



Test Report No. 9612309851

For Kramer Electronics Ltd.

Equipment Under Test:

Touch panel communication module

Model: AP6255

FCC ID: R8S-KT-107

***From The Standards Institution
Of Israel
Industry Division
Electronics & Telematics Laboratory
EMC Branch***



Certificate Number: AT-1359



Test report No: 9612309851

Page 2 of 47 Pages

Title: Touch panel communication module

Model: AP6255

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Table of Contents

| | |
|---|----|
| 1. Applicant information | 3 |
| 2. Test performance | 3 |
| 3. Summary of test: | 5 |
| 4. Equipment under test description..... | 6 |
| 4.1 General description | 6 |
| 5. Test results | 8 |
| 5.1 Transmitter characteristics | 8 |
| 5.1.1 Transmitter 6 dB occupied bandwidth..... | 8 |
| 5.1.2 Maximum peak conducted output power test. | 13 |
| 5.1.3 Power spectral density test..... | 19 |
| 5.1.4 Radiated emissions according to §§ 15.247(d), 15.205(a) | 25 |
| 5.2 Radiated emissions test according to § 15.209 | 35 |
| 5.3 Conducted emissions test according to § 15.207..... | 38 |
| APPENDIX A Test equipment used..... | 41 |
| APPENDIX B Photo of the test setups..... | 46 |
| APPENDIX C Abbreviations and acronyms. | 47 |

**Test report No:** 9612309851**Page 3 of 47 Pages****Title:** Touch panel communication module**Model:** AP6255**FCC ID:** R8S-KT-107

1. Applicant information

| | |
|------------------------------|-------------------------------------|
| Applicant: | Kramer Electronics Ltd.. |
| Address: | 3 Am VeOlamo St., Jerusalem, Israel |
| Sample for test selected by: | The customer |
| The date of tests: | 4, 13 April, 1 May 2017 |

Equipment under test information

| | |
|---|----------------------------------|
| Description of Equipment Under Test (EUT): | Touch panel communication module |
| Model: | AP6255 |
| Software version of radio unit: | 1.201.59.5 |
| Hardware version: | IL-A73 V2 20161210 |
| Manufactured by: | ILIFE Technology (HK) CO Ltd. |

2. Test performance

| | |
|-----------------------------|--|
| Location: | SII EMC Section |
| Purpose of test: | Apparatus compliance verification in accordance with emission requirements |
| Test specifications: | 47CFR part 15.247, 15.205, 15.207, 15.209 and part 1 §1.1310 |

This Test Report contains 47 pages and may be used only in full.

This Test Report applies only to the specimen tested and may not be applied to other specimens of the same product.



Test report No: 9612309851

Page 4 of 47 Pages

Title: Touch panel communication module

Model: AP6255

FCC ID: R8S-KT-107

Normative References.

| | |
|-------------------------------------|---|
| FCC 47 CFR Part 15, Subpart C, 2015 | Radio Frequency Devices Subpart C – Intentional Radiators |
| IC RSS – 247 issue 1, 2015 | Radio Standard Specification, Issue 1, Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices |
| ANSI C63.4: 2014 | American National Standard for Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz |
| ANSI C63.10: 2013 | American National Standard for Testing of Unlicensed Wireless Devices. |
| RSS – Gen , 2014 | Radio Standard Specification, Issue 4, General Requirements for Compliance of Radio Apparatus |
| FCC OET KDB 558074, April 2017 | Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 |



Test report No: 9612309851

Page 5 of 47 Pages

Title: Touch panel communication module

Model: AP6255

FCC ID: R8S-KT-107

3. Summary of test:

The EUT was found to comply with requirements of: 47CFR Part 15, §§ 15.247, 15.205, 15.207, 15.209.

| Transmitter characteristics | Subclasses |
|---|-------------------|
| Minimum 6 dB bandwidth | 15.247(a)(2) |
| Maximum output power | 15.247(b)(3) |
| Peak power spectral density | 15.247(e) |
| Out of band spurious emissions radiated | 15.205, 15.247(d) |
| Unwanted radiated emissions below 1 GHz | 15.209 |
| Conducted emissions on AC power line | 15.207 |

Electronics and
Telematics Laboratory

May 2017

Name: Eng. Yuri Rozenberg
Position: Head of EMC Branch.

Name: Michael Feldman.
Position: Test engineer.

Measurement uncertainty.

The test equipment was calibrated according to its recommended procedures and is within the manufacturer's published limit of error.

The laboratory calibrates its standards by a third party (traceable to NIST, USA) on a regular basis according to equipment manufacturer requirements.

In the following table the uncertainty calculation is given.

| Test description | Calculated uncertainty U_{LAB} |
|--|-------------------------------------|
| Conducted measurements | |
| Frequency error | 37.6 Hz |
| Spurious emission | ± 2.98 dB |
| Radiated emissions | |
| Electric field strength in a SAR at 3 m distance 30 MHz – 1.0 GHz | ± 4.32 dB |
| Electric field strength in a FAR at 3 m distance 1.0 GHz – 18 GHz | ± 4.47 |
| Substitution measurements | |
| In a FAR at 3 m distance 1.0 GHz – 18 GHz | ± 3.41 dB |

**Test report No:** 9612309851**Page 6 of 47 Pages****Title:** Touch panel communication module**Model:** AP6255**FCC ID:** R8S-KT-107

4. Equipment under test description.

*The applicant provided description.

4.1 General description

The EUT, is internal communication module in KT-107RB touch panel, that intended to provide an HMI (Human Machine Interface) for control center or monitor. The EUT supports WIFI and Bluetooth connection.

EUT technical characteristics

| Transmitter technical characteristics: | | Note |
|--|--|--------------------------|
| Assigned frequency band | 2400 MHz – 2483.5 MHz | |
| Operating frequency range: | 2402 MHz – 2480 MHz | Bluetooth transmitter. |
| | 2412 MHz – 2462 MHz | WLAN transmitter |
| WLAN transmitter: | IEEE 802.11 b/g/n (11 – 54 Mbit/s) data bit rate. | |
| Bluetooth transmitter: | BLE 4.0 | |
| Types of modulation: | QPSK, BPSK, 16/64-QAM etc. | |
| Declare temperature range: | 0°C - 35°C | Normal indoor use |
| Antenna information | | |
| Type | Manufacturer | Antenna gain, dBi |
| Internal | ILIFE Technology (HK) CO Ltd. | 2.9 |

| | |
|--|---------------------------|
| Test report No: 9612309851 | Page 7 of 47 Pages |
| Title: Touch panel communication module | |
| Model: AP6255 | FCC ID: R8S-KT-107 |

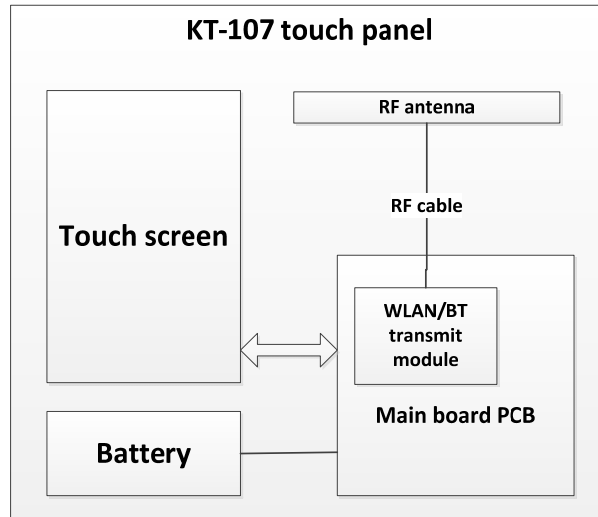


Figure 1. KT-107 touch panel block diagram.

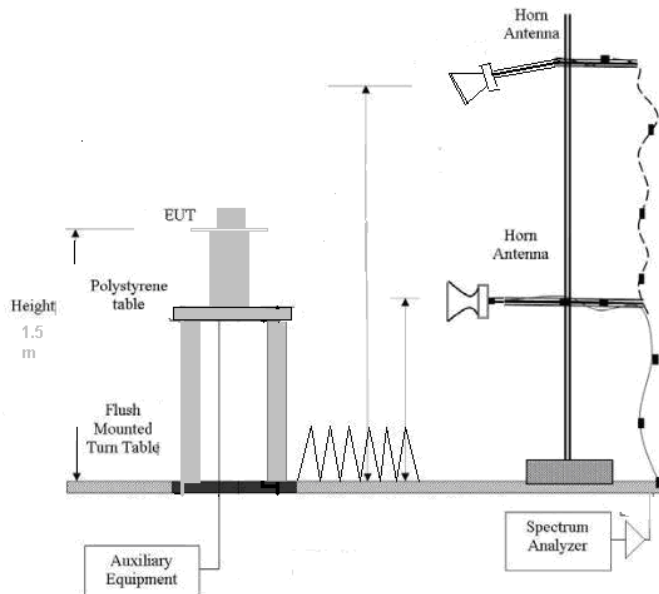


Fig.2. RE test setup above 1 GHz.



Test report No: 9612309851

Page 8 of 47 Pages

Title: Touch panel communication module

Model: AP6255

FCC ID: R8S-KT-107

5. Test results

5.1 Transmitter characteristics

5.1.1 Transmitter 6 dB occupied bandwidth.

Method of measurement 558074 D01 DTS Meas Guidance. Section 8.1
 Operating Frequency Range 2402– 2480 MHz
 Detector used Peak
 Resolution bandwidth 100 kHz
 Video bandwidth > 3 x RBW.
 Trace mode Max Hold.
 Sweep time: Auto couple.
 Ambient Temperature 22° C Relative Humidity 53% Air Pressure 1009 hPa

The minimum 6 dB occupied bandwidth shall be at least 500 kHz.

WLAN transmitter.

| Wi-Fi protocol options | Carrier frequency, MHz | Measured 6 dB occupied bandwidth, MHz | Measured 99% power occupied bandwidth, MHz | 6 dB occupied bandwidth limit, kHz | Reference to plot # |
|------------------------|------------------------|---------------------------------------|--|------------------------------------|---------------------|
| 802.11b | 2412 | 8.8 | 11.69 | 500 | 1 |
| | 2437 | 8.6 | 11.79 | 500 | 2 |
| | 2462 | 8.7 | 11.81 | 500 | 3 |
| 802.11g | 2412 | 15.8 | 16.43 | 500 | 4 |
| | 2437 | 15.7 | 16.33 | 500 | 5 |
| | 2462 | 15.9 | 16.37 | 500 | 6 |
| 802.11n | 2412 | 17.5 | 17.56 | 500 | 7 |
| | 2437 | 17.0 | 17.54 | 500 | 8 |
| | 2462 | 17.5 | 17.56 | 500 | 9 |

Bluetooth transmitter.

| Carrier frequency, MHz | Measured 6 dB occupied bandwidth, kHz | Measured 99% power occupied bandwidth, MHz | 6 dB occupied bandwidth limit, kHz | Reference to plot # |
|------------------------|---------------------------------------|--|------------------------------------|---------------------|
| 2402 | 720 | 1.09 | 500 | 10 |
| 2440 | 720 | 1.10 | 500 | 11 |
| 2480 | 719 | 1.08 | 500 | 13 |

TEST EQUIPMENT USED:

| | | | | | |
|---|---|----|--|--|--|
| 1 | 3 | 14 | | | |
|---|---|----|--|--|--|



Test report No: 9612309851

Page 9 of 47 Pages

Title: Touch panel communication module

Model: AP6255

FCC ID: R8S-KT-107

WLAN transmitter test result.

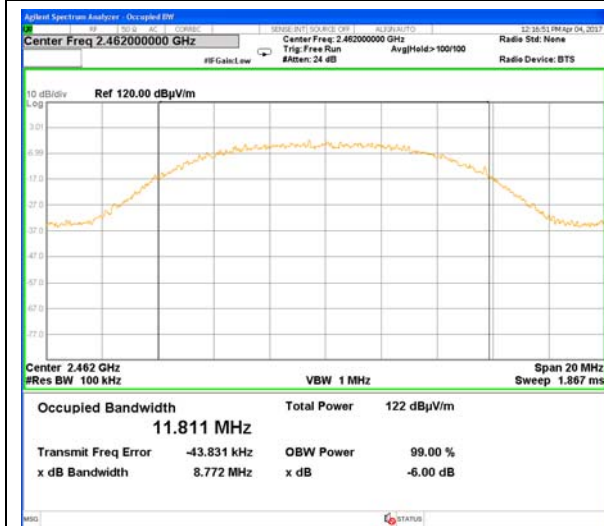
802.11b



Plot # 1.



Plot # 2.



Plot # 3.



Test report No: 9612309851

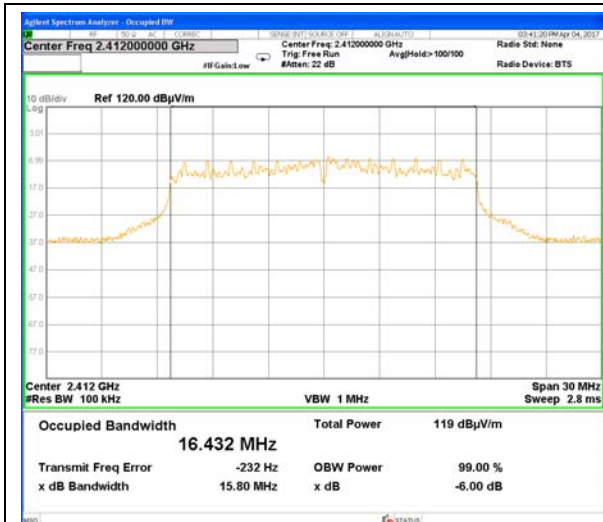
Page 10 of 47 Pages

Title: Touch panel communication module

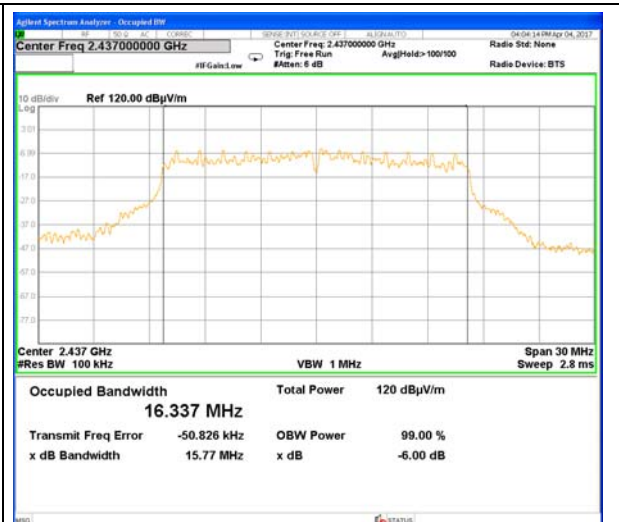
Model: AP6255

FCC ID: R8S-KT-107

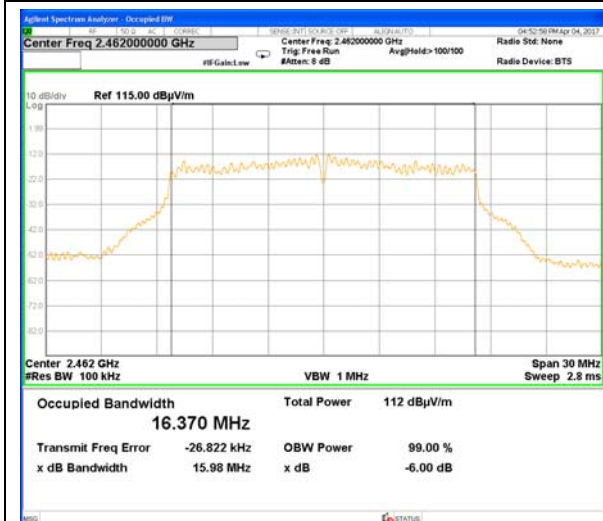
802.11g



Plot # 4.



Plot # 5.



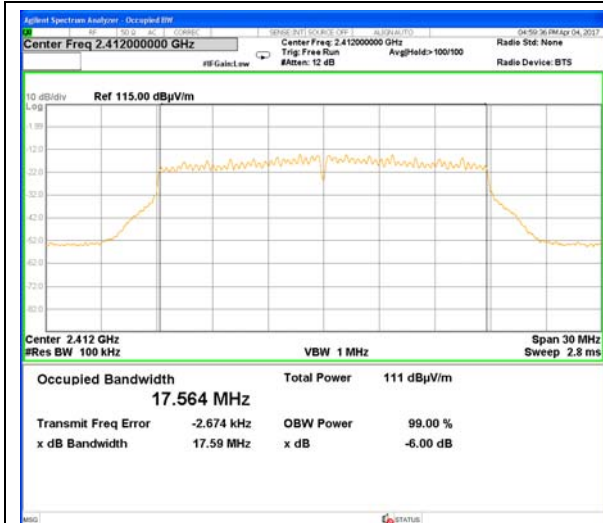
Plot # 6.



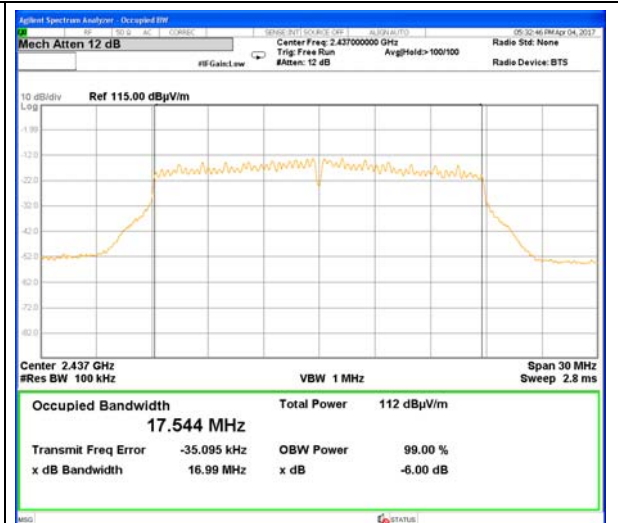
Test report No: 9612309851
Title: Touch panel communication module
Model: AP6255

Page 11 of 47 Pages
FCC ID: R8S-KT-107

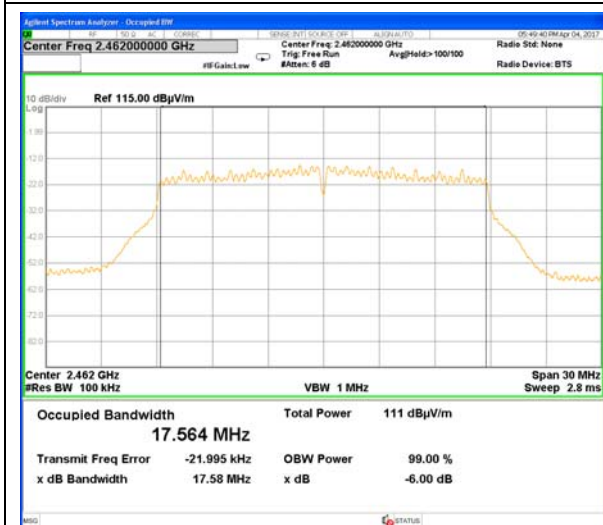
802.11n



Plot # 7.



Plot # 8.



Plot # 9.



Test report No: 9612309851

Page 12 of 47 Pages

Title: Touch panel communication module

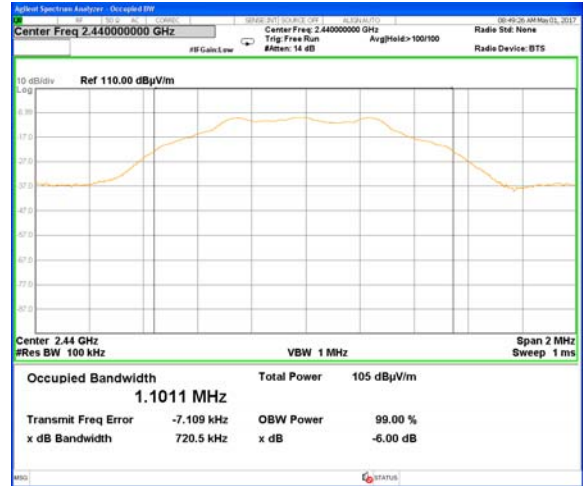
Model: AP6255

FCC ID: R8S-KT-107

BT transmitter test result.



Plot # 10.



Plot # 11.



Plot # 12.



Test report No: 9612309851

Page 13 of 47 Pages

Title: Touch panel communication module

Model: AP6255

FCC ID: R8S-KT-107

5.1.2 Maximum conducted output power test.

Method of measurement 558074 D01 DTS Meas Guidance. Section 3.
 Operating Frequency Range 2402– 2480 MHz
 Detector used RMS
 Resolution bandwidth 1 MHz
 Video bandwidth 3 x RBW.
 Trace mode Max Hold.
 Ambient Temperature 23° C Relative Humidity 52% Air Pressure 1009 hPa

For Digital Transmit System the peak conducted output power in the 2400 – 2483.5 MHz band shall not exceed 1W (30 dBm) with antennas gain that do not exceed 6 dBi.

WLAN transmitter.

| Wi-Fi protocol options | Carrier frequency, MHz | Field strength, dBμ V/m | 99% OBW, MHz | **EIR power, dBm | *Conducted output power, dBm | Conducted power limit, dBm | Reference to plot # |
|------------------------|------------------------|-------------------------|--------------|------------------|------------------------------|----------------------------|---------------------|
| 802.11b | 2412 | 109.99 | 11.69 | 25.4 | 22.5 | 30 | 13 |
| | 2437 | 109.42 | 11.79 | 24.9 | 22.0 | 30 | 14 |
| | 2462 | 109.44 | 11.81 | 24.9 | 22.0 | 30 | 15 |
| 802.11g | 2412 | 108.20 | 16.43 | 25.1 | 22.2 | 30 | 16 |
| | 2437 | 109.30 | 16.33 | 26.2 | 23.3 | 30 | 17 |
| | 2462 | 107.94 | 16.37 | 24.9 | 22.0 | 30 | 18 |
| 802.11n | 2412 | 107.45 | 17.56 | 24.7 | 21.8 | 30 | 19 |
| | 2437 | 108.22 | 17.54 | 25.4 | 22.5 | 30 | 20 |
| | 2462 | 106.71 | 17.56 | 24.0 | 21.1 | 30 | 21 |

*The maximum conducted output power = EIR power – Antenna gain.

Antenna gain = 2.9 dBi.

**EIR power = E Field strength (dBμ V/m@3m) - 95.2 + (10 Log 99% OBW).



Test report No: 9612309851

Page 14 of 47 Pages

Title: Touch panel communication module

Model: AP6255

FCC ID: R8S-KT-107

Bluetooth transmitter:

| Carrier frequency, MHz | Field strength, dBµV/m | 99% OBW, MHz | **EIR power, dBm | *Conducted output power, dBm | Conducted power limit, dBm | Reference to plot # |
|------------------------|------------------------|--------------|------------------|------------------------------|----------------------------|---------------------|
| 2402 | 100.9 | 1.09 | 6.0 | 3.1 | 30 | 22 |
| 2440 | 98.7 | 1.10 | 3.9 | 1.0 | 30 | 23 |
| 2480 | 98.0 | 1.08 | 3.1 | 0.2 | 30 | 24 |

*The maximum conducted output power = EIR power – Antenna gain. Antenna gain = 2.9 dBi.

**EIR power = E Field strength (dBµV/m@3m) - 95.2 + (10 Log 99% OBW).

Measured field straight level was converted to EIRP level and compute by integrating across the 99% occupied bandwidth. The measurement of EIRP provided after verification according to ANSI/TIA-603-D-2010 substitution test method.

EUT was replaced by generator and substitution antenna. Result calculated from generator output level, substitution antenna gain and loss of connected cable was used for EIRP calculation.

Transmitter was operated at continuous transmit mode at bottom, middle and top of the 2400 – 2483.5 MHz frequency band and at maximum output power and maximum data bit rate.

TEST EQUIPMENT USED:

| | | | | | | |
|---|---|---|---|---|---|----|
| 1 | 2 | 3 | 5 | 8 | 9 | 13 |
|---|---|---|---|---|---|----|



Test report No: 9612309851

Title: Touch panel communication module

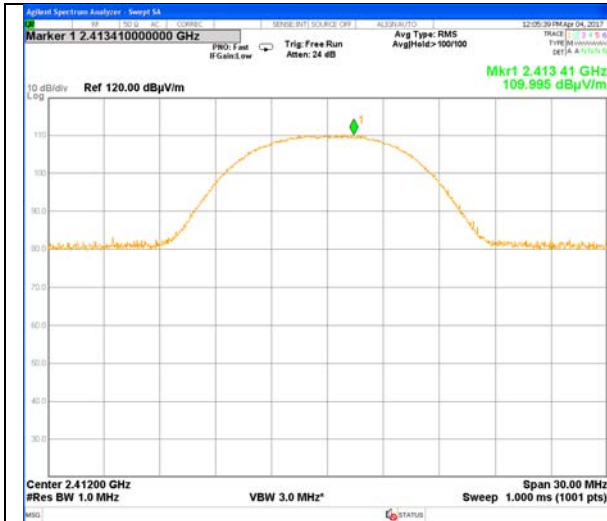
Model: AP6255

Page 15 of 47 Pages

FCC ID: R8S-KT-107

WLAN transmitter.

802.11 b (11 Mbit/s bit rate).



Plot # 13. Carrier frequency – 2412 MHz



Plot # 14. Carrier frequency – 2437 MHz



Plot # 15. Carrier frequency – 2462 MHz



Test report No: 9612309851

Title: Touch panel communication module

Model: AP6255

Page 16 of 47 Pages

FCC ID: R8S-KT-107

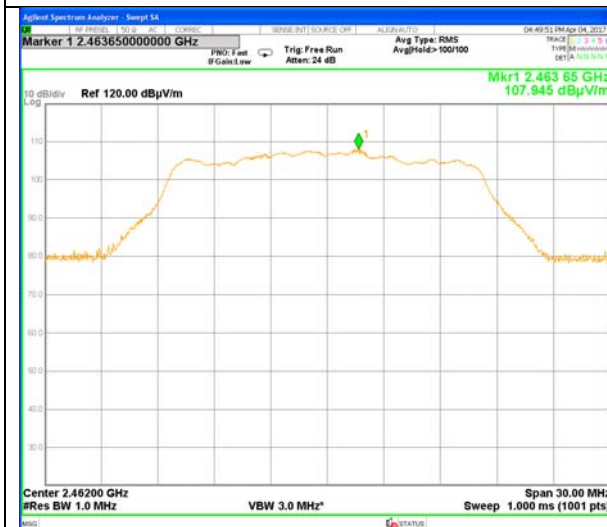
802.11 g (54 Mbit/s bit rate).



Plot # 16. Carrier frequency – 2412 MHz



Plot # 17. Carrier frequency – 2437 MHz



Plot # 18. Carrier frequency – 2462 MHz



Test report No: 9612309851

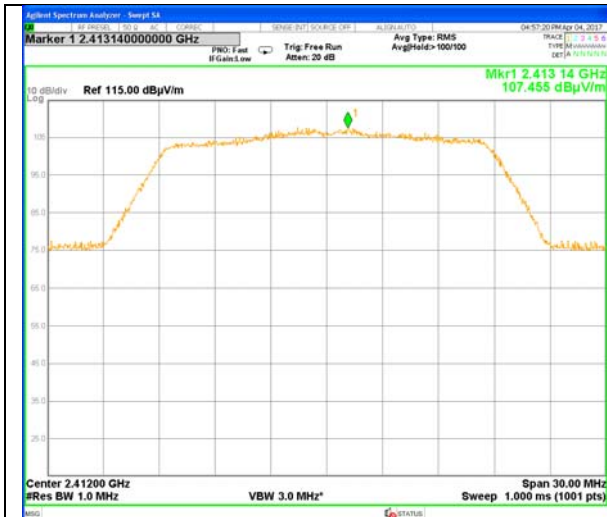
Page 17 of 47 Pages

Title: Touch panel communication module

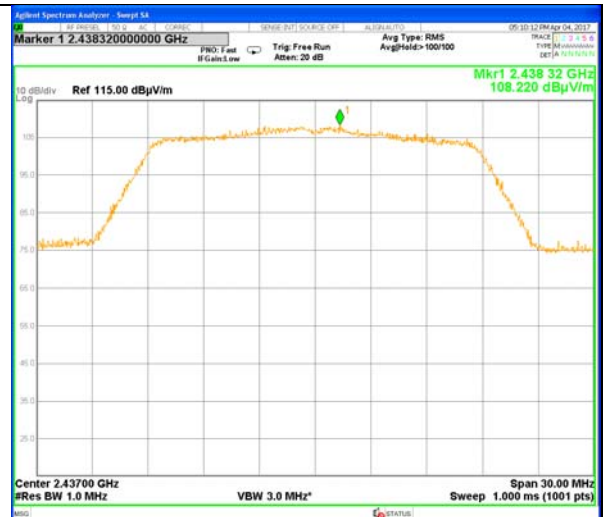
Model: AP6255

FCC ID: R8S-KT-107

802.11n (54 Mbit/s bit rate).



Plot # 19. Carrier frequency – 2412 MHz



Plot # 20. Carrier frequency – 2437 MHz



Plot # 21. Carrier frequency – 2462 MHz



Test report No: 9612309851

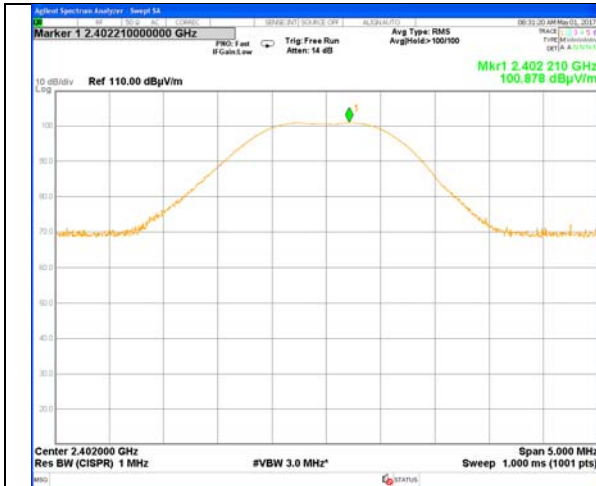
Page 18 of 47 Pages

Title: Touch panel communication module

Model: AP6255

FCC ID: R8S-KT-107

BT transmitter test result.



Plot # 22. Carrier frequency – 2402 MHz



Plot # 23. Carrier frequency – 2440 MHz



Plot # 24. Carrier frequency – 2480 MHz



Test report No: 9612309851

Page 19 of 47 Pages

Title: Touch panel communication module

Model: AP6255

FCC ID: R8S-KT-107

5.1.3 Power spectral density test

Operating Frequency Range 2402– 2480 MHz
Detector used Peak
Resolution bandwidth 10 kHz
Video bandwidth 3 x RBW.
Trace mode Max Hold.
Ambient Temperature 23⁰ C **Relative Humidity** 52% **Air Pressure** 1009 hPa

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

WLAN transmitter.

| Wi-Fi protocol options | Carrier frequency, MHz | Field strength, dBμV/m | EIR power, dBm | *Conducted PSD dBm | Conducted PSD limit, dBm/3 kHz | Reference to plot # |
|------------------------|------------------------|------------------------|----------------|--------------------|--------------------------------|---------------------|
| 802.11b | 2412 | 93.32 | -1.9 | -10.0 | 8 | 25 |
| | 2437 | 94.95 | -0.3 | -8.4 | 8 | 26 |
| | 2462 | 95.67 | 0.4 | -7.7 | 8 | 27 |
| 802.11g | 2412 | 92.89 | -2.3 | -10.5 | 8 | 28 |
| | 2437 | 93.43 | -1.8 | -9.9 | 8 | 29 |
| | 2462 | 92.44 | -2.8 | -10.9 | 8 | 30 |
| 802.11n | 2412 | 91.58 | -3.7 | -11.8 | 8 | 31 |
| | 2437 | 93.44 | -1.8 | -9.9 | 8 | 32 |
| | 2462 | 92.33 | -2.9 | -11.0 | 8 | 33 |

*The conducted to antenna PSD:

EIR power – Antenna gain. Antenna gain = 2.9 dBi

EIRP = E Field strength (dBμV/m@3m) - 95.2 + 10 Log (3 kHz RBW/ 10 kHz RBW).

Calculation of EIRP performed after verification by substitution method.

Bluetooth transmitter:

| Carrier frequency, MHz | Field strength, dBμV/m | **EIR power, dBm | *Conducted PSD dBm | Conducted PSD limit, dBm/3 kHz | Reference to plot # |
|------------------------|------------------------|------------------|--------------------|--------------------------------|---------------------|
| 2402 | 91.5 | -3.7 | -11.9 | 8 | 34 |
| 2440 | 89.8 | -5.4 | -13.6 | 8 | 35 |
| 2480 | 89.3 | -5.9 | -14.1 | 8 | 36 |

*The conducted to antenna PSD:

EIR power – Antenna gain. Where antenna gain = 2.9 dBi.

**EIRP = E Field strength (dBμV/m@3m) - 95.2 + 10 Log (3 kHz RBW/ 10 kHz RBW).

Calculation of EIRP performed after verification by substitution method.



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|--|----------------------------|
| Test report No: 9612309851 | Page 20 of 47 Pages |
| Title: Touch panel communication module | |
| Model: AP6255 | FCC ID: R8S-KT-107 |

TEST SUMMARY

EUT maximum output power result is below PSD limit per 47 CFR 15.247 (e).
The EUT was found complies with standard requirement.

TEST EQUIPMENT USED:

| | | | | | | |
|---|---|----|--|--|--|--|
| 1 | 3 | 14 | | | | |
|---|---|----|--|--|--|--|



Test report No: 9612309851

Title: Touch panel communication module

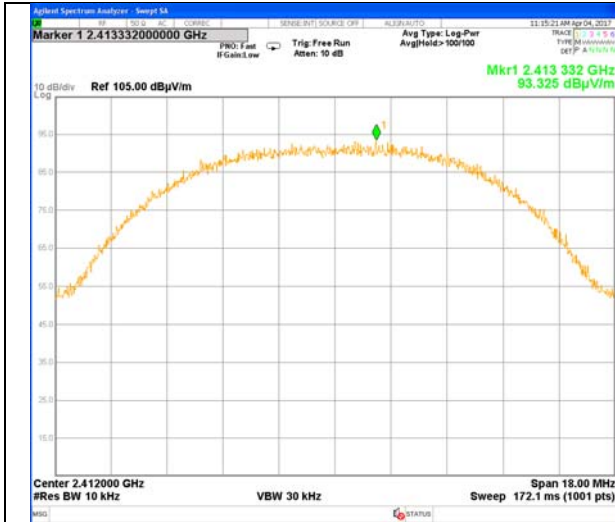
Model: AP6255

Page 21 of 47 Pages

FCC ID: R8S-KT-107

WLAN transmitter.

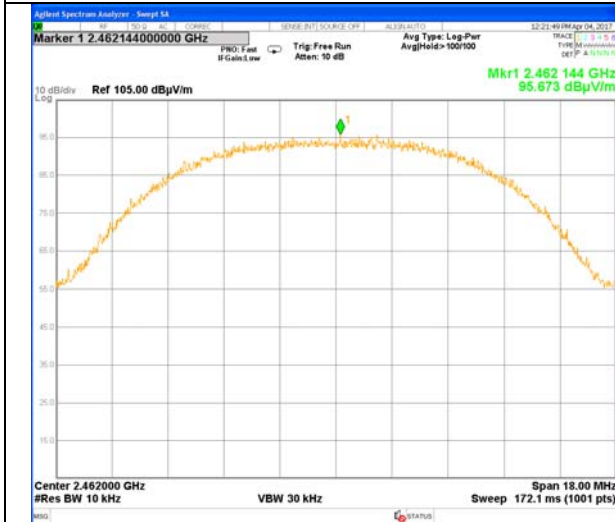
802.11 b (11 Mbit/s bit rate).



Plot # 25. Carrier frequency – 2412 MHz



Plot # 26. Carrier frequency – 2437 MHz



Plot # 27. Carrier frequency – 2462 MHz



Test report No: 9612309851

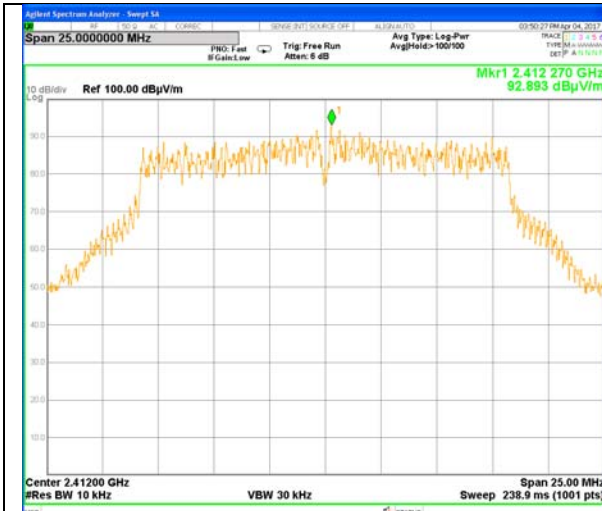
Title: Touch panel communication module

Model: AP6255

Page 22 of 47 Pages

FCC ID: R8S-KT-107

802.11 g (54 Mbit/s bit rate).



Plot # 28. Carrier frequency – 2412 MHz



Plot # 29. Carrier frequency – 2437 MHz



Plot # 30. Carrier frequency – 2462 MHz



Test report No: 9612309851

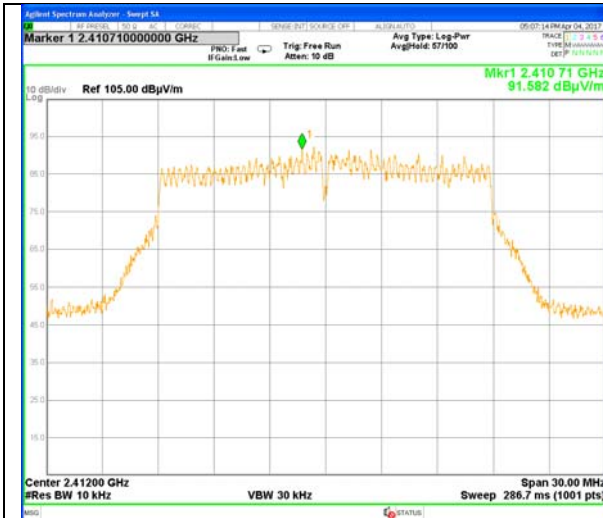
Title: Touch panel communication module

Model: AP6255

Page 23 of 47 Pages

FCC ID: R8S-KT-107

802.11n (54 Mbit/s bit rate).



Plot # 31. Carrier frequency – 2412 MHz



Plot # 32. Carrier frequency – 2437 MHz



Plot # 33. Carrier frequency – 2462 MHz



Test report No: 9612309851

Page 24 of 47 Pages

Title: Touch panel communication module

Model: AP6255

FCC ID: R8S-KT-107



Plot # 34. Carrier frequency – 2402 MHz



Plot # 35. Carrier frequency – 2440 MHz



Plot # 36. Carrier frequency – 2480 MHz



| | |
|--|----------------------------|
| Test report No: 9612309851 | Page 25 of 47 Pages |
| Title: Touch panel communication module | FCC ID: R8S-KT-107 |
| Model: AP6255 | |

5.1.4 Radiated emissions according to §§ 15.247(d), 15.205(a)

| | | | |
|----------------------------------|--|------------------------------|--|
| Method of measurement | 558074 D01 DTS Meas Guidance. Sec. 12.1. | | |
| Operating Frequency Range | 2402– 2480 MHz | | |
| Detector used: | Trace 1 – Peak; Trace 2 - RMS | | |
| Resolution bandwidth | 1 MHz/100 kHz | | |
| Video bandwidth | 3x RBW. | | |
| Trace mode: | Trace 1 – Max hold; Trace 2 – Power averaging. | | |
| Ambient Temperature 23° C | Relative Humidity 52% | Air Pressure 1009 hPa | |

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

In addition, radiated emissions, which fall in the restricted bands, as, defined in Section 15.205(a) must also comply with the radiated emission limits specified in Section 15.209(a).

WLAN transmitter results.

Carrier frequency 2412 MHz

| Frequency, MHz | Radiated emissions, dBµV/m | Peak limit, dBµV/m | Avg limit, dBµV/m | Margin, dB | Note | Note | Reference to plot# |
|----------------|----------------------------|--------------------|-------------------|------------|-----------|------------------|--------------------|
| 2389.9 | 62.8 | 74 | - | 11.2 | *RB | Detector peak | 13 |
| 2389.8 | 46.9 | - | 54 | 7.1 | RB | Detector average | 13 |
| 2400.0 | 64.4 | 84.0 | - | 19.6 | Band edge | Detector peak. | 15 |
| 5441.0 | 59.2 | 74.0 | - | 14.8 | RB | Detector peak | 16 |
| 5448.0 | 48.7 | - | 54 | 5.3 | RB | Detector average | 16 |

*RB – restricted band

Carrier frequency 2437 MHz

| Frequency, MHz | Radiated emissions, dBµV/m | Peak limit, dBµV/m | Avg limit, dBµV/m | Margin, dB | Note | Note | Reference to plot# |
|----------------|----------------------------|--------------------|-------------------|------------|-----------|------------------|--------------------|
| 2370.5 | 54.2 | 74 | - | 19.8 | *RB | Detector peak | 20 |
| 2388.6 | 42.3 | - | 54 | 11.7 | RB | Detector average | 20 |
| 2400 | 62.2 | 83.9 | - | >20 | Band edge | Detector peak. | 21 |
| 5444.0 | 57.7 | 74 | - | 16.3 | RB | Detector peak | 23 |
| 5444.0 | 46.4 | - | 54 | 7.6 | RB | Detector average | 23 |

**Test report No:** 9612309851**Page 26 of 47 Pages****Title:** Touch panel communication module**Model:** AP6255**FCC ID:** R8S-KT-107

Carrier frequency 2462 MHz

| Frequency, MHz | Radiated emissions, dB μ V/m | Peak limit, dB μ V/m | Avg limit, dB μ V/m | Margin, dB | Note | Note | Reference to plot# |
|----------------|----------------------------------|--------------------------|-------------------------|------------|------|-------------------|--------------------|
| 2262.1 | 53.8 | 74 | - | >20 | *RB | Detector peak | 26 |
| 2262.1 | 41.3 | - | 54 | 12.7 | RB | Detector average. | 26 |
| 2484.4 | 60.4 | 74 | - | 13.4 | RB | Detector peak | 28 |
| 2483.6 | 45.3 | - | 54 | 8.7 | RB | Detector average | 28 |
| 4925.5 | 57.0 | 74 | - | 17.0 | RB | Detector peak | 29 |
| 4925.5 | 46.5 | - | 54 | 7.5 | RB | Detector average | 29 |

*RB – restricted band



Test report No: 9612309851

Page 27 of 47 Pages

Title: Touch panel communication module

Model: AP6255

FCC ID: R8S-KT-107

Carrier frequency 2402 MHz

| Frequency, MHz | Radiated emissions, dB μ V/m | Peak limit, dB μ V/m | Avg limit, dB μ V/m | Margin, dB | Note | Note | Reference to plot# |
|----------------|----------------------------------|--------------------------|-------------------------|------------|-----------|------------------|--------------------|
| 2231.5 | 52.3 | 74 | - | >20 | *RB | Detector peak | 54 |
| 2303.8 | 47.8 | - | 54 | 6.2 | RB | Detector average | 54 |
| 2400.0 | 62.4 | 80.6 | - | 18.2 | Band edge | Detector peak. | 55 |
| 5381.0 | 48.0 | 74.0 | - | >20 | RB | Detector peak | 56 |
| 5385.0 | 37.9 | - | 54 | 16.1 | RB | Detector average | 56 |

*RB – restricted band

Carrier frequency 2440 MHz

| Frequency, MHz | Radiated emissions, dB μ V/m | Peak limit, dB μ V/m | Avg limit, dB μ V/m | Margin, dB | Note | Note | Reference to plot# |
|----------------|----------------------------------|--------------------------|-------------------------|------------|-----------|------------------|--------------------|
| 2324.6 | 51.4 | 74 | - | >20 | RB | Detector peak | 59 |
| 2388.6 | 42.3 | - | 54 | 11.7 | RB | Detector average | 59 |
| 2400 | 62.2 | 79.0 | - | 16.8 | Band edge | Detector peak. | 60 |
| 5420.0 | 52.3 | 74 | - | >20 | RB | Detector peak | 61 |
| 5423.0 | 46.0 | - | 54 | 8.0 | RB | Detector average | 61 |

Carrier frequency 2480 MHz

| Frequency, MHz | Radiated emissions, dB μ V/m | Peak limit, dB μ V/m | Avg limit, dB μ V/m | Margin, dB | Note | Note | Reference to plot# |
|----------------|----------------------------------|--------------------------|-------------------------|------------|------|-------------------|--------------------|
| 2284.3 | 49.2 | 74 | - | >20 | *RB | Detector peak | 64 |
| 2295.5 | 44.6 | - | 54 | 9.4 | RB | Detector average. | 64 |
| 2488.0 | 47.3 | 74 | - | >20 | RB | Detector peak | 66 |
| 2488.3 | 41.6 | - | 54 | 12.4 | RB | Detector average | 66 |
| 7503.0 | 51.6 | 74 | - | >20 | RB | Detector peak | 68 |
| 7503.0 | 44.5 | - | 54 | 9.5 | RB | Detector average | 68 |

*RB – restricted band

The test was conducted in maximum allowed occupied bandwidth and maximum data bit rate that is a worst case



Test report No: 9612309851

Page 28 of 47 Pages

Title: Touch panel communication module

Model: AP6255

FCC ID: R8S-KT-107

TEST SUMMARY

All emissions outside of the 2400 – 2483.5 MHz frequency band were found below 15.247(d) limits.

TEST EQUIPMENT USED:

| | | | | | | |
|---|---|---|----|----|----|--|
| 1 | 3 | 4 | 10 | 13 | 14 | |
|---|---|---|----|----|----|--|



Test report No: 9612309851

Page 29 of 47 Pages

Title: Touch panel communication module

Model: AP6255

FCC ID: R8S-KT-107

WLAN transmitter result.

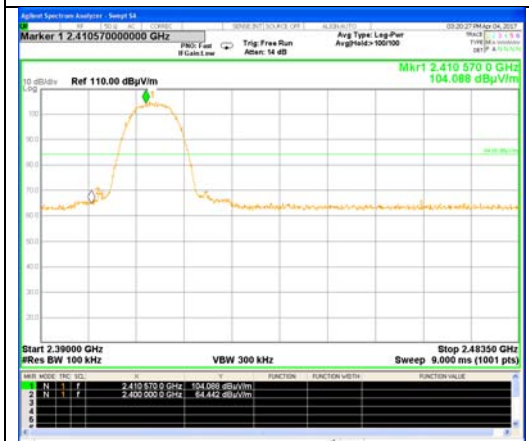
Carrier frequency – 2412 MHz.



Plot # 37



Plot # 38



Plot # 39



Plot # 40



Plot # 41.



Plot # 42.



Test report No: 9612309851

Page 30 of 47 Pages

Title: Touch panel communication module

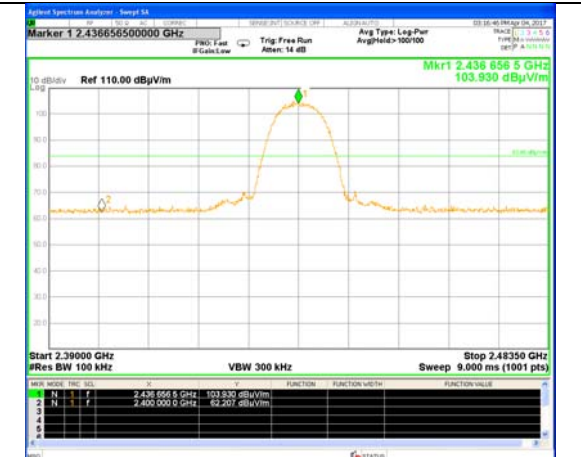
Model: AP6255

FCC ID: R8S-KT-107

Carrier frequency – 2437 MHz.



Plot # 43



Plot # 44



Plot # 45



Plot # 46



Plot # 47



Test report No: 9612309851

Page 31 of 47 Pages

Title: Touch panel communication module

Model: AP6255

FCC ID: R8S-KT-107

Carrier frequency – 2462 MHz.



Plot # 48



Plot # 49



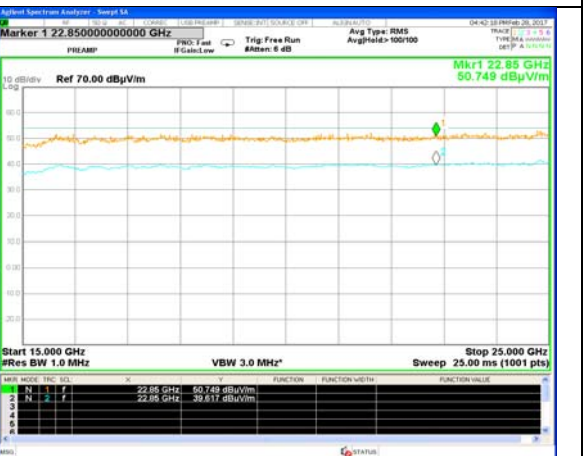
Plot # 50



Plot # 51



Plot # 52.



Plot # 53.



Test report No: 9612309851

Title: Touch panel communication module

Model: AP6255

Page 32 of 47 Pages

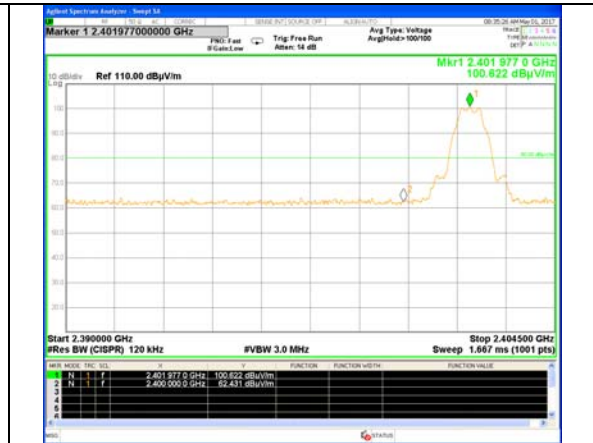
FCC ID: R8S-KT-107

Bluetooth transmitter.

Carrier frequency – 2402 MHz.



Plot # 54



Plot # 55



Plot # 56



Plot # 57



Plot # 58.



Test report No: 9612309851

Page 33 of 47 Pages

Title: Touch panel communication module

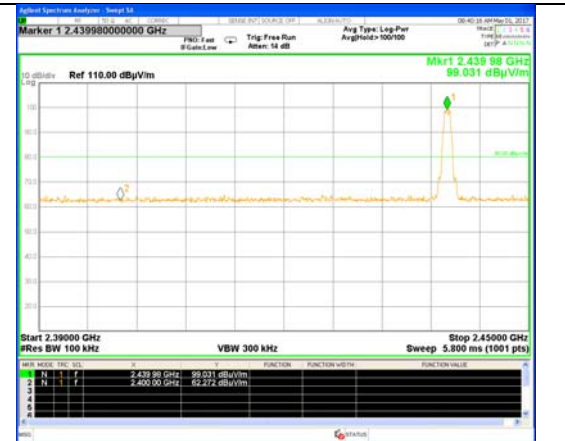
Model: AP6255

FCC ID: R8S-KT-107

Carrier frequency - 2440 MHz.



Plot # 59



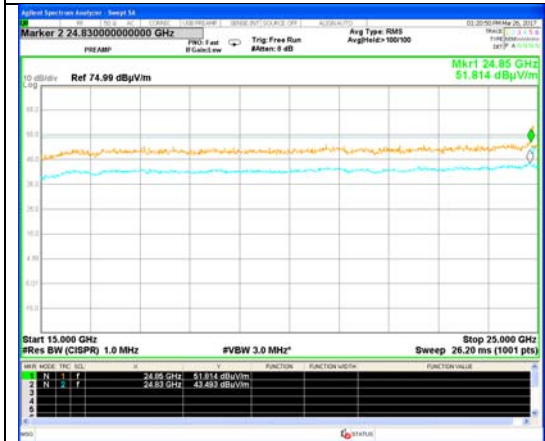
Plot # 60



Plot # 61



Plot # 62



Plot # 63.



Test report No: 9612309851

Page 34 of 47 Pages

Title: Touch panel communication module

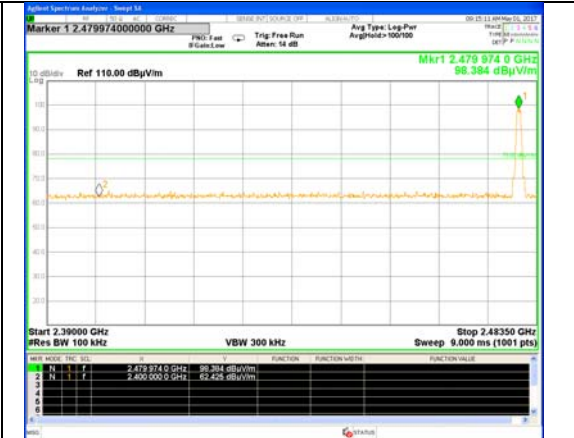
Model: AP6255

FCC ID: R8S-KT-107

Carrier frequency 2480 MHz.



Plot # 64



Plot # 65



Plot # 66



Plot # 67



Plot # 68



Plot # 69



Test report No: 9612309851

Page 35 of 47 Pages

Title: Touch panel communication module

Model: AP6255

FCC ID: R8S-KT-107

5.2 Radiated emissions test according to § 15.209

| | | | | | |
|------------------------------|-------------------------|--------------------------|------------|---------------------|-----------------|
| Method of measurement | ANSI C63.10 §6.5 | | | | |
| Detectors used | CISPR Quasi-Peak | | | | |
| Resolution bandwidth | 9 kHz/120 kHz | | | | |
| Video bandwidth | >3 x RBW. | | | | |
| Trace mode | Free run | | | | |
| Ambient Temperature | 24⁰ C | Relative Humidity | 55% | Air Pressure | 1009 hPa |

TEST DESCRIPTION:

The measurements were performed at 3 m test distance in Anechoic chamber. The EUT was arranged on a polystyrene table 0.8 m height placed on the turn - table. Test was conducted for two transmit options WLAN and Bluetooth. The Active Loop antenna in 9 kHz to 30 MHz frequency band and Biconilog antenna in 30 MHz – 1.0 GHz frequency band were used. The emission level was maximized by initially rotating turntable through 360°, varying the antenna height between 1 m and 4 m, rerouting EUT cables and changing antenna polarization from vertical to horizontal.

REQUIREMENTS:

EUT radiated emission shall not exceed value required in section 15.209

TEST RESULT:

Test results are presented in a table below and in plots ## 70 - 71

TEST EQUIPMENT USED:

| | | | | | | |
|---|---|----|----|--|--|--|
| 1 | 6 | 13 | 15 | | | |
|---|---|----|----|--|--|--|

**Test report No:** 9612309851**Page 36 of 47 Pages****Title:** Touch panel communication module**Model:** AP6255**FCC ID:** R8S-KT-107**Radiated emission test results.**

| Frequency (MHz) | Antenna polariz. V/H | Antenna Height m | Turn- table Angle (°) | Emission Level Note 1 dBμV/m | Limit @ 3m dBμV/m | Margin Note 2 dB | Results |
|----------------------------|-------------------------------------|---------------------------------|--|--|---|---------------------------------|----------------|
| 30.5 | V | 1.0 | 239 | 31.7 | 40.0 | 8.3 | Pass |
| 89.1 | V | 1.0 | 24 | 31.8 | 43.5 | 11.7 | Pass |
| 161.0 | V | 1.0 | 327 | 32.9 | 43.5 | 10.6 | Pass |
| 169.4 | H | 1.7 | 249 | 24.9 | 43.5 | 18.6 | Pass |

Note 1: Emission level = E Reading (dB μ V) + Cable loss (dB) + Antenna Factor (dB/m).
For Cable Loss and Antenna Factor refer to Appendix 2.

Note 2: Margin (dB) = Limit (dB μ V/m) – Emission level (dB μ V/m)

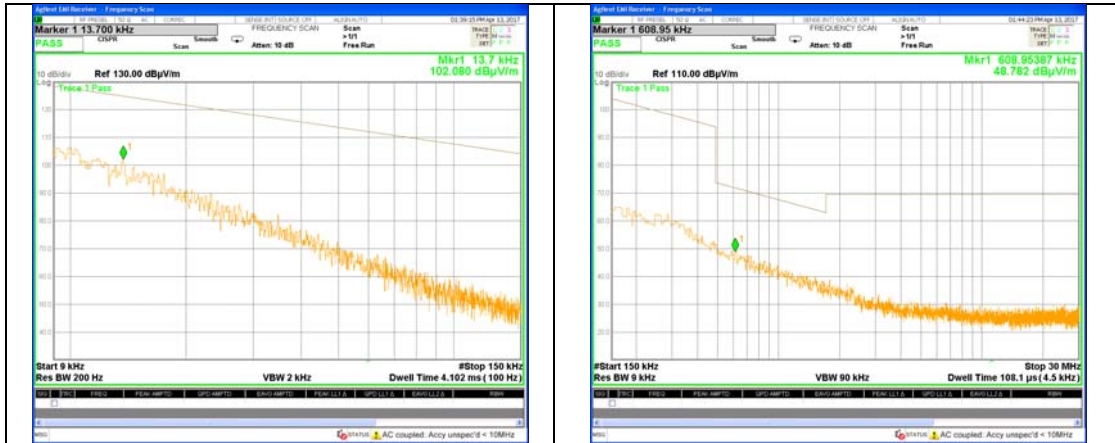
Test report No: 9612309851

Page 37 of 47 Pages

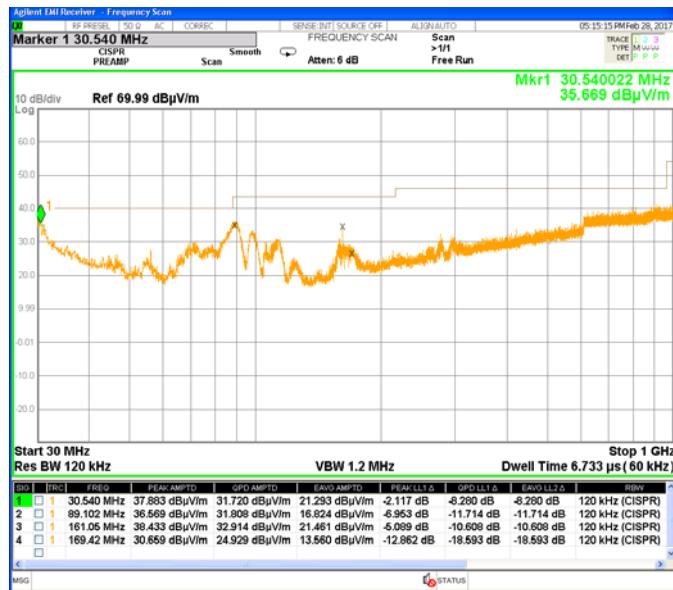
Title: Touch panel communication module

Model: AP6255

FCC ID: R8S-KT-107



Plot # 70. Investigation result in 0.009 – 30 MHz frequency range.



Plot # 71. Investigation result in 30 - 1000 MHz frequency range.



Test report No: 9612309851

Page 38 of 47 Pages

Title: Touch panel communication module

Model: AP6255

FCC ID: R8S-KT-107

5.3 Conducted emissions test according to § 15.207.

Method of measurement ANSI C63.10 §6.2
Ambient Temperature 23⁰ C Relative Humidity 54% Air Pressure 1008 hPa

| Frequency, MHz | Conducted limit, dBµV | |
|-------------------|-----------------------|----------|
| | QP | AVRG |
| 0.15 - 0.5 | 66 - 56* | 56 - 46* |
| 0.5 - 5 | 56 | 46 |
| 5 - 30 | 60 | 50 |

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

EUT was placed on a wooden table in a shielded chamber at a height of 80 cm from the floor and 40 cm from the vertical reference plane. The measurements were performed at mains terminals by means of LISN, connected to spectrum analyzer. The measurements were made with quasi-peak and average (CISPR) detectors.

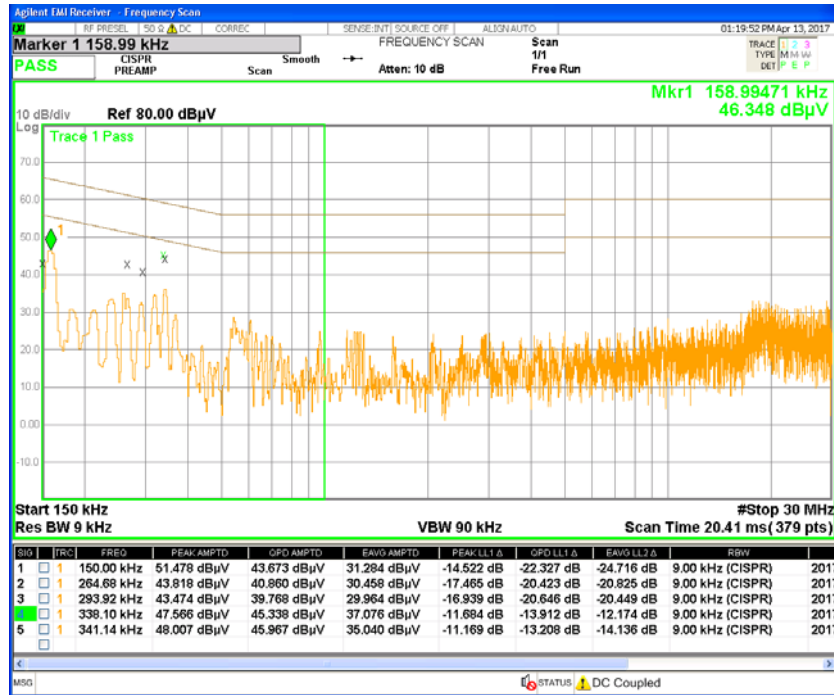
TEST RESULTS:

Test result in transmittion mode present in plots # 72, 73.

TEST EQUIPMENT USED:

| | | | | | |
|---|----|----|--|--|--|
| 1 | 12 | 13 | | | |
|---|----|----|--|--|--|

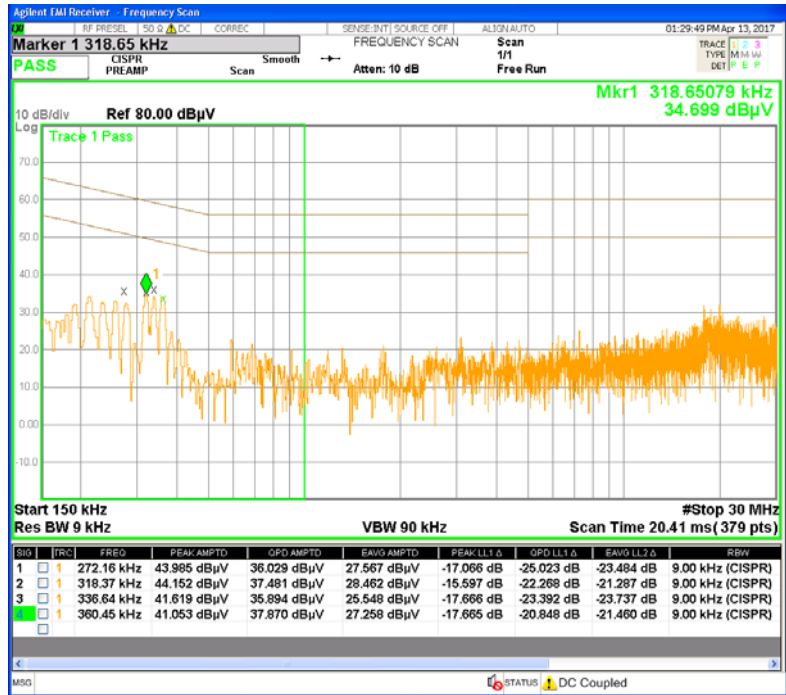
Test report No: 9612309851 **Page 39 of 47 Pages**
Title: Touch panel communication module
Model: AP6255 **FCC ID: R8S-KT-107**



Plot # 72. AC line conducted emissions test. Line Phase.

| Frequency MHz | QP dBμV | Limit QP dB | Margin dB | Avg dBμV | Limit Avg dB | Margin dB |
|---------------|---------|-------------|-----------|----------|--------------|-----------|
| 0.338 | 45.3 | 59.2 | -13.9 | 37.0 | 49.2 | -12.2 |
| 0.341 | 45.9 | 59.1 | -13.2 | 35.0 | 49.1 | -14.1 |

| | |
|--|----------------------------|
| Test report No: 9612309851 | Page 40 of 47 Pages |
| Title: Touch panel communication module | |
| Model: AP6255 | FCC ID: R8S-KT-107 |



Plot # 73. AC line conducted emissions test. Line Neutral.

| Frequency MHz | QP dBμV | Limit QP dB | Margin dB | Avg dBμV | Limit Avg dB | Margin dB |
|---------------|---------|-------------|-----------|----------|--------------|-----------|
| 0.336 | 35.9 | 59.2 | -23.3 | 25.5 | 49.2 | -23.7 |
| 0.360 | 37.8 | 58.6 | -20.8 | 27.2 | 48.6 | -21.4 |

**Test report No:** 9612309851**Page 41 of 47 Pages****Title:** Touch panel communication module**Model:** AP6255**FCC ID:** R8S-KT-107**APPENDIX A Test equipment used.****Test equipment used**

| No | Description | Manufacturer information | | | Due Calibration date |
|----|--|--------------------------------|------------------|------------|----------------------|
| | | Name | Model | Serial No | |
| 1 | MXE EMI Receiver 20 Hz -26.5 GHz | Agilent | N9038A | SII 650114 | April 2018 |
| 2 | Cable RF 1m | Huber-Suhner | Sucoflex 104 | 21325/4PE | October 2017 |
| 3 | Double Ridged Guide Antenna 0.75 – 18 GHz | ETS-Lindgren | 3115 | 00143138 | December 2017 |
| 4 | Broadband Horn antenna 15 – 40 GHz | Schwarzbeck Mess-Electronik | BBHA 9170 | 9170-341 | December 2017 |
| 5 | Double Ridged Waveguide Horn Antenna 1 – 18 GHz | ETS-Lindgren | 3117 | 00139055 | December 2017 |
| 6 | Antenna Biconilog 26 – 6000 MHz | ETS-Lindgren | 31142D | 0146490 | December 2017 |
| 7 | Spectrum analyzer 20 Hz-40 GHz | Rohde&Schwarz | ESU 40 | 100168 | November 2017 |
| 8 | MXG Signal Generator 100 KHz - 20 GHz | Agilent | N5183A | 6501148 | May 2017 |
| 9 | Attenuator 3 dB DC – 12.4 GHz | HP | 8491A | 50469 | October 2017 |
| 10 | USB preamplifier 2 GHz – 50 GHz | Keysight | U7227F | MY55380004 | January 2018 |
| 11 | LISN 9 kHz – 30 MHz | FCC | LISN 250-32-4-16 | SII5023 | October 2017 |
| 12 | Transient limiter 0.009-200 MHz | HP | 11947A | 3107105 | August 2017 |
| 13 | Cable RF 4m | Huber-Suhner | Sucoflex 104PE | 21329/4PE | October 2017 |
| 14 | Cable RF 0.5m | Huber-Suhner | Multiflex 141 | 520201 | October 2017 |
| 15 | Active Loop antenna 1.0 kHz – 30 MHz | ETS-Lindgren | 6507 | 00144641 | December 2017 |



Test report No: 9612309851

Page 42 of 47 Pages

Title: Touch panel communication module

Model: AP6255

FCC ID: R8S-KT-107

Cable Loss (Mast 6 m set cable.)

| Point | Frequency (MHz) | Cable Loss (dB) | Point | Frequency (MHz) | Cable Loss (dB) |
|-------|-----------------|-----------------|-------|-----------------|-----------------|
| 1 | 30 | 0.3 | 21 | 1000 | 2.5 |
| 2 | 50 | 0.4 | 22 | 1100 | 2.6 |
| 3 | 100 | 0.6 | 23 | 1200 | 2.8 |
| 4 | 150 | 0.8 | 24 | 1300 | 2.9 |
| 5 | 200 | 1.0 | 25 | 1400 | 3.1 |
| 6 | 250 | 1.1 | 26 | 1500 | 3.2 |
| 7 | 300 | 1.2 | 27 | 1600 | 3.3 |
| 8 | 350 | 1.3 | 28 | 1700 | 3.5 |
| 9 | 400 | 1.5 | 29 | 1800 | 3.6 |
| 10 | 450 | 1.6 | 30 | 1900 | 3.7 |
| 11 | 500 | 1.7 | 31 | 2000 | 3.9 |
| 12 | 550 | 1.8 | 32 | 2100 | 4.0 |
| 13 | 600 | 1.9 | 33 | 2200 | 4.1 |
| 14 | 650 | 1.9 | 34 | 2300 | 4.2 |
| 15 | 700 | 2.0 | 35 | 2400 | 4.4 |
| 16 | 750 | 2.1 | 36 | 2500 | 4.6 |
| 17 | 800 | 2.1 | 37 | 2600 | 4.7 |
| 18 | 850 | 2.2 | 38 | 2700 | 4.8 |
| 19 | 900 | 2.3 | 39 | 2800 | 4.9 |
| 20 | 950 | 2.4 | 40 | 2900 | 5.0 |



Test report No: 9612309851 **Page 43 of 47 Pages**
Title: Touch panel communication module
Model: AP6255 **FCC ID:** R8S-KT-107

Antenna factor
Biconilog Antenna, ETS-Lindgren mod. 31142D, S/N: 0146490 3 m calibration.

| f / MHz | AF / dB/m | f / MHz | AF / dB/m | f / MHz | AF / dB/m |
|---------|-----------|---------|-----------|---------|-----------|
| 30 | 18.7 | 250 | 12.0 | 2750 | 31.0 |
| 35 | 15.7 | 300 | 13.8 | 3000 | 31.2 |
| 40 | 12.9 | 400 | 16.2 | 3250 | 32.7 |
| 45 | 10.6 | 500 | 18.6 | 3500 | 34.5 |
| 50 | 9.0 | 600 | 20.2 | 3750 | 34.3 |
| 60 | 7.3 | 700 | 21.8 | 4000 | 34.5 |
| 70 | 7.7 | 800 | 22.9 | 4250 | 35.3 |
| 80 | 8.2 | 900 | 24.1 | 4500 | 35.5 |
| 90 | 9.2 | 1000 | 24.8 | 4750 | 36.1 |
| 100 | 9.4 | 1250 | 26.9 | 5000 | 37.4 |
| 120 | 8.5 | 1500 | 30.2 | 5250 | 38.4 |
| 140 | 8.5 | 1750 | 28.5 | 5000 | 39.9 |
| 160 | 9.1 | 2000 | 28.9 | 5750 | 38.2 |
| 180 | 10.5 | 2250 | 29.8 | 6000 | 39.1 |
| 200 | 10.9 | 2500 | 32.5 | - | - |

**Test report No: 9612309851****Page 44 of 47 Pages****Title: Touch panel communication module****Model: AP6255****FCC ID: R8S-KT-107****Antenna Factor****Double Ridged Guide Antenna mfr ETS-Lindgren model 3115 1m calibration**

| Point | Frequency (MHz) | Antenna Factor (dB/m) |
|-------|-----------------|-----------------------|
| 1 | 1000 | 23.7 |
| 2 | 1500 | 25.5 |
| 3 | 2000 | 28.5 |
| 4 | 2500 | 28.1 |
| 5 | 3000 | 29.6 |
| 6 | 3500 | 31.1 |
| 7 | 4000 | 32.5 |
| 8 | 4500 | 32.5 |
| 9 | 5000 | 33.5 |
| 10 | 5500 | 34.7 |
| 11 | 6000 | 36.1 |
| 12 | 6500 | 36.5 |
| 13 | 7000 | 37.3 |
| 14 | 7500 | 38.0 |
| 15 | 8000 | 37.3 |
| 16 | 8500 | 37.9 |
| 17 | 9000 | 38.1 |
| 18 | 9500 | 38.5 |
| 19 | 10000 | 38.7 |
| 20 | 10500 | 38.8 |
| 21 | 11000 | 38.6 |
| 22 | 11500 | 38.8 |
| 23 | 12000 | 38.9 |
| 24 | 12500 | 39.3 |
| 25 | 13000 | 40.2 |
| 26 | 13500 | 40.6 |
| 27 | 14000 | 40.6 |
| 28 | 14500 | 40.4 |
| 29 | 15000 | 39.6 |
| 30 | 15500 | 39.5 |
| 31 | 16000 | 39.8 |
| 32 | 16500 | 40.4 |
| 33 | 17000 | 41.3 |
| 34 | 17500 | 42.6 |
| 35 | 18000 | 43.2 |

Cable Loss**Type: Sucoflex 104PE; Ser.No.21329/4PE; 4 m length**

| Point | Frequency (GHz) | Cable Loss (dB) |
|-------|-----------------|-----------------|
| 0 | 0.0-1.8 | 1.67 |
| 1 | 1.8 – 3.6 | 2.39 |
| 2 | 3.6 – 5.4 | 3.04 |
| 3 | 5.4-7.2 | 3.58 |
| 4 | 7.2-9.0 | 4.06 |
| 5 | 9.0-10.8 | 4.49 |
| 6 | 10.8-12.6 | 4.91 |
| 7 | 12.6-14.4 | 5.31 |
| 8 | 14.4-16.2 | 5.66 |
| 9 | 16.2-18.00 | 6.01 |

**Test report No: 9612309851****Page 45 of 47 Pages****Title: Touch panel communication module****Model: AP6255****FCC ID: R8S-KT-107**

Antenna Factor
Broadband Horn Antenna model BBHA 9170 1m calibration

| Point | Frequency (GHz) | Antenna Factor (dB/m) |
|-------|-----------------|-----------------------|
| 1 | 15.0 | 38.5 |
| 2 | 16.0 | 37.7 |
| 3 | 17.0 | 38.1 |
| 4 | 18.0 | 37.9 |
| 5 | 19.0 | 38.0 |
| 6 | 20.0 | 38.0 |
| 7 | 21.0 | 37.9 |
| 8 | 22.0 | 38.2 |
| 9 | 23.0 | 39.6 |
| 10 | 24.0 | 39.6 |
| 11 | 25.0 | 39.3 |
| 12 | 26.0 | 39.5 |
| 13 | 27.0 | 39.6 |
| 14 | 28.0 | 39.6 |
| 15 | 30.0 | 40.1 |
| 16 | 32.0 | 41.2 |
| 17 | 34.0 | 41.5 |
| 18 | 35.0 | 41.9 |
| 19 | 36.0 | 42.2 |
| 20 | 38.0 | 43.8 |
| 21 | 40.0 | 43.2 |

Antenna Factor
For Antenna Loop MFR ETS Lindgren, Type/Model 6507, S/N: 00144641

| No. | Frequency MHz | Magnetic antenna factor, dBS/m | Electric antenna factor, dB/m |
|-----|---------------|--------------------------------|-------------------------------|
| 1 | 9 | -21.5 | 30.0 |
| 2 | 10 | -22.0 | 29.5 |
| 3 | 20 | -27.7 | 23.8 |
| 4 | 50 | -32.2 | 19.4 |
| 5 | 75 | -33.0 | 18.5 |
| 6 | 100 | -33.4 | 18.2 |
| 7 | 150 | -33.6 | 17.9 |
| 8 | 250 | -33.7 | 17.9 |
| 9 | 500 | -33.8 | 17.8 |
| 10 | 750 | -33.8 | 17.7 |
| 11 | 1000 | -33.8 | 17.7 |
| 12 | 2000 | -33.7 | 17.9 |
| 13 | 3000 | -33.8 | 17.8 |
| 14 | 4000 | -34.0 | 17.5 |
| 15 | 5000 | -34.3 | 17.2 |
| 16 | 10000 | -35.2 | 16.4 |
| 17 | 15000 | -35.8 | 15.8 |
| 18 | 20000 | -36.0 | 15.6 |
| 19 | 25000 | -36.2 | 15.3 |
| 20 | 30000 | -36.4 | 15.2 |

Test report No: 9612309851

Title: Touch panel communication module

Model: AP6255

Page 46 of 47 Pages

FCC ID: R8S-KT-107

APPENDIX B Photo of the test setups.



Photo 1.



Photo 2.



Photo 3.



Photo 4.

**Test report No:** 9612309851**Page** 47 of 47 Pages**Title:** Touch panel communication module**Model:** AP6255**FCC ID:** R8S-KT-107

APPENDIX C Abbreviations and acronyms.

The following abbreviations and acronyms are applicable to this test report:

| | |
|----------------|---|
| AC | alternating current |
| cm | centimeter |
| dB | decibel |
| dBm | decibel referred to one milliwatt |
| dB(μ V) | decibel referred to one microvolt |
| dB(μ V/m) | decibel referred to one microvolt per meter |
| EBW | emission bandwidth. |
| EMC | electromagnetic compatibility |
| EUT | equipment under test |
| GHz | gigahertz |
| H | height |
| Hz | hertz |
| kHz | kilohertz |
| L | length |
| LNA | low noise amplifier |
| m | meter |
| Mbps | megabit per second |
| MHz | megahertz |
| NA | not applicable |
| OFDM | Orthogonal Frequency Division Multiple Access |
| PRBS | pseudo random binary sequence |
| QP | quasi-peak |
| RF | radio frequency |
| RE | radiated emission |
| SA | spectrum analyzer |
| rms | root mean square |
| W | width |