49.48 | 39.50 | 10.13 | 59.61 | 49.63 | 74.00 | 54.00 | -4.37 | Horizontal |
| 14893.75 | 50.61 | 40.20 | 12.33 | 62.94 | 52.53 | 74.00 | 54.00 | -1.47 | Horizontal |

Vertical

| Frequency (MHz) | Peak Reading (dBuV/m) | Average Reading (dBuV/m) | Factor (dB) | Peak Level (dBuV/m) | Average Level (dBuV/m) | PK Limit (dBuV/m) | AV Limit (dBuV/m) | Margin(dB) | ANT |
|---|---|---|---|---|---|---|---|---|---|
| 1497 | 40.36 | 29.68 | 0.14 | 40.50 | 29.82 | 74.00 | 54.00 | -24.18 | Vertical |
| 2201.5 | 41.07 | 30.32 | 10.1 | 51.17 | 40.42 | 74.00 | 54.00 | -13.58 | Vertical |
| 4282.5 | 51.65 | 40.52 | -6.84 | 44.81 | 33.68 | 74.00 | 54.00 | -20.32 | Vertical |
| 8737.5 | 50.20 | 40.12 | 4.74 | 54.94 | 44.86 | 74.00 | 54.00 | -9.14 | Vertical |
| 11392.5 | 50.34 | 40.09 | 9.72 | 60.06 | 49.81 | 74.00 | 54.00 | -4.19 | Vertical |
| 14906.25 | 50.15 | 40.02 | 12.38 | 62.53 | 52.40 | 74.00 | 54.00 | -1.60 | Vertical |

**GFSK-Mid**

Horizontal

| Frequency (MHz) | Peak Reading (dBuV/m) | Average Reading (dBuV/m) | Factor (dB) | Peak Level (dBuV/m) | Average Level (dBuV/m) | PK Limit (dBuV/m) | AV Limit (dBuV/m) | Margin(dB) | ANT |
|---|---|---|---|---|---|---|---|---|---|
| 1899 | 43.88 | 35.62 | 1.9 | 45.78 | 37.52 | 74.00 | 54.00 | -16.48 | Horizontal |
| 2197.5 | 40.50 | 30.33 | 10.17 | 50.67 | 40.50 | 74.00 | 54.00 | -13.50 | Horizontal |
| 5352.5 | 50.84 | 40.24 | -3.52 | 47.32 | 36.72 | 74.00 | 54.00 | -17.28 | Horizontal |
| 8085 | 50.99 | 39.03 | 5.01 | 56.00 | 44.04 | 74.00 | 54.00 | -9.96 | Horizontal |
| 10972.5 | 49.41 | 39.08 | 10.15 | 59.56 | 49.23 | 74.00 | 54.00 | -4.77 | Horizontal |
| 14881.25 | 50.45 | 40.25 | 12.22 | 62.67 | 52.47 | 74.00 | 54.00 | -1.53 | Horizontal |

Vertical

| Frequency (MHz) | Peak Reading (dBuV/m) | Average Reading (dBuV/m) | Factor (dB) | Peak Level (dBuV/m) | Average Level (dBuV/m) | PK Limit (dBuV/m) | AV Limit (dBuV/m) | Margin(dB) | ANT |
|---|---|---|---|---|---|---|---|---|---|
| 1092 | 40.16 | 29.47 | -1.32 | 38.84 | 28.15 | 74.00 | 54.00 | -25.85 | Vertical |
| 2214 | 40.41 | 29.90 | 9.38 | 49.79 | 39.28 | 74.00 | 54.00 | -14.72 | Vertical |
| 5432.5 | 51.01 | 40.87 | -3.45 | 47.56 | 37.42 | 74.00 | 54.00 | -16.58 | Vertical |
| 8750 | 50.09 | 40.03 | 4.64 | 54.73 | 44.67 | 74.00 | 54.00 | -9.33 | Vertical |
| 10972.5 | 50.72 | 39.42 | 10.15 | 60.87 | 49.57 | 74.00 | 54.00 | -4.43 | Vertical |
| 14876.25 | 50.92 | 40.39 | 12.17 | 63.09 | 52.56 | 74.00 | 54.00 | -1.44 | Vertical |

**GFSK-High**

Horizontal

| Frequency (MHz) | Peak Reading (dBuV/m) | Average Reading (dBuV/m) | Factor (dB) | Peak Level (dBuV/m) | Average Level (dBuV/m) | PK Limit (dBuV/m) | AV Limit (dBuV/m) | Margin(dB) | ANT |
|---|---|---|---|---|---|---|---|---|---|
| 1079.5 | 41.18 | 29.69 | -1.47 | 39.71 | 28.22 | 74.00 | 54.00 | -25.78 | Horizontal |
| 2215 | 40.79 | 30.28 | 9.33 | 50.12 | 39.61 | 74.00 | 54.00 | -14.39 | Horizontal |
| 7645 | 51.07 | 40.02 | 4.4 | 55.47 | 44.42 | 74.00 | 54.00 | -9.58 | Horizontal |
| 11237.5 | 49.93 | 39.27 | 9.65 | 59.58 | 48.92 | 74.00 | 54.00 | -5.08 | Horizontal |
| 14888.75 | 50.35 | 40.38 | 12.28 | 62.63 | 52.66 | 74.00 | 54.00 | -1.34 | Horizontal |
| 16996.25 | 50.04 | 38.92 | 11.47 | 61.51 | 50.39 | 74.00 | 54.00 | -3.61 | Horizontal |

Vertical

| Frequency (MHz) | Peak Reading (dBuV/m) | Average Reading (dBuV/m) | Factor (dB) | Peak Level (dBuV/m) | Average Level (dBuV/m) | PK Limit (dBuV/m) | AV Limit (dBuV/m) | Margin(dB) | ANT |
|---|---|---|---|---|---|---|---|---|---|
| 1241.5 | 39.99 | 29.46 | -0.61 | 39.38 | 28.85 | 74.00 | 54.00 | -25.15 | Vertical |
| 2180.5 | 39.83 | 29.55 | 10.04 | 49.87 | 39.59 | 74.00 | 54.00 | -14.41 | Vertical |
| 5877.5 | 50.07 | 39.94 | -1.96 | 48.11 | 37.98 | 74.00 | 54.00 | -16.02 | Vertical |
| 8147.5 | 49.55 | 39.69 | 4.62 | 54.17 | 44.31 | 74.00 | 54.00 | -9.69 | Vertical |
| 10962.5 | 49.20 | 39.07 | 10.09 | 59.29 | 49.16 | 74.00 | 54.00 | -4.84 | Vertical |
| 14906.25 | 51.12 | 40.14 | 12.38 | 63.50 | 52.52 | 74.00 | 54.00 | -1.48 | Vertical |

**APENDIX BPHOTOS OF TEST SETUP**

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

※※※※※END OF THE REPORT※※※※※