



11.6 Number of hopping channels

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- DA 00-705
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

Test site:
Laboratory

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

CMC S108, CMC S136, CMC S164
Measurement uncertainty: See clause 7 of this test report

Test specification

See FCC Part 15.247

Environmental conditions

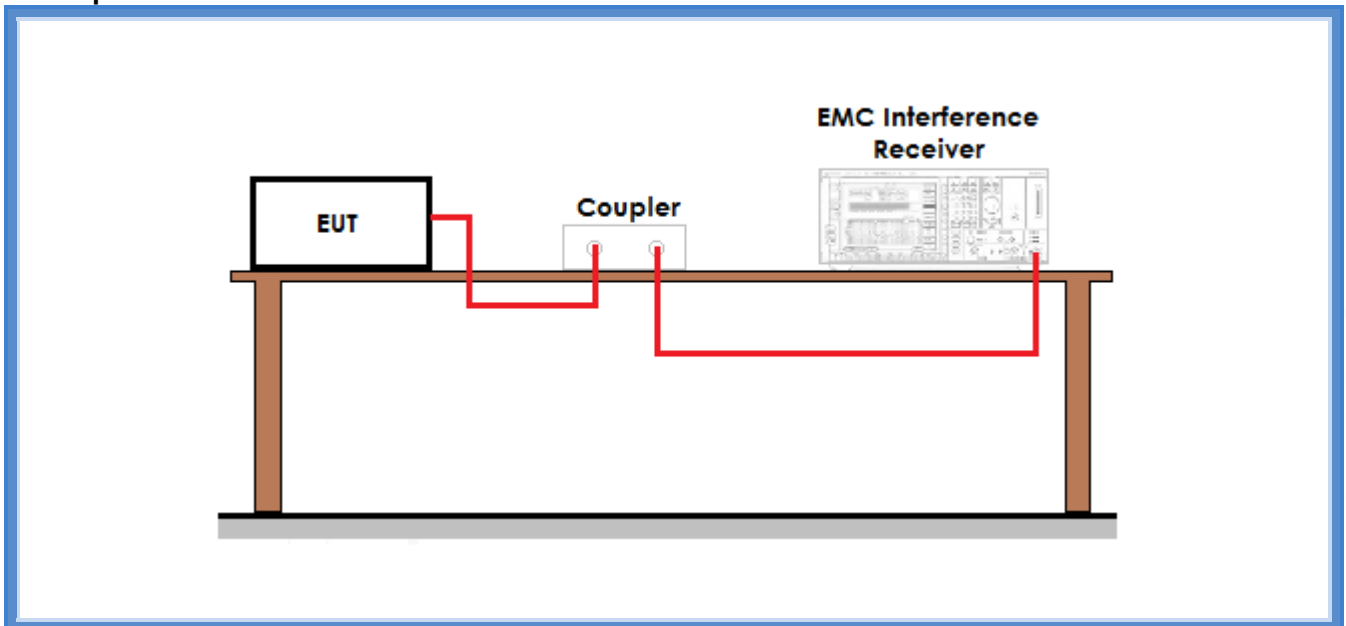
| Temperature (°C) | Atmospheric pressure (kPa) | Relative humidity (%) |
|------------------|----------------------------|-----------------------|
| 21 | 98 | 48 |

Acceptance limits:

For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies.



Setup



Result

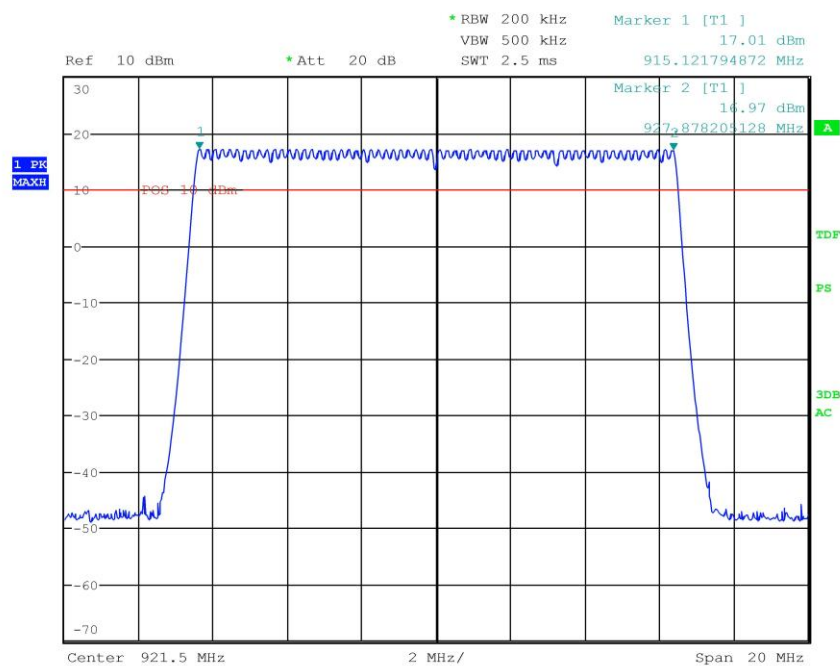
| <i>Graphs</i> | <i>Number of hopping channels</i> | <i>Results</i> |
|---------------|-----------------------------------|----------------|
| G14026622 | 64 | Complies |



Graphs

G14026622

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Gandini 14026622
Test Spec



Result: The requirements are met



11.7 Time of occupancy

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- DA 00-705
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

Test site:
Laboratory

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

CMC S164
Measurement uncertainty: See clause 7 of this test report

Test specification

See FCC Part 15.247

Environmental conditions

| Temperature (°C) | Atmospheric pressure (kPa) | Relative humidity (%) |
|------------------|----------------------------|-----------------------|
| 22 | 99 | 49 |

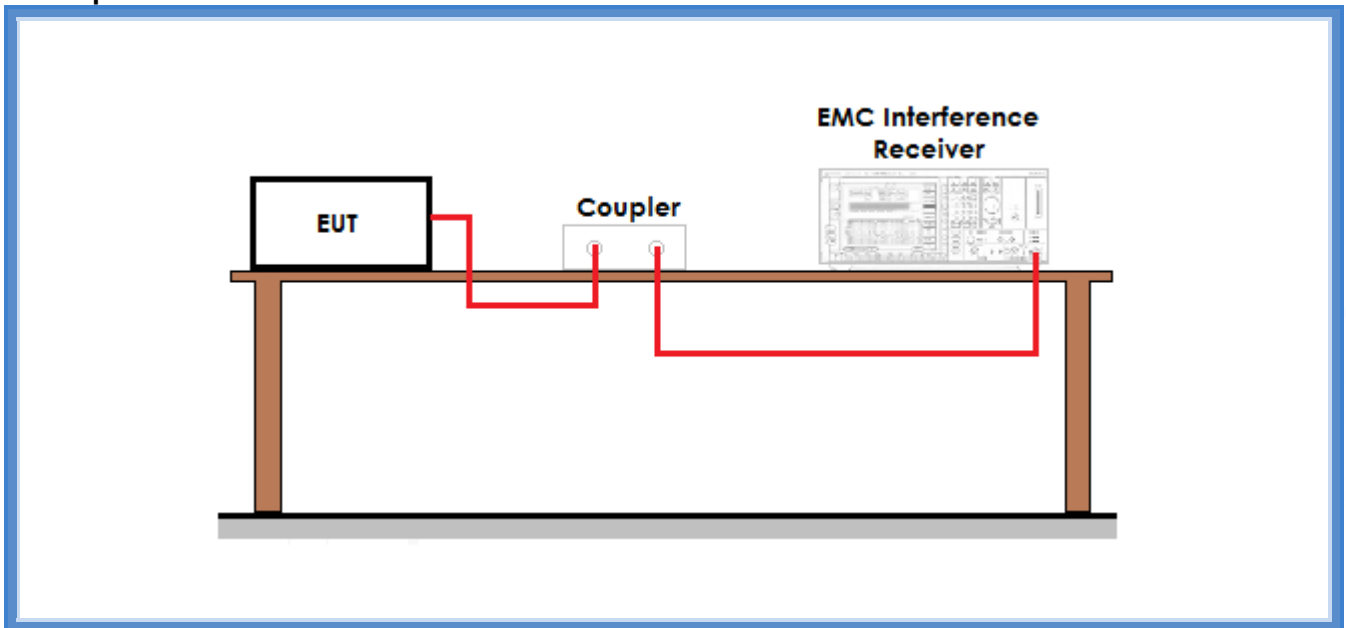
Acceptance limits:

For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed



Setup



Result

Dwell time of transmission

| Frequency (MHz) | Graphs | Dwell time (ms) |
|-----------------|-----------|-----------------|
| 915,12 | G14026618 | 14,7 |

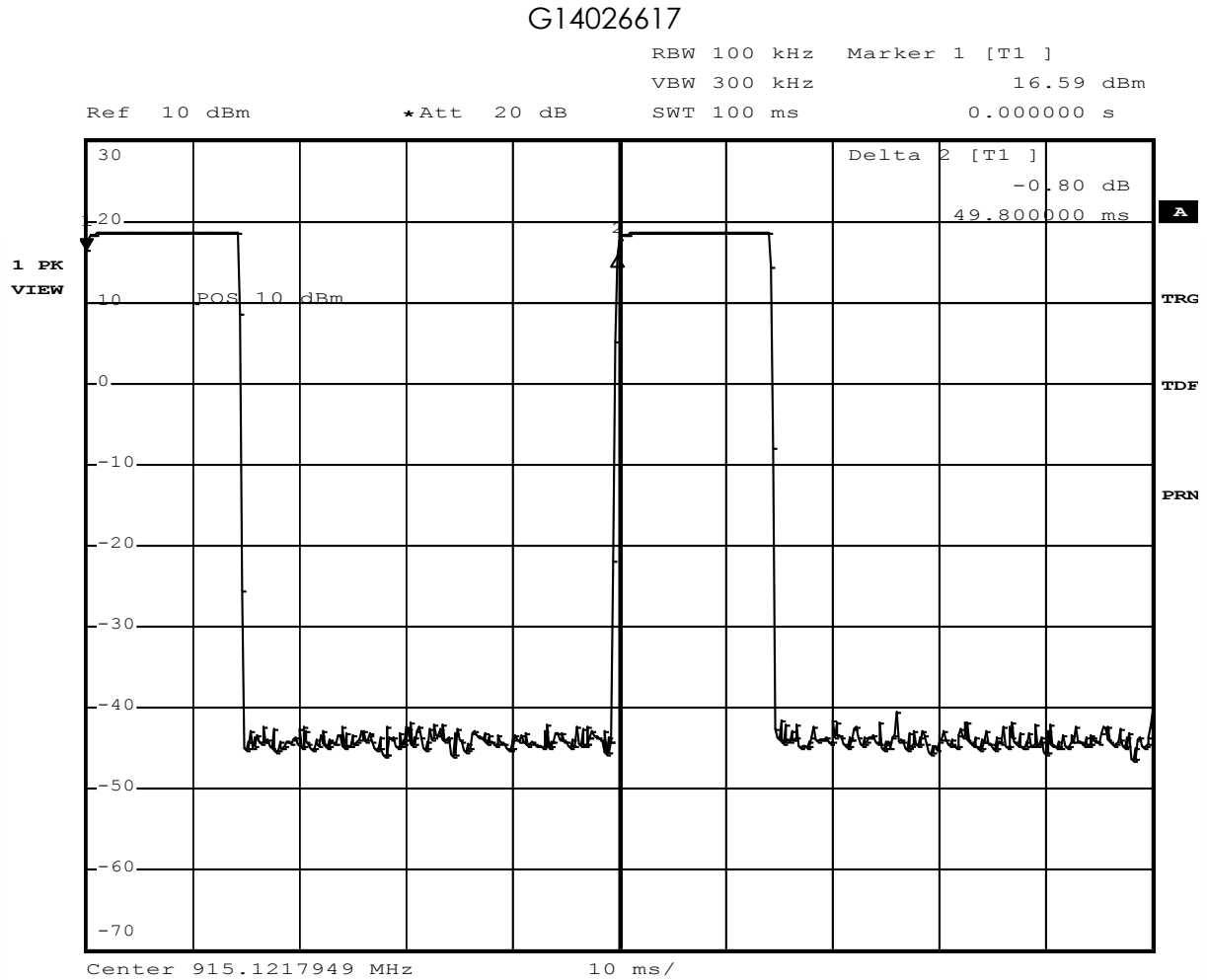
Number of transmissions per period (20s)

| Frequency (MHz) | Time between 2 transmission on different channels | | Number of transmission |
|-----------------|---|---------|--------------------------|
| 915,32 | G14026617 | 49,8 ms | 20000 / 49,8 / 64 = 6,27 |

| | |
|--|------------------------|
| Time of occupancy (Dwell time x Nr. of transmission) | 14,7 x 6,27 = 92,17 ms |
|--|------------------------|



Graphs





11.8 Band edge

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- DA 00-705
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

Test site:
Laboratory

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

CMC S164
Measurement uncertainty: See clause 7 of this test report

Test specification

See FCC Part 15.247

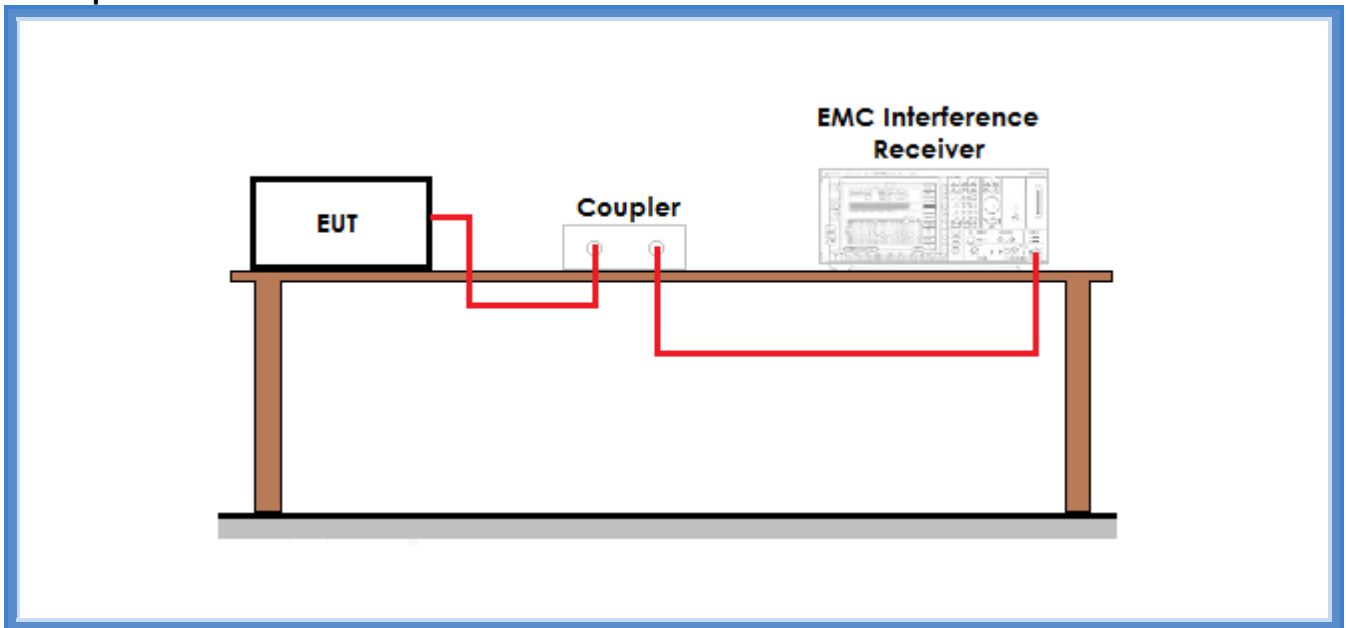
Environmental conditions

| <i>Temperature (°C)</i> | <i>Atmospheric pressure (kPa)</i> | <i>Relative humidity (%)</i> |
|-----------------------------|---------------------------------------|----------------------------------|
| 22 | 98 | 50 |

Acceptance limits: operation within the band 902 – 928 MHz



Setup



Result

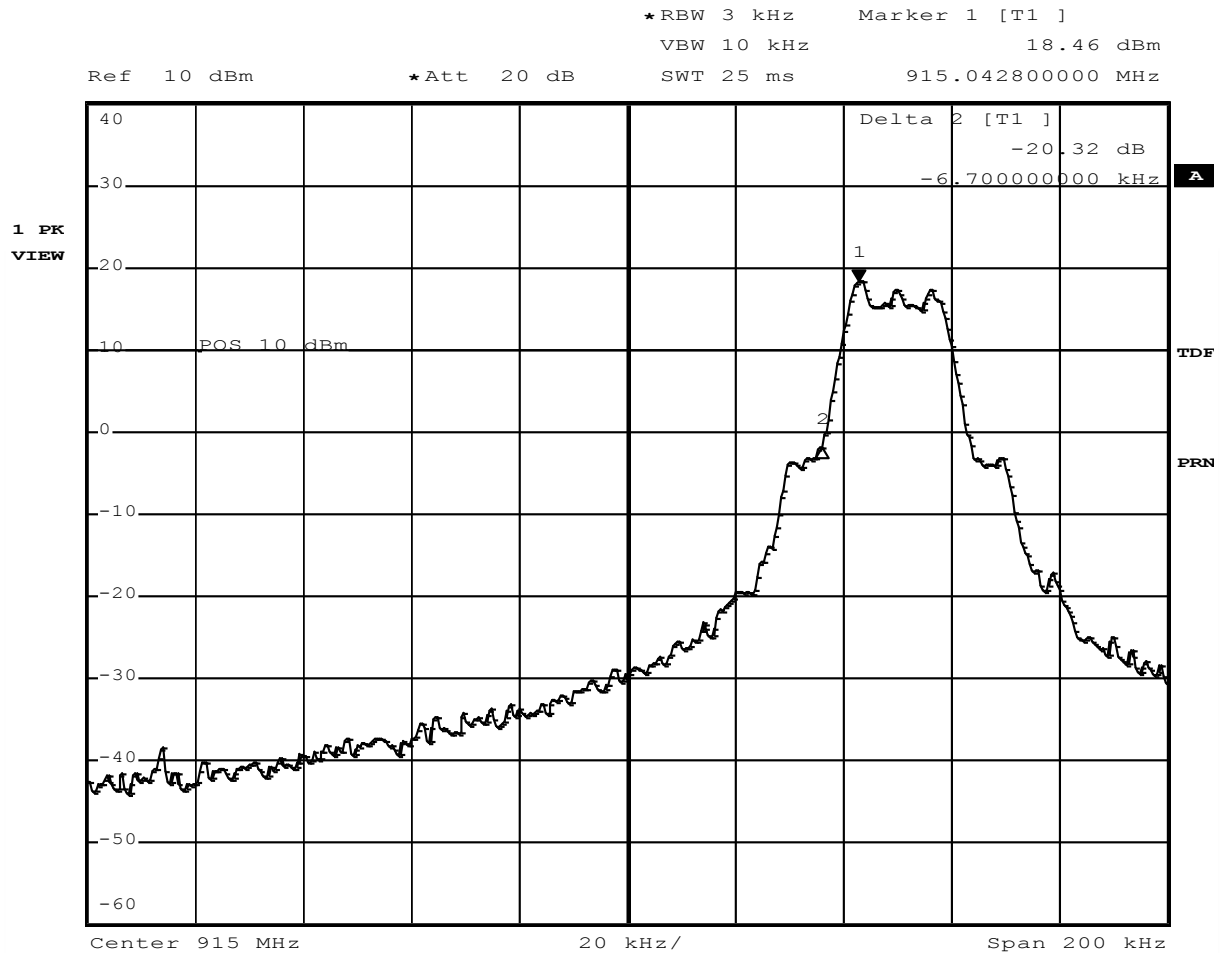
| Frequency (MHz) | Graph(s) – Hopping | Results | |
|-----------------|--------------------|-------------------------------|----------|
| 915,050 | G14026619 | F _L : 915,0357 MHz | Complies |
| 927,950 | G14026620 | F _H : 927,9631 MHz | Complies |

| Frequency (MHz) | Graph(s) – No hopping | Results | |
|-----------------|-----------------------|-------------------------------|----------|
| 915,050 | G14026608 | F _L : 915,0361 MHz | Complies |
| 927,950 | G14026613 | F _H : 927,9628 MHz | Complies |



Graphs

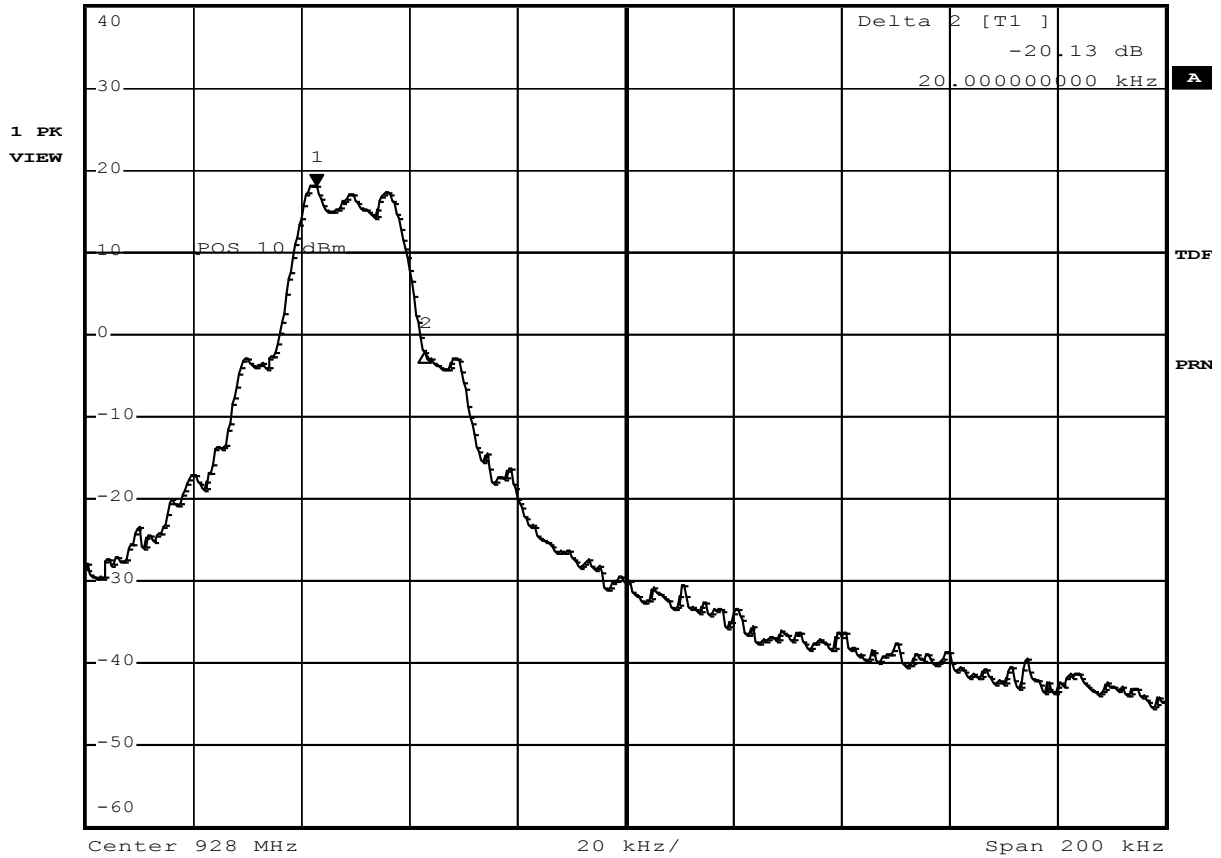
G14026608





G14026613

Ref 10 dBm *Att 20 dB *RBW 3 kHz Marker 1 [T1] VBW 10 kHz 18.10 dBm
SWT 25 ms 927.942800000 MHz

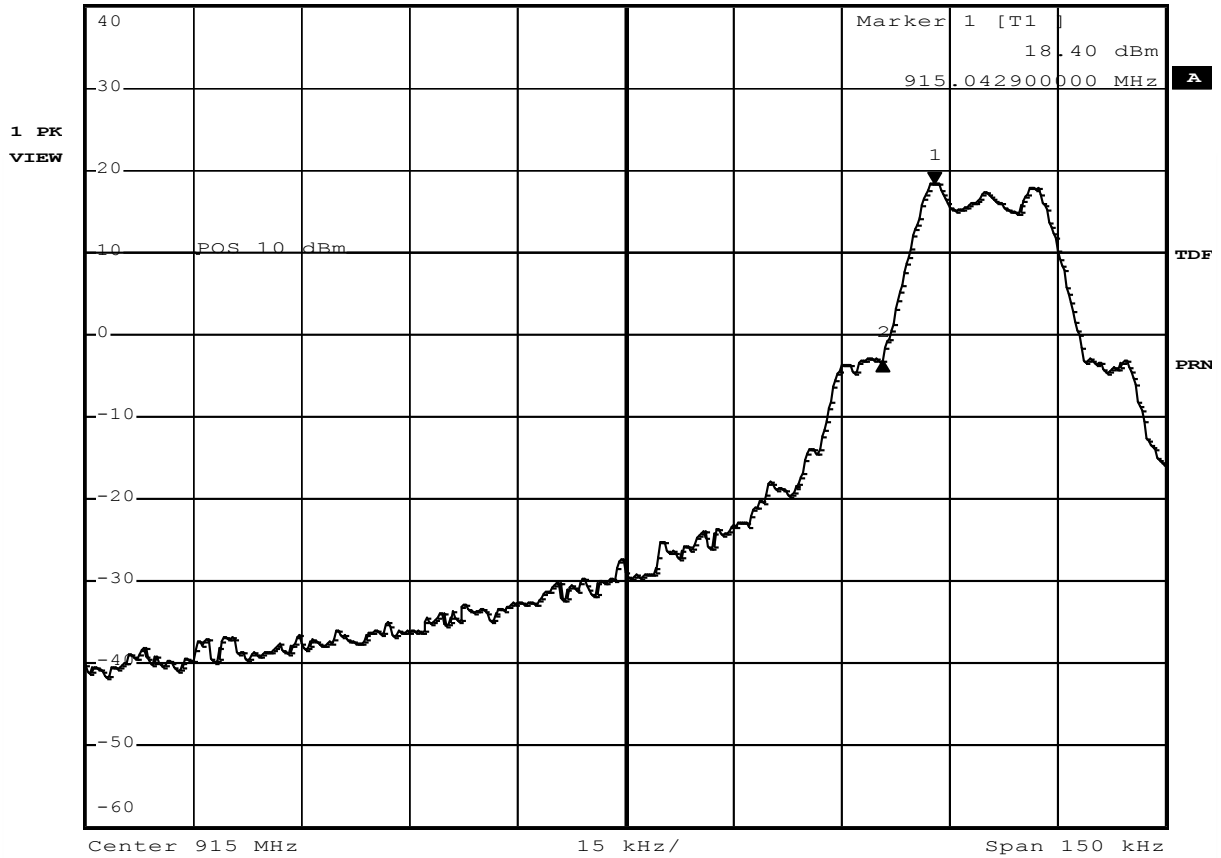


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G14026619

*RBW 3 kHz Delta 2 [T1]
VBW 10 kHz -21.64 dB
Ref 10 dBm *Att 20 dB SWT 20 ms -7.200000000 kHz

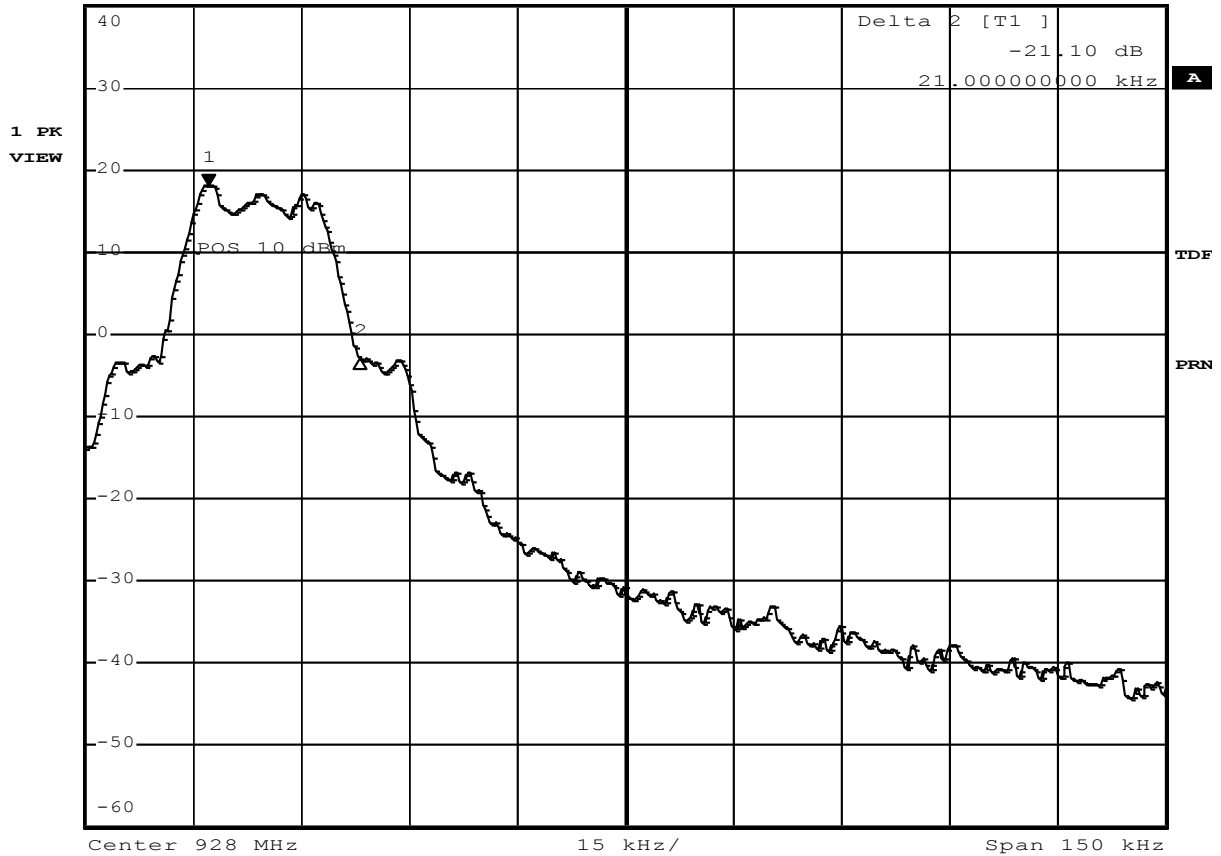


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G14026620

*RBW 3 kHz Marker 1 [T1]
VEW 10 kHz 18.19 dBm
Ref 10 dBm *Att 20 dB SWT 20 ms 927.942100000 MHz



Result: The requirements are met

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11.9 Peak Output Power – Conducted

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- DA 00-705
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

Test site:
Semi-anechoic chamber

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

CMC S164
Measurement uncertainty: See clause 7 of this test report

Test specification

Port: Antenna

Environmental conditions

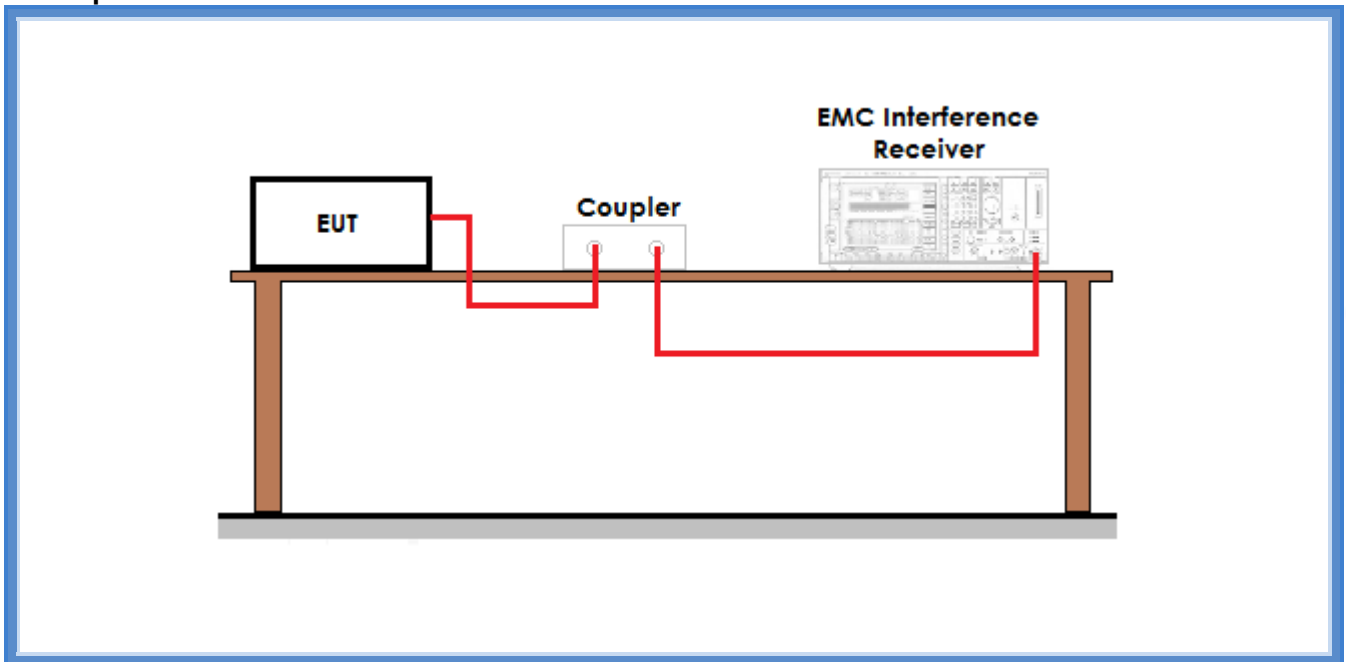
| Temperature (°C) | Atmospheric pressure (kPa) | Relative humidity (%) |
|------------------|----------------------------|-----------------------|
| 23 | 98 | 51 |

Acceptance limits:

For frequency hopping systems operating in the 902–928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0,25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels



Setup



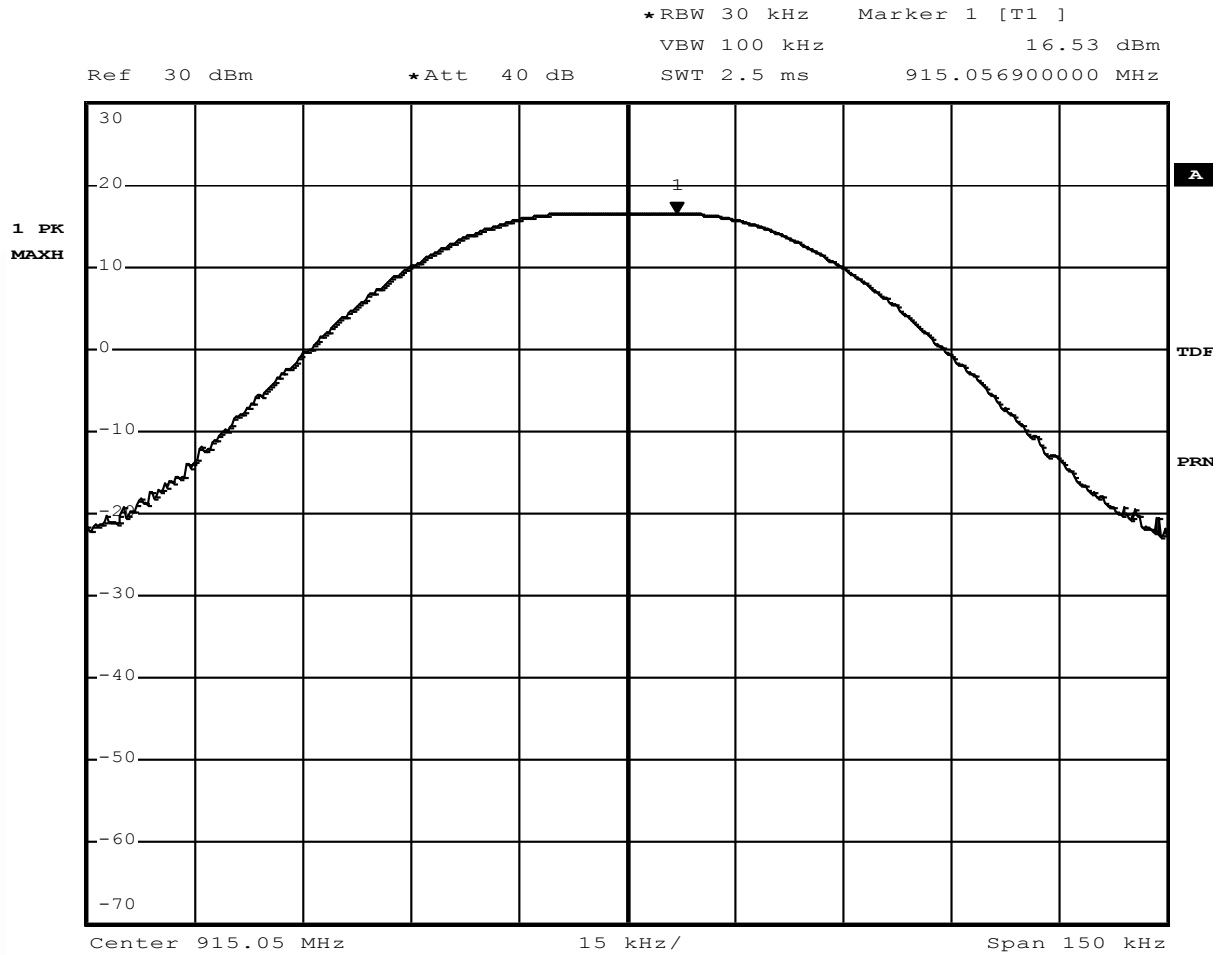
Result

| Frequency (MHz) | Graphs | Measured level (dBm) | Peak Output Power (mW) | Remarks |
|--------------------|-----------|----------------------|------------------------|---------|
| 915,050 | G14026652 | 16,53 | 45,0 | -- |
| 921,500 | G14026653 | 16,45 | 44,2 | -- |
| 927,950 | G14026654 | 16,30 | 42,7 | -- |
| Remarks: -- | | | | |



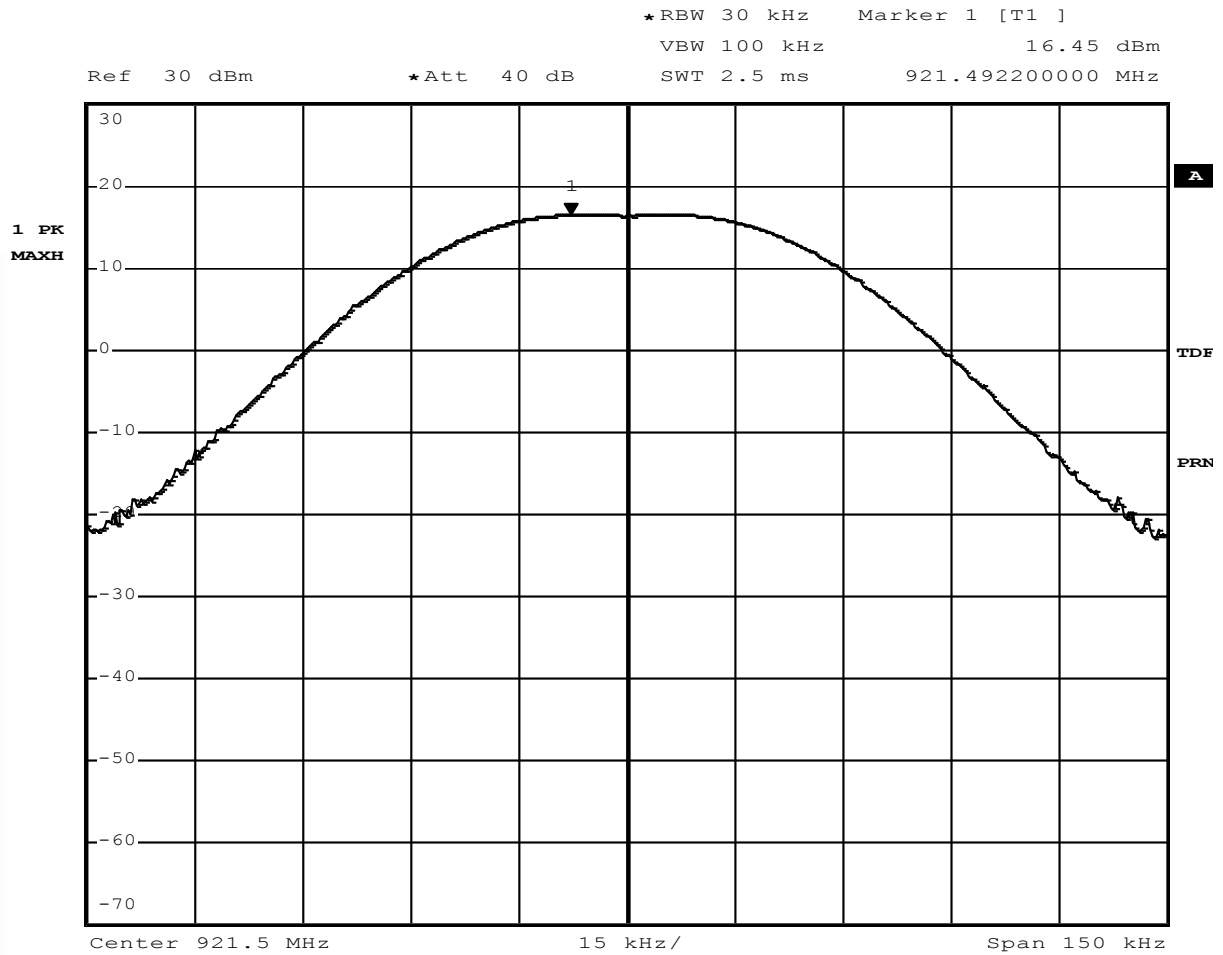
Graphs

G14026652





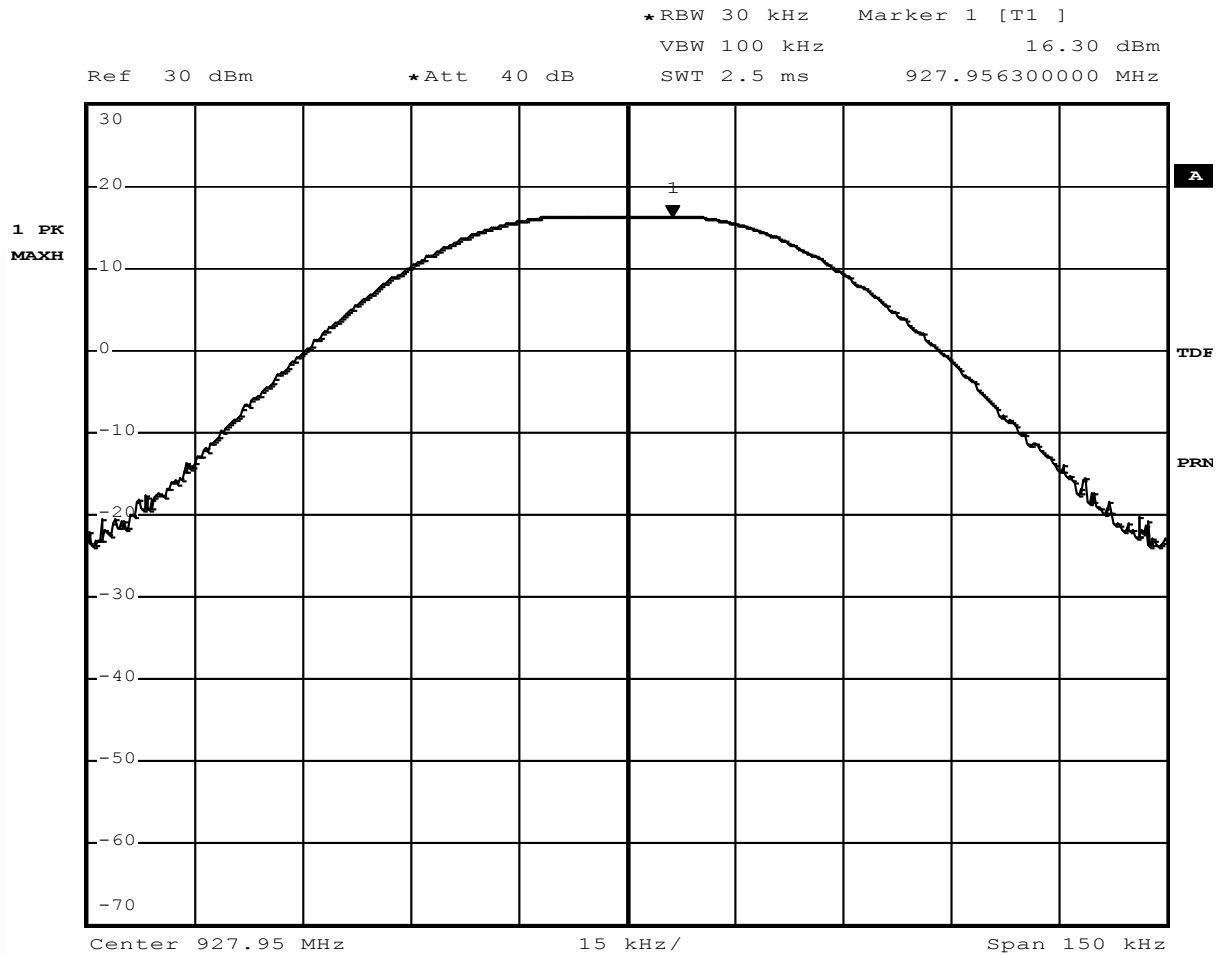
G14026653



CMC Centro Misure Compatibilità S.r.l.



G14026654



Result: The requirements are met

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11.10 Spurious Emission

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.209
- DA 00-705
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

Test site:
Semi-anechoic chamber

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

CMC S108, CMC S136, CMC S164
Measurement uncertainty: See clause 7 of this test report

Test specification

Port: Enclosure
Antenna polarization: Horizontal (H) – Vertical (V)
EUT – Antenna distance: 3 m
Detector AV + Peak

Environmental conditions

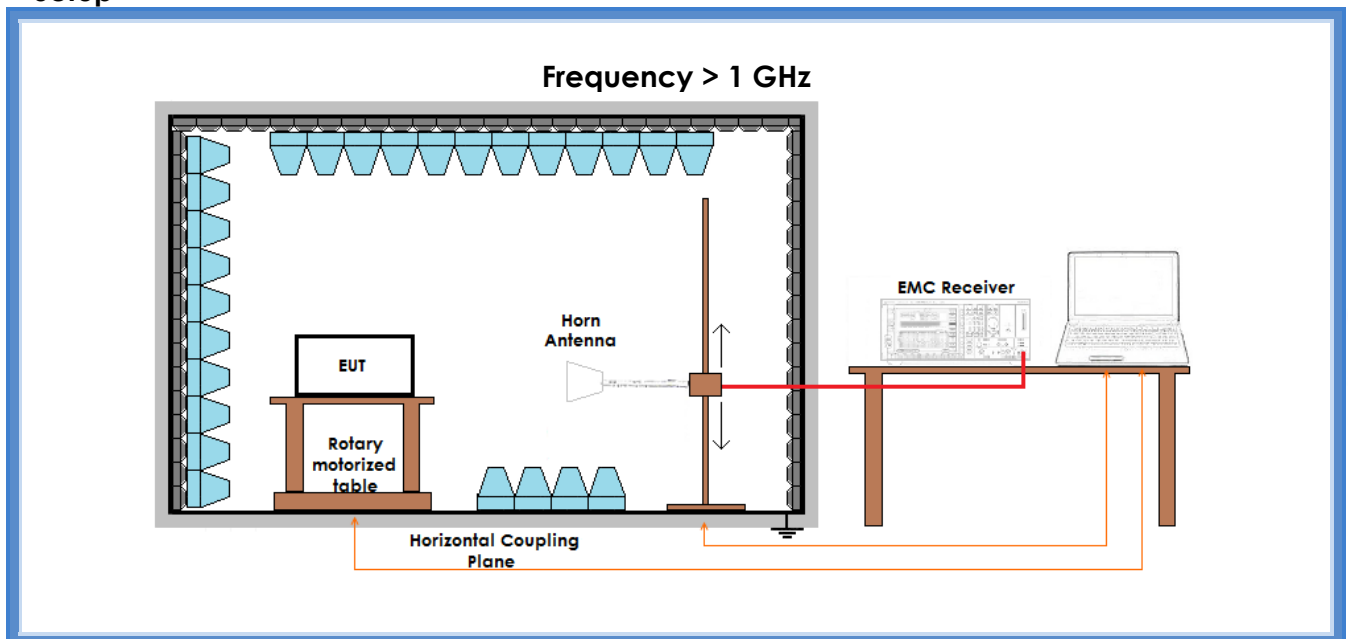
| Temperature (°C) | Atmospheric pressure (kPa) | Relative humidity (%) |
|---------------------|-------------------------------|--------------------------|
| 22 | 99 | 48 |

Acceptance limits

| Frequency (MHz) | AV limits [dB(μV/m)] | Peak limits [dB(μV/m)] |
|--------------------|-------------------------|---------------------------|
| > 1000 | 54 | 74 |



Setup



Graph:

G14026632 and G14026633



Result – AV detector

| Harmonic | Limits (dBµV/m) | Level (dBµV/m) | | | Results |
|----------|-----------------|----------------------------|----------------------------|----------------------------|----------|
| | | 915,050 MHz | 921,000 MHz | 927,950 MHz | |
| II | 54 | 39,1 | 41,4 | 41,9 | Complies |
| III | 54 | More than 15dB below limit | More than 15dB below limit | More than 15dB below limit | Complies |
| IV | 54 | 51,7 | More than 15dB below limit | More than 15dB below limit | Complies |
| V | 54 | 42,3 | More than 15dB below limit | More than 15dB below limit | Complies |
| VI | 54 | More than 15dB below limit | More than 15dB below limit | More than 15dB below limit | Complies |
| VII | 54 | More than 15dB below limit | More than 15dB below limit | More than 15dB below limit | Complies |
| VIII | 54 | More than 15dB below limit | More than 15dB below limit | More than 15dB below limit | Complies |
| IX | 54 | More than 15dB below limit | More than 15dB below limit | More than 15dB below limit | Complies |
| X | 54 | More than 15dB below limit | More than 15dB below limit | More than 15dB below limit | Complies |

Remarks:

EUT was tested in 3 orthogonal planes. The results in this table show the highest values

Result – Peak detector

| Harmonic | Limits (dBµV/m) | Level (dBµV/m) | | | Results |
|----------|-----------------|----------------------------|----------------------------|----------------------------|----------|
| | | 915,050 MHz | 921,000 MHz | 927,950 MHz | |
| II | 74 | 42,4 | 43,8 | 43,9 | Complies |
| III | 74 | More than 15dB below limit | More than 15dB below limit | More than 15dB below limit | Complies |
| IV | 74 | 53,4 | More than 15dB below limit | More than 15dB below limit | Complies |
| V | 74 | 49,1 | More than 15dB below limit | More than 15dB below limit | Complies |
| VI | 74 | More than 15dB below limit | More than 15dB below limit | More than 15dB below limit | Complies |
| VII | 74 | More than 15dB below limit | More than 15dB below limit | More than 15dB below limit | Complies |
| VIII | 74 | More than 15dB below limit | More than 15dB below limit | More than 15dB below limit | Complies |
| IX | 74 | More than 15dB below limit | More than 15dB below limit | More than 15dB below limit | Complies |
| X | 74 | More than 15dB below limit | More than 15dB below limit | More than 15dB below limit | Complies |

Remarks:

EUT was tested in 3 orthogonal planes. The results in this table show the highest values

Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.



11.11 Maximum permissible exposure

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 1.1310
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

Test site:
Laboratory

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

CMC S108, CMC S136, CMC S164
 Measurement uncertainty: See clause 7 of this test report

Test specification

Port: Antenna

| | |
|--------------------------|---|
| Acceptance limits | 902/1500 mW/cm ² = 0,60 mW/cm ² max at 20cm of distance |
|--------------------------|---|

Result

| Power Density Limit (mW/cm ²) | Output Power (mW) | Antenna Gain (G) | Power Density at 20cm (mW/cm ²) | Remarks |
|---|-------------------|------------------|---|----------|
| 0,60 | 45,0 | 1,58 (2 dBi) | 0,014 | Measured |
| Remarks: Power Density = (P x G) / (4πR ²) | | | | |

Result: The requirements are met