

TEST REPORT

Equipment under Test: CC9051

Serial Number: 9070000000281095 and 9070000000280436

FCC ID: QZ9-CC9040-51

Applicant: Bury GmbH & Co. KG

Manufacturer: Bury GmbH & Co. KG

**Test Laboratory
(CAB)
accredited by
DATech GmbH
in compliance with DIN EN ISO/IEC 17025
under the
Reg. No. DAT-P-105/99-21
and
FCC Test site registration number 90877**

TEST REPORT REFERENCE: R70695 Edition 1

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1 IDENTIFICATION

1.1 APPLICANT

Name:	Bury GmbH & Co. KG
Address:	Robert-Koch-Straße 1-7
	32584 Löhne
Country:	Germany
Name for contact purposes:	Mr. Frank UNTERKÖTTER
Tel:	(0 57 32) 97 06-246
Fax:	(0 57 32) 97 06-99
e-mail address:	unterkoetter@thb.de

1.2 MANUFACTURER

Name:	Bury GmbH & Co. KG
Address:	Robert-Koch-Straße 1-7
	32584 Löhne
Country:	Germany
Name for contact purposes:	Mr. Frank UNTERKÖTTER
Tel:	(0 57 32) 97 06-246
Fax:	(0 57 32) 97 06-99
e-mail address:	unterkoetter@thb.de

1.3 DATES

Date of receipt of test sample:	25 April 2007
Start of test:	07 May 2007
End of test:	11 May 2007

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2 TECHNICAL DATA OF EQUIPMENT

2.1 DEVICE UNDER TEST

Type:	CC9051					
Type of equipment: *	Bluetooth handsfree kit for vehicular environment					
FCC ID: *	QZ9-CC9040-51					
Rated RF output power: *	0 dBm (50 Ω)					
Antenna type: *	Integral					
Antenna gain: *	2.0 dBi					
Antenna connector: *	None					
Channel spacing: *	1 MHz					
Alignment range: *	2402 MHz to 2480 MHz					
Number of channels: *	79					
Adaptive frequency hopping: *	No					
Modulation: *	FHSS (GFSK)					
Supply Voltage (RF-unit): *	U _{nom} =	3.3 V DC	U _{min} =	3.1 V DC	U _{max} =	4.2 V DC
Temperature range: *	-25 °C to 85 °C					
Lowest internal frequency: *	App. 16 kHz					
Highest internal frequency: *	2.480 GHz (RF-unit), 16 MHz (main unit)					
Hardware designation: *	BL6820					
Software version: *	CC 9051 V04					

* declared by the applicant.

Bluetooth operates in the unlicensed ISM band at 2.4 GHz. In North America (USA and Canada) a band with a width of 83.5 MHz is available. In this band 79 RF channels spaced 1 MHz apart are defined. The channel is represented by a pseudo random hopping sequence through the 79 channels. The normally occupancy time of one frequency will be 625 μs. The ordinary hopping rate will be 1600 hops/s. All frequencies will be used equally.

For the compliance with further requirements for a Bluetooth device, please refer the "Additional declaration part according to FCC 15.247 for Bluetooth devices", which will be attached to this test report.

The following external I/O cables were used:

Identification	Connector		Lenght
	EUT	Ancillary	
Connection cable	Customised connector	-	2.3 m

*: Length during the test if no other specified.

2.2 PERIPHERY DEVICES

The following equipment was used as control unit and ancillary equipment:

- none

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3 OPERATIONAL STATES AND PHYSICAL BOUNDARIES

The EUT is intended to be used in a vehicular environment as handsfree kit for Bluetooth mobile phones. The tests were carried out with a sample with integral antenna (serial no. 9070000000281095) and another sample equipped with a temporary antenna connector (serial no. 9070000000281095). Both samples were equipped with a power supply connector for the RF-unit (this connector was not used during these tests). Both samples were equipped with an additionally UART interface for choosing the relevant operation mode as given in the table below. The test mode was adjusted with the help of a test software and laptop computer, which was connected to the UART interface of the EUT. After adjusting the test mode, the connection between the EUT and the laptop computer was terminated.

During all tests the EUT was powered with 12 V DC.

If not otherwise stated, for modulating the transmitter, a pseudo random bit sequence with a length of 128 byte and with a pattern type DH3 was used.

During the tests, the EUT was not labelled with a FCC-label.

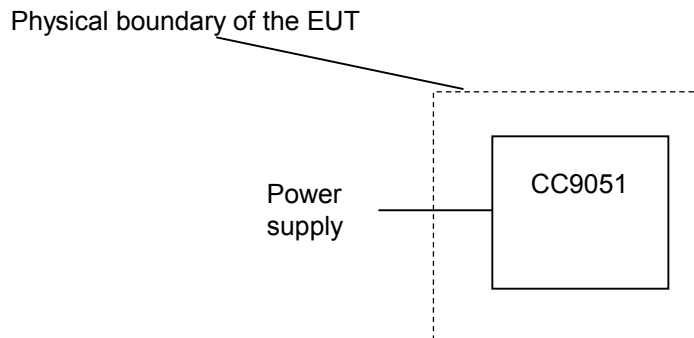
Object of this test report is the Bluetooth transceiver only. As declared by the applicant the emissions of the handsfree kit under normal conditions (handsfree mode) will be measured by the applicant and documented in a separate test report.

The following operation modes were used during the tests:

Operation mode	Description of the operation mode
1	Continuous transmitting on 2402 MHz
2	Continuous transmitting on 2441 MHz
3	Continuous transmitting on 2480 MHz
4	Transmitter hopping on all channels
5	Receiver receiving on 2441 MHz

Additionally during all operation modes the implemented remote control receiver of the EUT operates in continuous receiving mode.

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As declared by the applicant, the Bluetooth part will be implemented in identical way in the following units with the following software versions:

Type designation	Hardware designation	Software version
CC9051 M	BL6820	CC 9051M V04
CC9050	BL6820	CC 9050 V04 or CC 9050 H04 (hebrew version)
CC9050 M	BL6820	CC 9050M V04
CC9040	BL6820	CC 9040 V04
CC9040 M	BL6820	CC 9040 V04

4 LIST OF MEASUREMENTS

Application	Frequency range [MHz]	FCC 47 CFR Part 15 section	Status	Refer page
20 dB bandwidth	General	15.247 (a) (1)	Passed	8 et seq.
Carrier frequency separation	General	15.247 (a) (1)	Passed	9 et seq.
Number of hopping channels	2400.0 - 2483.5	15.247 (a) (1) (iii)	Passed	12 et seq.
Dwell time	2400.0 - 2483.5	15.247 (a) (1) (iii)	Passed	16 et seq.
Maximum peak output power	2400.0 - 2483.5	15.247 (b) (1)	Passed	20 et seq.
Band edge compliance	2400.0 - 2483.5	15.247 (d)	Passed	23 et seq.
Radiated emissions (transmitter)	0.009 - 25,000	15.205 (a) 15.209 (a)	Passed	29 et seq.

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5 TEST RESULTS

5.1 20 dB BANDWIDTH

5.1.1 METHOD OF MEASUREMENT (20 dB BANDWIDTH)

The calibration of the spectrum analyser has to be checked with the help of a known signal from a signal generator. The EUT has to be connected to the spectrum analyser via a low loss cable. If the EUT is not equipped with an antenna connector, a temporary antenna connector has to be installed. The EUT has to be switched on and the hopping function has to be disabled, the transmitter shall work with its maximum data rate.

The following spectrum analyser settings shall be used:

- Span: App. 2 to 3 times the 20 dB bandwidth, centred on the actual hopping channel.
- Resolution bandwidth: $\geq 1\%$ of the 20 dB bandwidth.
- Video bandwidth: \geq the resolution bandwidth.
- Sweep: Auto.
- Detector function: peak.
- Trace mode: Max hold.

After trace stabilisation the marker shall be set on the signal peak. The first display line has to be set on this value. The second display line has to be set 20 dB below the first line (or the peak marker). The frequency lines shall be set on the intersection points between the second display line and the measured curve.

The measurement will be performed at the upper, the lower end and the middle of the assigned frequency band.

Test set-up:

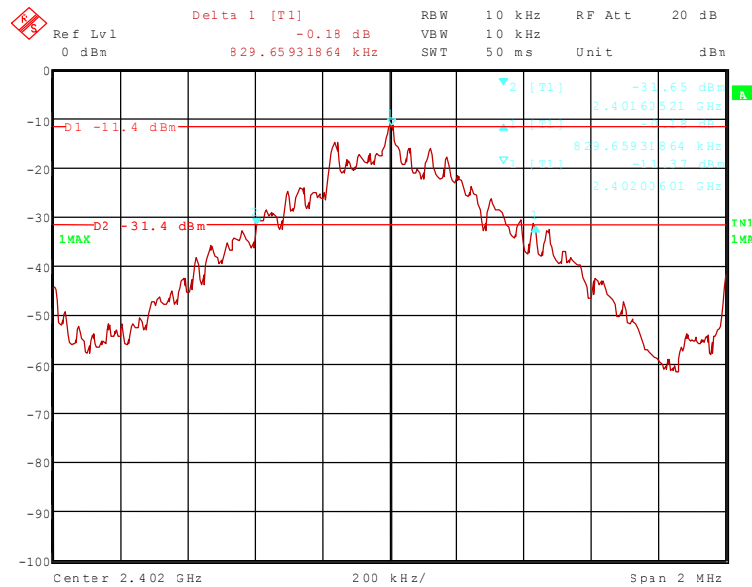


TEST REPORT REFERENCE: R70695 Edition 1

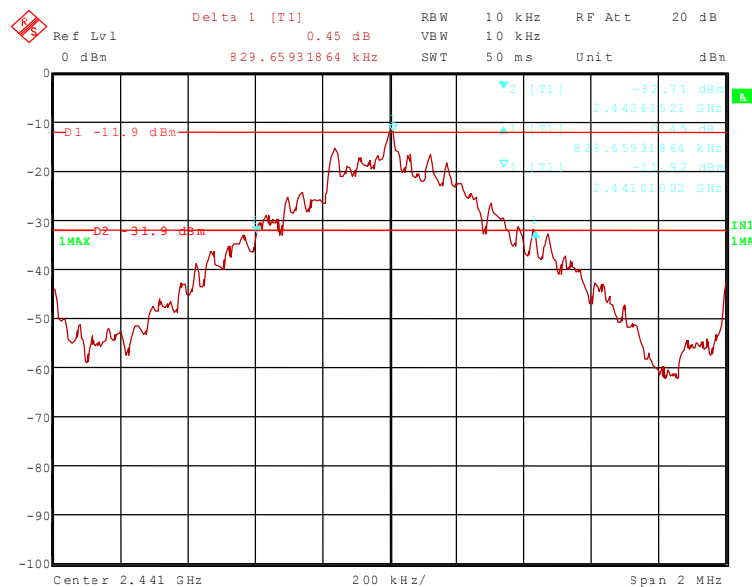
5.1.2 TEST RESULTS (20 dB BANDWIDTH)

Ambient temperature	21 °C	Relative humidity	50 %
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70695_48.wmf: (20 dB bandwidth at the lower end of the assigned frequency band):

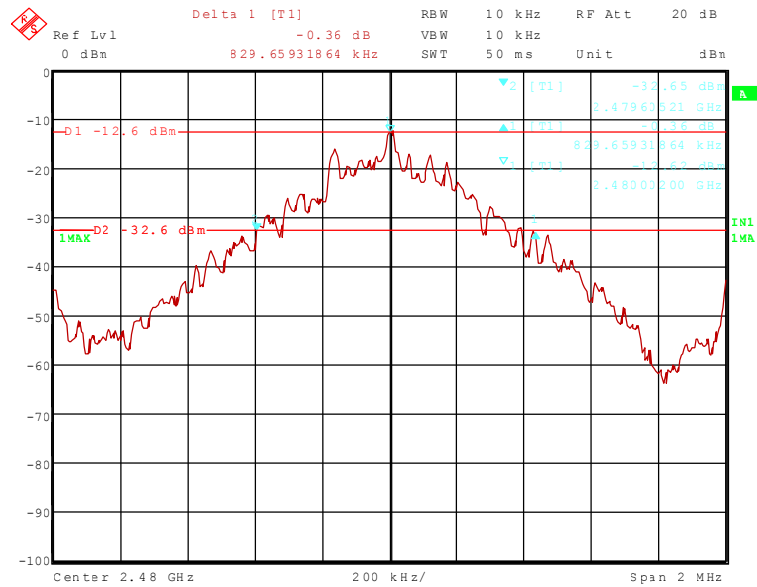


70695_49.wmf: (20 dB bandwidth at the middle of the assigned frequency band):



TEST REPORT REFERENCE: R70695 Edition 1

70695_50.wmf: (20 dB bandwidth at the upper end of the assigned frequency band):



Channel number	Channel frequency [MHz]	20 dB bandwidth [kHz]
0	2402	829.659
39	2441	829.659
78	2480	829.659
Measurement uncertainty		+0.66 dB / -0.72 dB

TEST EQUIPMENT USED FOR THE TEST:

31, 46, 54

TEST REPORT REFERENCE: R70695 Edition 1

5.2 CARRIER FREQUENCY SEPARATION

5.2.1 METHOD OF MEASUREMENT (CARRIER FREQUENCY SEPARATION)

The calibration of the spectrum analyser has to be checked with the help of a known signal from a signal generator. The EUT has to be connected to the spectrum analyser via a low loss cable. If the EUT is not equipped with an antenna connector, a temporary antenna connector has to be installed. The EUT has to be switched on and the hopping function has to be enabled.

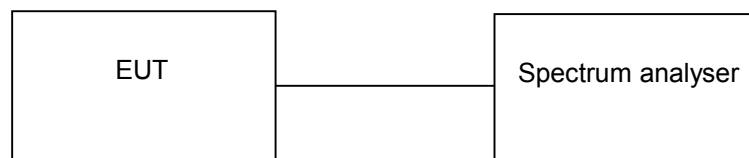
The following spectrum analyser settings shall be used:

- Span: Wide enough to capture the peaks of two adjacent channels.
- Resolution bandwidth: $\geq 1\%$ of the span.
- Video bandwidth: \geq the resolution bandwidth.
- Sweep: Auto.
- Detector function: peak.
- Trace mode: Max hold.

After trace stabilisation the marker and the delta marker function will be used to determine the separation between the peaks of two adjacent channel signals.

The measurement will be performed at the upper, the lower end and the middle of the assigned frequency band.

Test set-up:

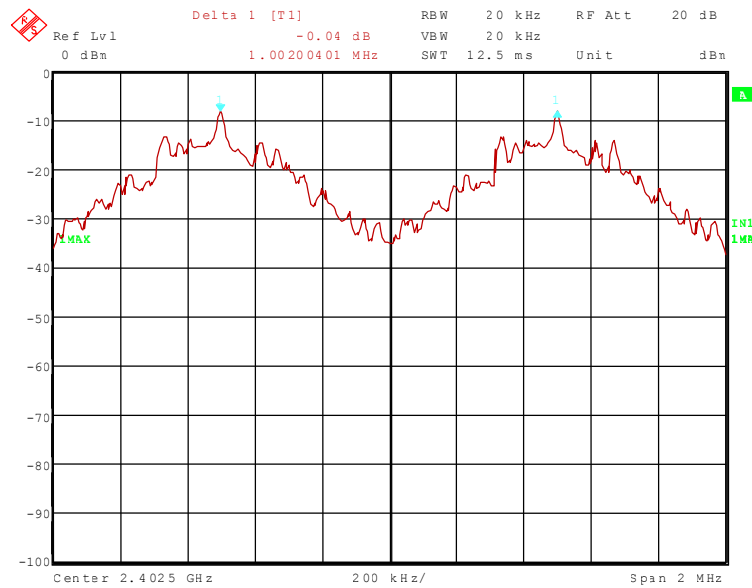


TEST REPORT REFERENCE: R70695 Edition 1

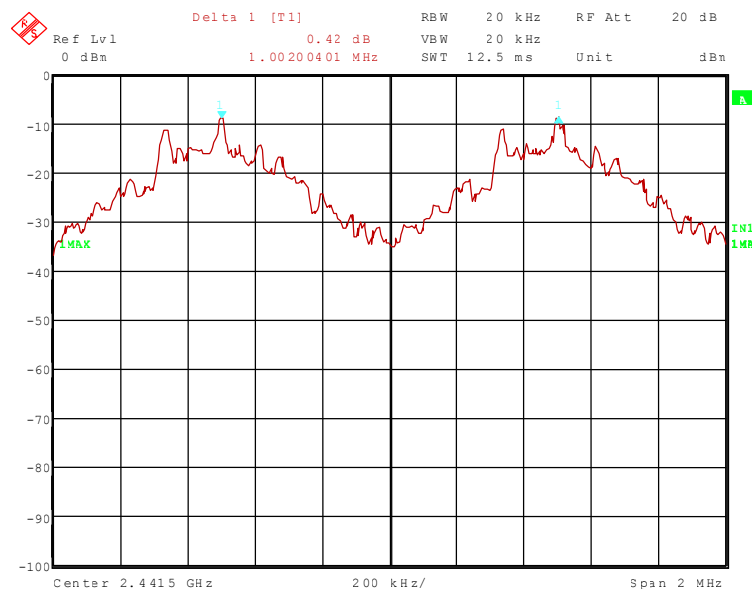
5.2.2 TEST RESULTS (CARRIER FREQUENCY SEPARATION)

Ambient temperature	21 °C	Relative humidity	50 %
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70695_53.wmf: (channel separation at the lower end of the assigned frequency band):

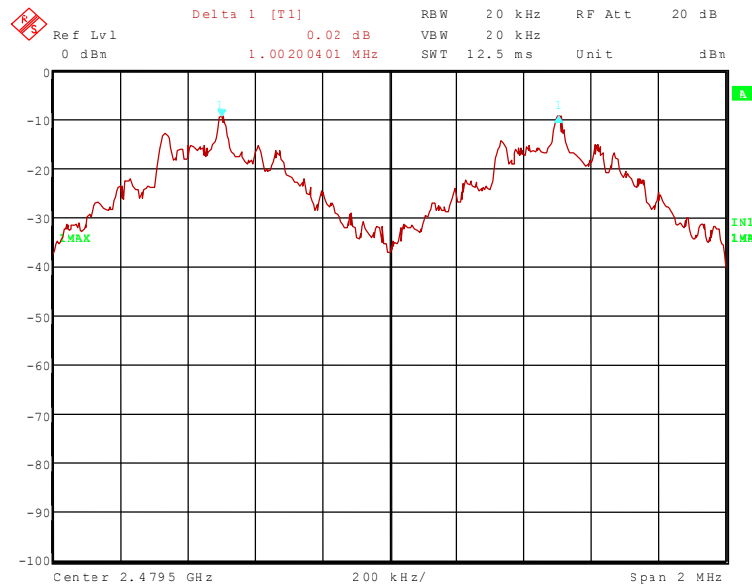


70695_52.wmf: (channel separation at the middle of the assigned frequency band):



TEST REPORT REFERENCE: R70695 Edition 1

70695_51.wmf: (channel separation at the upper end of the assigned frequency band):



Channel number	Channel frequency [MHz]	Channel separation [kHz]	Minimum limit [kHz]
0	2402	1002.004	829.659 (20 dB bandwidth)
39	2441	1002.004	829.659 (20 dB bandwidth)
78	2480	1002.004	829.659 (20 dB bandwidth)
Measurement uncertainty			$<10^{-7}$

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

31, 46, 54

TEST REPORT REFERENCE: R70695 Edition 1

5.3 NUMBER OF HOPPING FREQUENCIES

5.3.1 METHOD OF MEASUREMENT (NUMBER OF HOPPING FREQUENCIES)

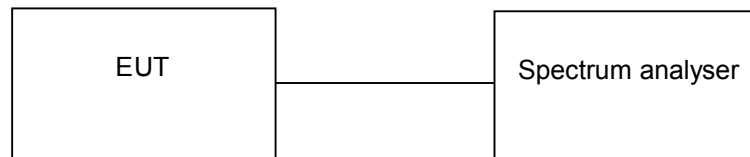
The calibration of the spectrum analyser has to be checked with the help of a known signal from a signal generator. The EUT has to be connected to the spectrum analyser via a low loss cable. If the EUT is not equipped with an antenna connector, a temporary antenna connector has to be installed. The EUT has to be switched on and the hopping function has to be enabled.

The following spectrum analyser settings shall be used:

- Span: Equal to the assigned frequency band.
- Resolution bandwidth: ≥ 1 % of the span.
- Video bandwidth: \geq the resolution bandwidth.
- Sweep: Auto.
- Detector function: Peak.
- Trace mode: Max hold.

After trace stabilisation the number of hopping channels could be counted. It might be possible to divide the span into some sub ranges in order to clearly show all hopping frequencies.

Test set-up:

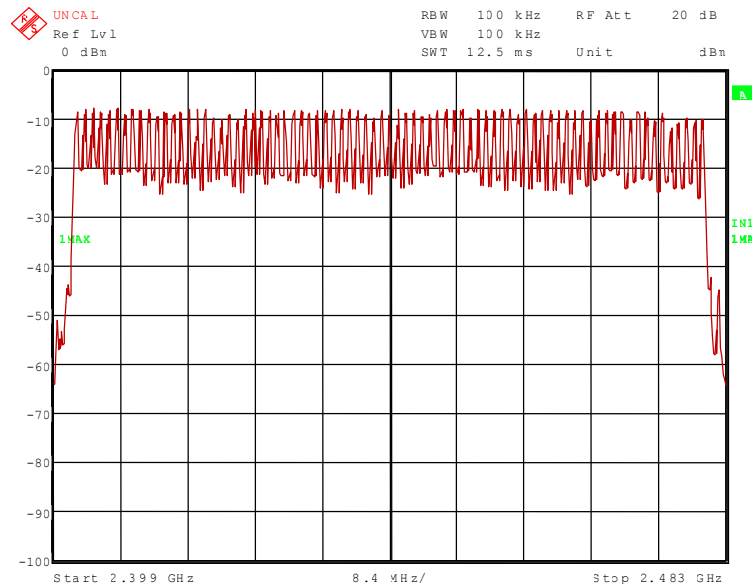


TEST REPORT REFERENCE: R70695 Edition 1

5.3.2 TEST RESULTS (NUMBER OF HOPPING FREQUENCIES)

Ambient temperature	21 °C	Relative humidity	50 %
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70695_55.wmf (number of hopping channels):



Number of hopping channels	Limit
79	At least 15

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

31, 46, 54

TEST REPORT REFERENCE: R70695 Edition 1

5.4 DWELL TIME

5.4.1 METHOD OF MEASUREMENT (DWELL TIME)

The calibration of the spectrum analyser has to be checked with the help of a known signal from a signal generator. The EUT has to be connected to the spectrum analyser via a low loss cable. If the EUT is not equipped with an antenna connector, a temporary antenna connector has to be installed. The EUT has to be switched on and the hopping function has to be enabled.

The following spectrum analyser settings shall be used:

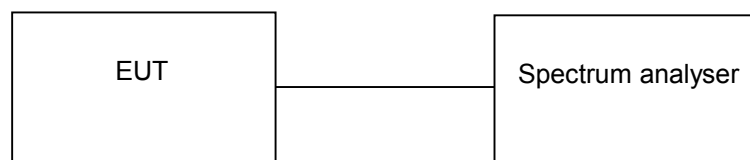
- Span: Zero, centred on a hopping channel.
- Resolution bandwidth: 1 MHz.
- Video bandwidth: \geq the resolution bandwidth.
- Sweep: As necessary to capture the entire dwell time per hopping channel.
- Detector function: peak.
- Trace mode: Max hold.

The marker and delta marker function of the spectrum analyser will be used to determine the dwell time.

The measurement will be performed at the upper and lower end and the middle of the assigned frequency band.

If the EUT is possible to operate with different mode of operation (data rates, modulation formats etc.) the test will be repeated with every different operation mode of the EUT.

Test set-up:

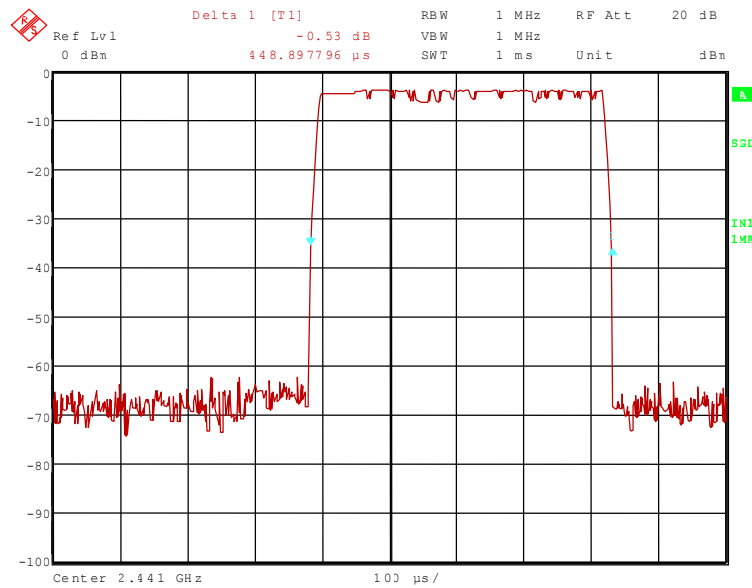


TEST REPORT REFERENCE: R70695 Edition 1

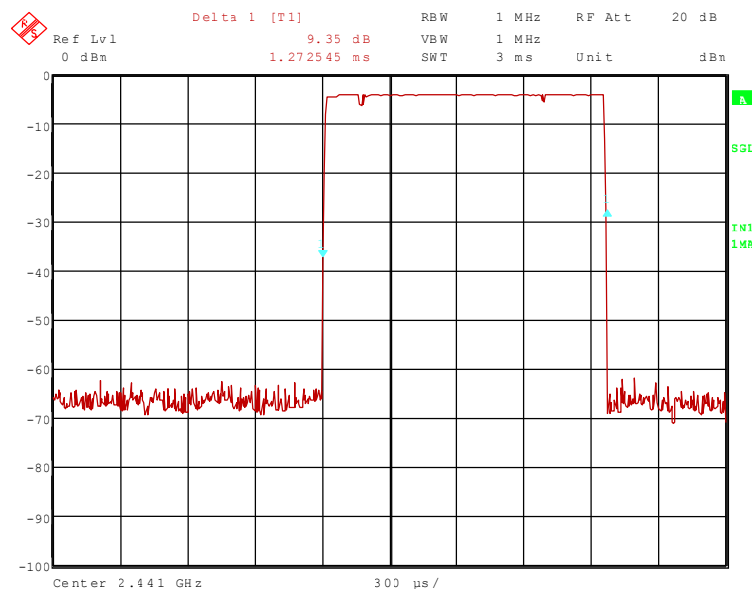
5.4.2 TEST RESULTS (DWEELL TIME)

Ambient temperature	21 °C	Relative humidity	50 %
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70695_56.wmf: Dwell time at the middle of the assigned frequency band), hopping mode DH1:

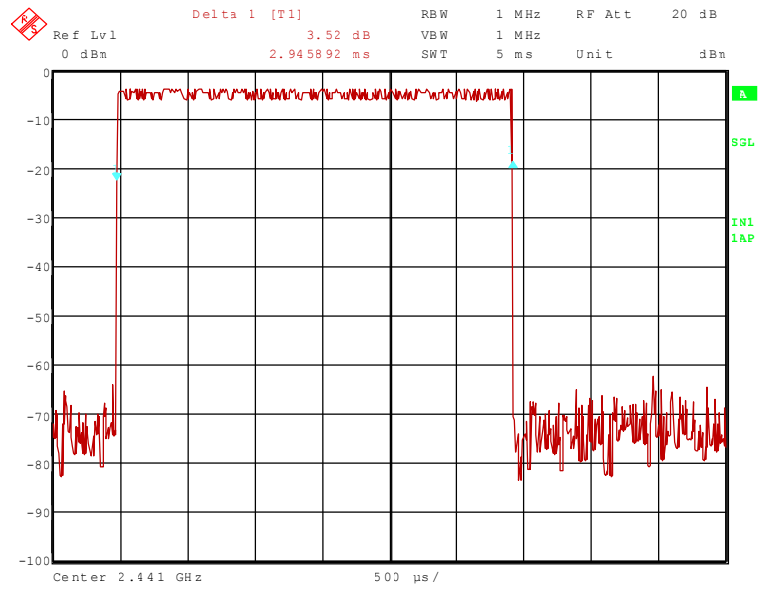


70695_57.wmf: Dwell time at the middle of the assigned frequency band), hopping mode DH3:



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70695_58.wmf: Dwell time at the middle of the assigned frequency band), hopping mode DH5:



Continued next page

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The dwell time is calculated with the following formula:

Dwell time = $t_{\text{pulse}} \times n_{\text{hops}} / \text{number of hopping channels} \times 31.6$ (equal to 0.4 s x number of hopping channels)

Where:

t_{pulse} is the measured pulse time (pls. refer the plots of the spectrum analyser above) [s],
 n_{hops} is the number of hops per second in the actual operating mode of the transmitter [1/s].

The hopping rate of the system is 1600 hops per second and the system uses 79 channels. For this reason one time slot has a length of 625 μs .

With the used hopping mode (DH1) a packet need 1 timeslot for transmitting and the next timeslot for receiving. So the system makes in worst case 800 hops per second in transmit mode ($n_{\text{hops}} = 800$ 1/s).

With the used hopping mode (DH3) a packet need 3 timeslots for transmitting and the next timeslot for receiving. So the system makes in worst case 400 hops per second in transmit mode ($n_{\text{hops}} = 400$ 1/s).

With the used hopping mode (DH5) a packet need 5 timeslots for transmitting and the next timeslot for receiving. So the system makes in worst case 266.667 hops per second in transmit mode ($n_{\text{hops}} = 266.667$ 1/s).

Hopping mode DH1				
Channel number	Channel frequency [MHz]	t_{pulse} [μs]	Dwell time [ms]	Limit [ms]
39	2441	448.898	143.647	400
Hopping mode DH3				
Channel number	Channel frequency [MHz]	t_{pulse} [ms]	Dwell time [ms]	Limit [ms]
39	2441	1.273	203.680	400
Hopping mode DH5				
Channel number	Channel frequency [MHz]	t_{pulse} [ms]	Dwell time [ms]	Limit [ms]
39	2441	2.946	314.240	400
Measurement uncertainty			<10 ⁻⁷	

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:
31, 46, 54

TEST REPORT REFERENCE: R70695 Edition 1

5.5 MAXIMUM PEAK OUTPUT POWER

5.5.1 METHOD OF MEASUREMENT (MAXIMUM PEAK OUTPUT POWER)

The calibration of the spectrum analyser has to be checked with the help of a known signal from a signal generator. The EUT has to be connected to the spectrum analyser via a low loss cable. If the EUT is not equipped with an antenna connector, a temporary antenna connector has to be installed. The EUT has to be switched on and the hopping function has to be disabled.

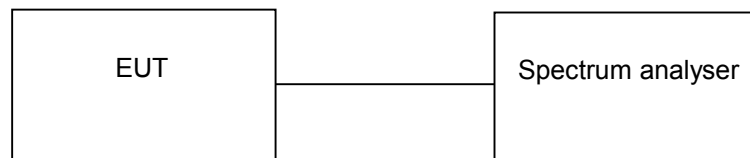
The following spectrum analyser settings shall be used:

- Span: Approx. 5 times the 20 dB bandwidth, centred on a hopping channel.
- Resolution bandwidth: > the 20 dB bandwidth of the emission being measured.
- Video bandwidth: \geq the resolution bandwidth.
- Sweep: Auto.
- Detector function: peak.
- Trace mode: Max hold.

After trace stabilisation the marker shall be set on the signal peak. The indicated level is the peak output power, which has to be corrected with the value of the cable loss and an external attenuation (if necessary).

The measurement will be performed at the upper and lower end and the middle of the assigned frequency band.

Test set-up:

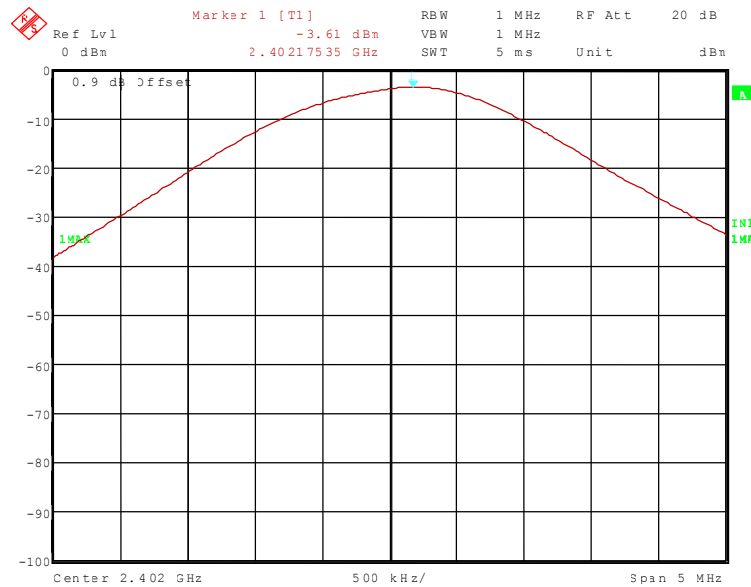


TEST REPORT REFERENCE: R70695 Edition 1

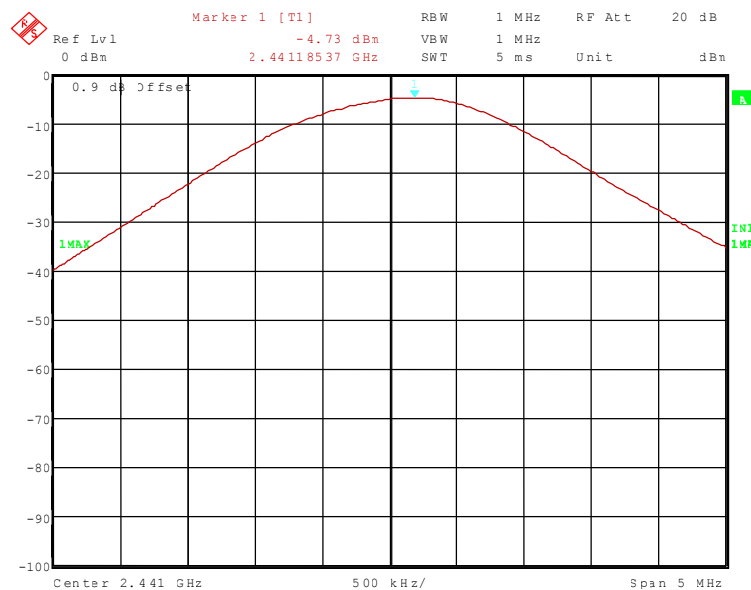
5.5.2 TEST RESULTS (MAXIMUM PEAK OUTPUT POWER)

Ambient temperature	21 °C	Relative humidity	50 %
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70695_41.wmf (maximum peak output power at the lower end of the assigned frequency band):

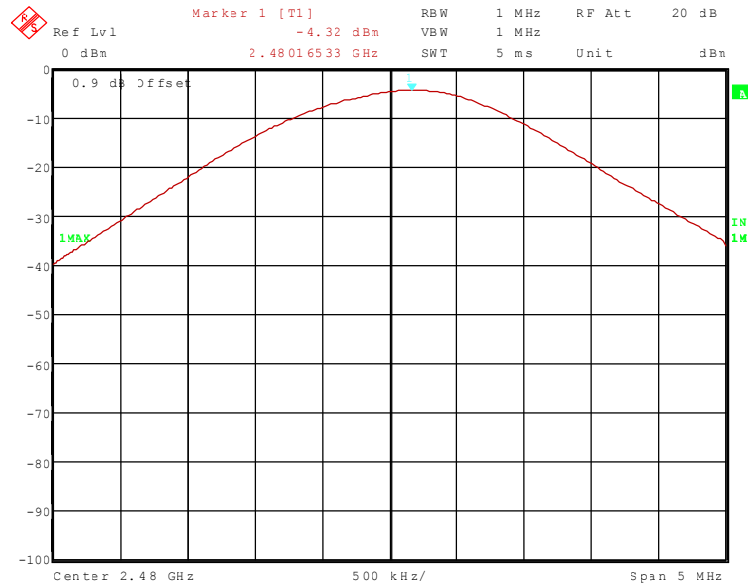


70695_42.wmf (maximum peak output power at the middle of the assigned frequency band):



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70695_43.wmf (maximum peak output power at the upper end of the assigned frequency band):



Channel number	Channel frequency [MHz]	Maximum peak output power [dBm]	Antenna gain [dBi]	Peak power limit [dBm]
0	2402	-3.6	2.0	30.0
39	2441	-4.7	2.0	30.0
78	2480	-4.3	2.0	30.0
Measurement uncertainty				+0.66 dB / -0.72 dB

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

31, 46, 54

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5.6 BAND-EDGE COMPLIANCE

5.6.1 METHOD OF MEASUREMENT (BAND-EDGE COMPLIANCE (CONDUCTED))

The calibration of the spectrum analyser has to be checked with the help of a known signal from a signal generator. The EUT has to be connected to the spectrum analyser via a low loss cable. If the EUT is not equipped with an antenna connector, a temporary antenna connector has to be installed. The EUT has to be switched on and the hopping function has to be disabled.

The following spectrum analyser settings shall be used:

- Span: Wide enough to capture the peak level of the emission on the channel closest to the band-edge, as well as any modulation products, which fall outside the assigned frequency band.
- Resolution bandwidth: $\geq 1\%$ of the span, but not below 30 kHz.
- Video bandwidth: \geq the resolution bandwidth.
- Sweep: Auto.
- Detector function: Peak.
- Trace mode: Max hold.

After trace stabilisation the marker shall be set on the signal peak. The first display line has to be set on this value. The second display line has to be set 20 dB below the first line (or the peak marker). The frequency line shall be set on the edge of the assigned frequency band. Set the second marker on the emission at the band-edge, or on the highest modulation product outside of the band, if this level is higher than that at the band-edge. After this the difference between this emission level and the signal peak will be calculated. With the value of measured field strength of the signal peak and the calculated difference to the emission level, the level of the field strength of the emission will be calculated.

The measurement will be performed at the upper and lower end of the assigned frequency band and with hopping on and off.

Test set-up:



5.6.2 METHOD OF MEASUREMENT (BAND-EDGE COMPLIANCE (RADIATED))

The same test set-up as used for the final radiated emission measurement shall be used (refer also subclause 5.8.1 of this test report). The measurements shall be carried out with using a resolution bandwidth of 100 kHz.

After trace stabilisation the marker shall be set on the signal peak. The first display line has to be set on this value. The second display line has to be set 20 dB below the first line (or the peak marker). The frequency line shall be set on the edge of the assigned frequency band. Set the second marker on the emission at the band-edge, or on the highest modulation product outside of the band, if this level is higher than that at the band-edge. This frequency shall be measured with the EMI receiver as described in subclause 5.8.1 of this test report, but 100 kHz resolution bandwidth shall be used.

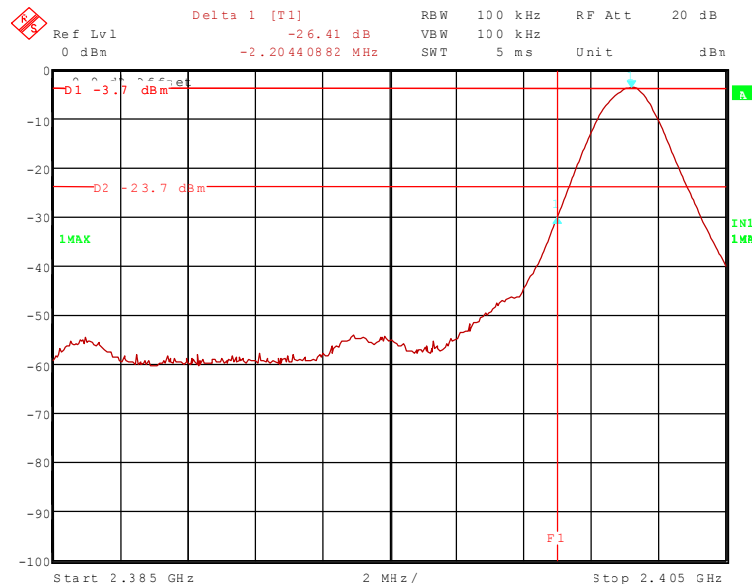
The measurement will be performed at the upper end of the assigned frequency band and with hopping on and off.

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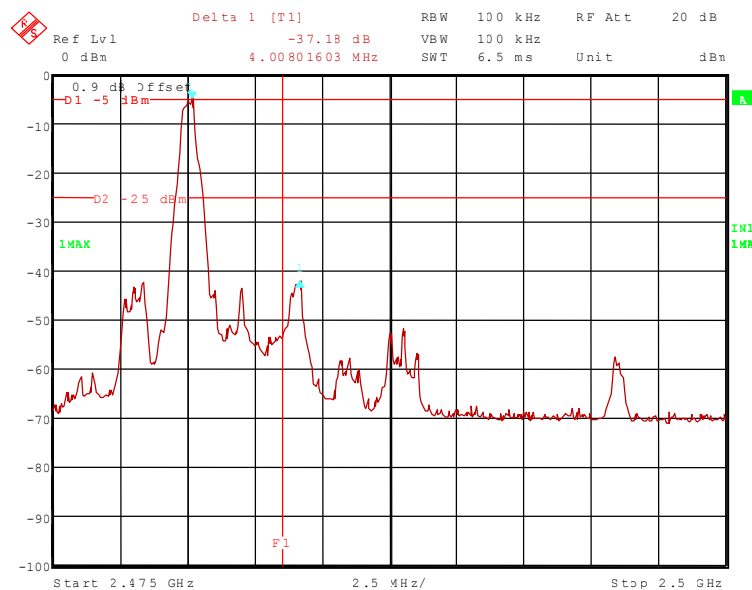
5.6.3 TEST RESULT (BAND-EDGE COMPLIANCE (CONDUCTED))

Ambient temperature	21 °C	Relative humidity	50 %
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70695_44.wmf (band-edge compliance, lower band edge, hopping off):

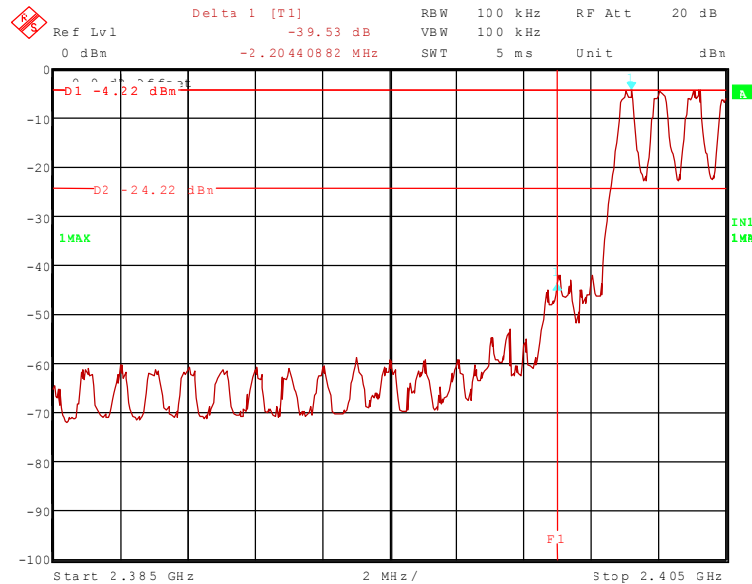


70695_47.wmf (band-edge compliance, upper band edge, hopping off):

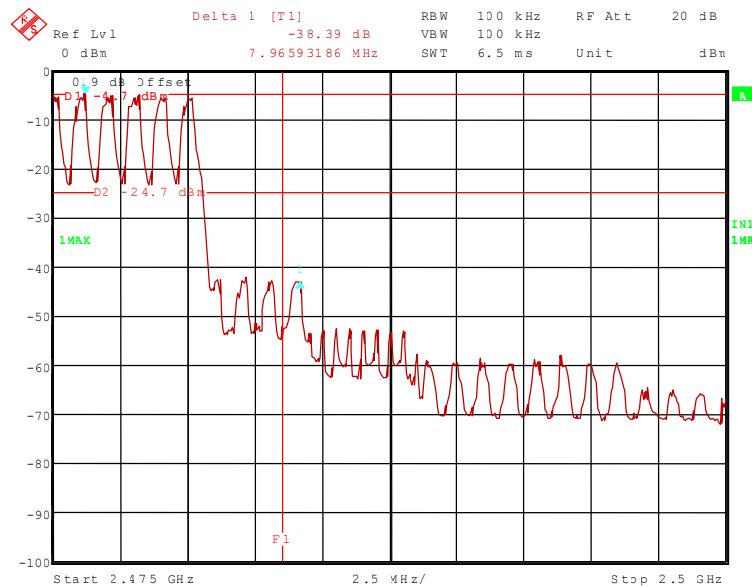


TEST REPORT REFERENCE: R70695 Edition 1

70695_45.wmf (band-edge compliance, lower band edge, hopping on):



70695_46.wmf (band-edge compliance, upper band edge, hopping on):



TEST REPORT REFERENCE: R70695 Edition 1

The plots on the two pages before are showing the band-edge compliance for the upper and lower band-edge, with and without hopping. The display line 1 (D1) in these plots represents the highest level within the assigned frequency band. The display line 2 (D2) represents the 20 dB offset to this highest level and shows the compliance with FCC 47 CFR Part 15.247 (d). The frequency line 1 (F1) shows the edge of the assigned frequency.

Band-edge compliance (hopping disabled)				
Band-edge	Difference to the signal peak [dB]	Field strength of this signal peak [dB μ V/m]	Field strength at the band edge [dB μ V/m]	Limit [dB μ V/m]
Upper	37.2	88.8	51.6	54.0
Lower	26.4	87.3	60.9	67.3
Measurement uncertainty			+2.2 dB / -3.6 dB	

Band-edge compliance (hopping enabled)				
Band-edge	Difference to the signal peak [dB]	Field strength of this signal peak [dB μ V/m]	Field strength at the band edge [dB μ V/m]	Limit [dB μ V/m]
Upper	38.4	88.8	50.4	54.0
Lower	39.5	87.3	47.8	67.3
Measurement uncertainty			+2.2 dB / -3.6 dB	

Test: Passed

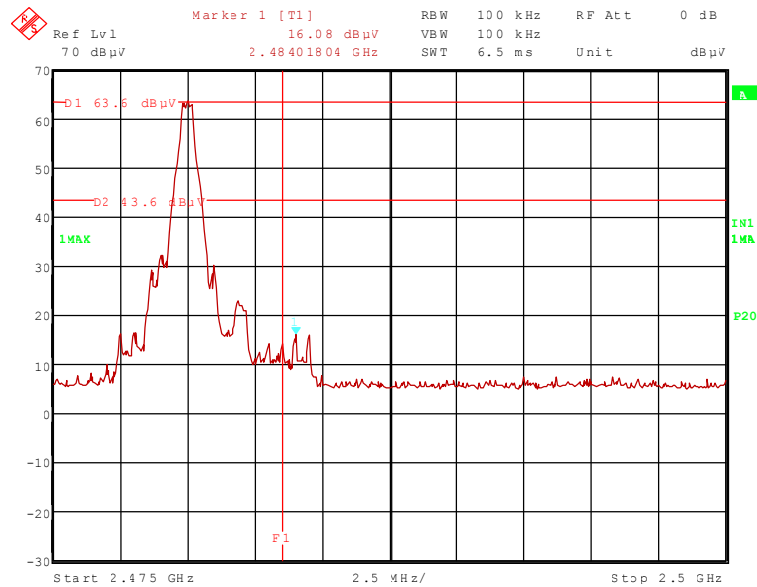
TEST EQUIPMENT USED FOR THE TEST:
31, 46, 54

TEST REPORT REFERENCE: R70695 Edition 1

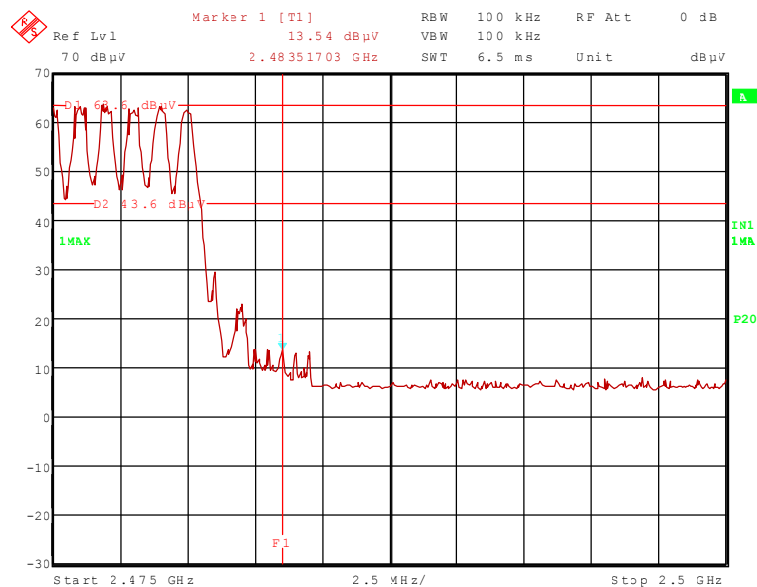
5.6.4 TEST RESULT (BAND-EDGE COMPLIANCE (RADIATED))

Ambient temperature	21 °C	Relative humidity	45 %
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70695_39.wmf (radiated band-edge compliance, upper band edge, hopping off):



70695_40.wmf (radiated band-edge compliance, upper band edge, hopping on):



TEST REPORT REFERENCE: R70695 Edition 1

The plots on the page before are showing the radiated band-edge compliance for the upper band-edge, with and without hopping. The display line 1 (D1) in these plots represents the highest level within the assigned frequency band. The display line 2 (D2) represents the 20 dB offset to this highest level and shows the compliance with FCC 47 CFR Part 15.247 (d). The frequency line 1 (F1) shows the edge of the assigned frequency.

Band-edge compliance (hopping disabled)										
Result measured with the peak detector:										
Frequency GHz	Corr. value dB μ V/m	Limit dB μ V/m	Margin dB	Readings dB μ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band
2.480	96.2	-	-	64.7	28.7	0.0	2.8	150	Hor.	-
2.484	48.5	74.0	25.5	17.0	28.7	0.0	2.8	150	Hor.	Yes
Result measured with the average detector:										
Frequency GHz	Corr. value dB μ V/m	Limit dB μ V/m	Margin dB	Readings dB μ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band
2.480	86.0	-	-	54.5	28.7	0.0	2.8	150	Hor.	-
2.484	30.4	54.0	23.6	-1.1	28.7	0.0	2.8	150	Hor.	Yes
Measurement uncertainty							+2.2 dB / -3.6 dB			

Band-edge compliance (hopping enabled)										
Result measured with the peak detector:										
Frequency GHz	Corr. value dB μ V/m	Limit dB μ V/m	Margin dB	Readings dB μ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band
2.480	96.2	-	-	64.7	28.7	0.0	2.8	150	Hor.	-
2.4835	47.3	74.0	26.7	15.8	28.7	0.0	2.8	150	Hor.	Yes
Result measured with the average detector:										
Frequency GHz	Corr. value dB μ V/m	Limit dB μ V/m	Margin dB	Readings dB μ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band
2.480	86.0	-	-	54.5	28.7	0.0	2.8	150	Hor.	-
2.4835	25.8	54.0	28.2	-5.7	28.7	0.0	2.8	150	Hor.	Yes
Measurement uncertainty							+2.2 dB / -3.6 dB			

TEST EQUIPMENT USED FOR THE TEST:

29, 31 – 35, 43, 54

TEST REPORT REFERENCE: R70695 Edition 1

5.7 RADIATED EMISSIONS

5.7.1 METHOD OF MEASUREMENT (RADIATED EMISSIONS)

The radiated emission measurement is subdivided into four stages.

- A preliminary measurement carried out in a fully anechoic chamber with a fixed antenna height in the frequency range 9 kHz to 1 GHz.
- A final measurement carried out on an outdoor test side without reflecting ground plane and a fixed antenna height in the frequency range 9 kHz to 30 MHz.
- A final measurement carried out on an open area test side with reflecting ground plane and various antenna height in the frequency range 30 MHz to 1 GHz.
- A final measurement carried out in a fully anechoic chamber with a fixed antenna height in the frequency range 1 GHz to 25 GHz.

All measurements will be carried out with the EUT working on the middle and upper and lower edge of the assigned frequency band. For this reason the hopping function of the EUT has to be disabled.

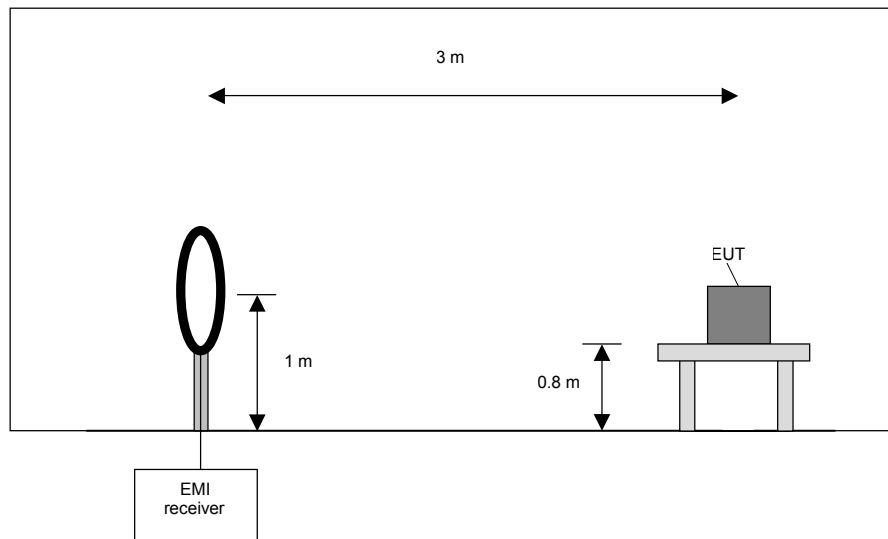
Preliminary measurement (9 kHz to 30 MHz):

In the first stage a preliminary measurement will be performed in a shielded room with a measuring distance of 3 meters. Tabletop devices will set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm. Floor-standing devices will be placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2003 [1].

The frequency range 9 kHz to 30 MHz will be monitored with a spectrum analyser while the system and its cables will be manipulated to find out the configuration with the maximum emission levels if applicable. The EMI Receiver will be set to MAX Hold mode. The EUT and the measuring antenna will be rotated around their vertical axis to found the maximum emissions.

The resolution bandwidth of the spectrum analyser will be set to the following values:

Frequency range	Resolution bandwidth
9 kHz to 150 kHz	200 Hz
150 kHz to 30 MHz	10 kHz



TEST REPORT REFERENCE: R70695 Edition 1

Preliminary measurement procedure:

Prescans were performed in the frequency range 9 kHz to 150 kHz and 150 kHz to 30 MHz.

The following procedure will be used:

- 1) Monitor the frequency range at horizontal polarisation and a EUT azimuth of 0 °.
- 2) Manipulate the system cables within the range to produce the maximum level of emission.
- 3) Rotate the EUT by 360 ° to maximize the detected signals.
- 4) Make a hardcopy of the spectrum.
- 5) Measure the frequencies of highest detected emission with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
- 6) Repeat steps 1) to 5) with the other orthogonal axes of the EUT (because of EUT is a module and might be used in a handheld equipment application).
- 7) Rotate the measuring antenna and repeat steps 1) to 5).

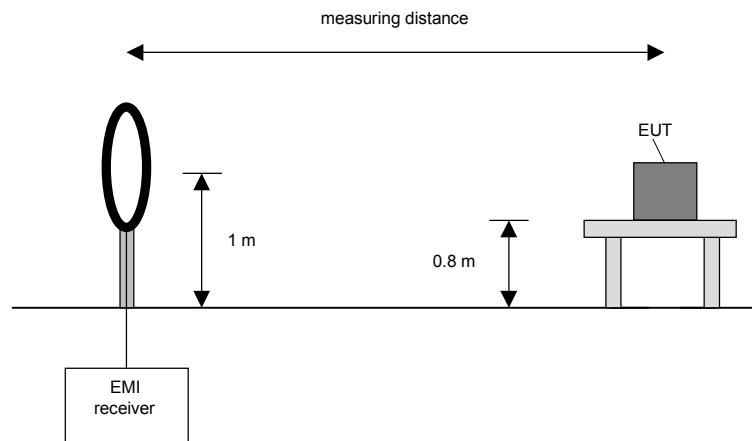
Final measurement (9 kHz to 30 MHz):

In the second stage a final measurement will be performed on an open area test site with no conducting ground plane in a measuring distances of 3 m, 10 m and 30 m. In the case where larger measuring distances are required the results will be extrapolated based on the values measured on the closer distances according to Section 15.31 (f) (2) [2]. The final measurement will be performed with a EMI Receiver set to Quasi Peak detector except for the frequency bands 9 kHz to 90 kHz and 110 kHz to 490 kHz where an average detector will be used according Section 15.209 (d) [2].

On the during the preliminary measurement detected frequencies the final measurement will be performed while rotating the EUT and the measuring antenna in the range of 0 ° to 360 ° around their vertical axis until the maximum value is found.

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
9 kHz to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz



TEST REPORT REFERENCE: R70695 Edition 1

Final measurement procedure:

The following procedure will be used:

- 1) Monitor the frequency range with the measuring antenna at vertical orientation parallel to the EUT at an azimuth of 0 °.
- 2) Rotate the EUT by 360 ° to maximize the detected signals and note the azimuth and orientation.
- 3) Rotate the measuring antenna to find the maximum and note the value.
- 4) Rotate the measuring antenna and repeat steps 1) to 3) until the maximum value is found.
- 5) Repeat steps 1) to 4) with the other orthogonal axes of the EUT (because of EUT is a module and might be used in a handheld equipment application).

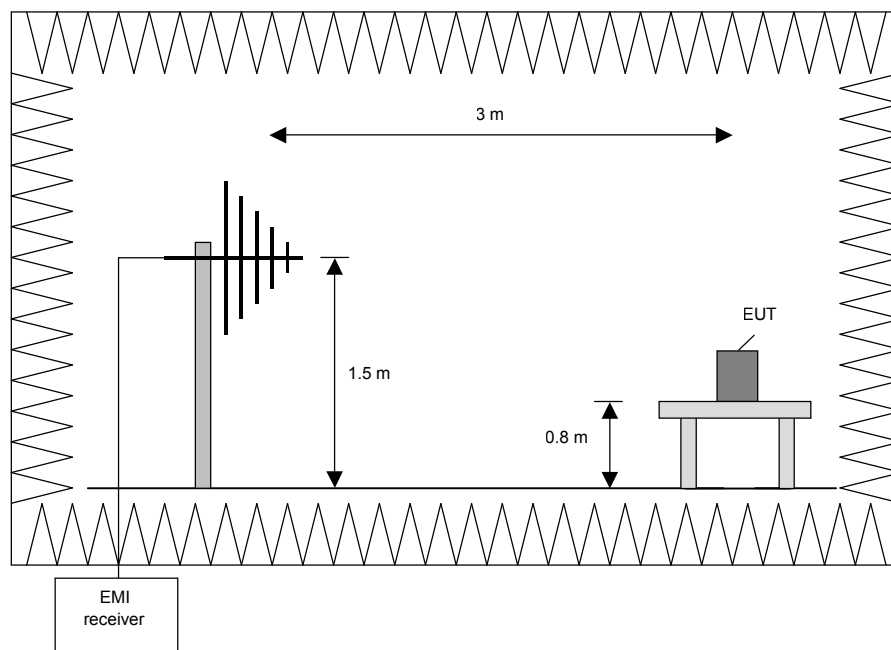
Preliminary measurement (30 MHz to 1 GHz)

In the first stage a preliminary measurement will be performed in a fully anechoic chamber with a measuring distance of 3 meter. Tabletop devices will set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm. Floor-standing devices will be placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2003 [1].

The frequency range 30 MHz to 1 GHz will be measured with an EMI Receiver set to MAX Hold mode and a resolution bandwidth of 100 kHz. The measurement will be performed in horizontal and vertical polarisation of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 ° to 360 °.

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
30 MHz to 230 MHz	100 kHz
230 MHz to 1 GHz	100 kHz



TEST REPORT REFERENCE: R70695 Edition 1

Procedure preliminary measurement:

Prescans were performed in the frequency range 30 MHz to 230 MHz and 230 MHz to 1 GHz.
The following procedure will be used:

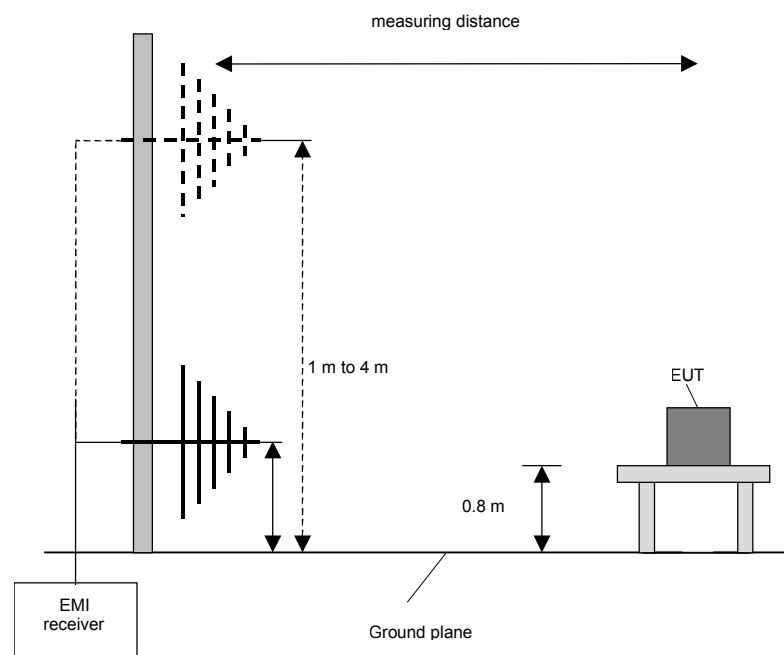
1. Monitor the frequency range at horizontal polarisation and a EUT azimuth of 0 °.
2. Manipulate the system cables within the range to produce the maximum level of emission.
3. Rotate the EUT by 360 ° to maximize the detected signals.
4. Make a hardcopy of the spectrum.
5. Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
6. Repeat 1) to 4) with the other orthogonal axes of the EUT (because of EUT is a module and might be used in a handheld equipment application).
7. Repeat 1) to 5) with the vertical polarisation of the measuring antenna.

Final measurement (30 MHz to 1 GHz)

A final measurement on an open area test site will be performed on selected frequencies found in the preliminary measurement. During this test the EUT will be rotated in the range of 0 ° to 360 °, the measuring antenna will be set to horizontal and vertical polarisation and raised and lowered in the range from 1 m to 4 m to find the maximum level of emissions.

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
30 MHz to 1 GHz	120 kHz



TEST REPORT REFERENCE: R70695 Edition 1

Procedure final measurement:

The following procedure will be used:

- 1) Measure on the selected frequencies at an antenna height of 1 m and a EUT azimuth of 23 °.
- 2) Move the antenna from 1 m to 4 m and note the maximum value at each frequency.
- 3) Rotate the EUT by 45 ° and repeat 2) until an azimuth of 337 ° is reached.
- 4) Repeat 1) to 3) for the other orthogonal antenna polarization.
- 5) Move the antenna and the turntable to the position where the maximum value is detected.
- 6) Measure while moving the antenna slowly +/- 1 m.
- 7) Set the antenna to the position where the maximum value is found.
- 8) Measure while moving the turntable +/- 45 °.
- 9) Set the turntable to the azimuth where the maximum value is found.
- 10) Measure with Final detector (QP and AV) and note the value.
- 11) Repeat 5) to 10) for each frequency.
- 12) Repeat 1) to 11) for each orthogonal axes of the EUT (because of EUT is a module and might be used in a handheld equipment application).

Preliminary and final measurement (1 GHz to 25 GHz)

This measurement will be performed in a fully anechoic chamber. Tabletop devices will set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm. Floor-standing devices will be placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2003 [1].

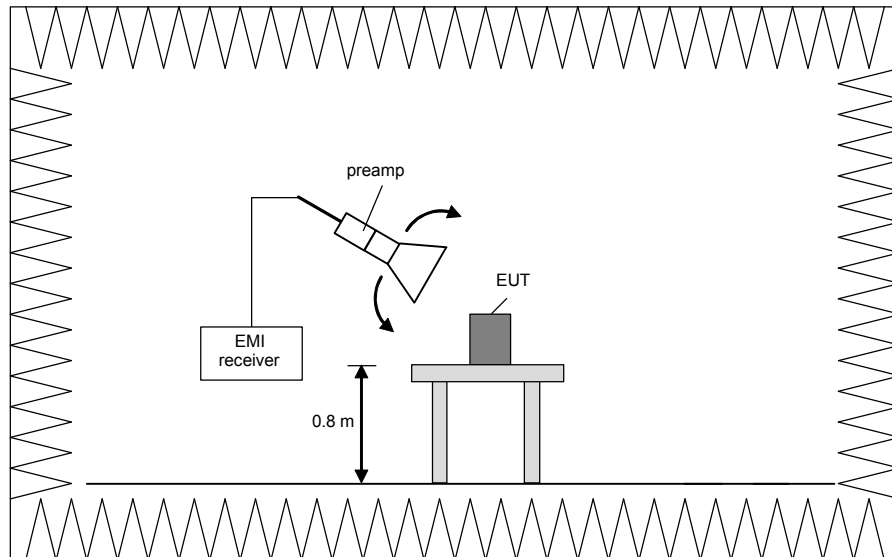
Preliminary measurement (1 GHz to 25 GHz)

The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The spectrum analyser set to MAX Hold mode and a resolution bandwidth of 100 kHz. The measurement will be performed in horizontal and vertical polarisation of the measuring antenna, the antenna close to the EUT and while moving the antenna over all sides of the EUT. With the spectrum analyser in CLEAR / WRITE mode the cone of the emission should be found and than the measuring distance will be set to 3 m with the receiving antenna moving in this cone of emission. At this position the final measurement will be carried out.

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
1 GHz to 4 GHz	100 kHz
4 GHz to 12 GHz	100 kHz
12 GHz to 18 GHz	100 kHz
18 GHz to 25 GHz	100 kHz

TEST REPORT REFERENCE: R70695 Edition 1

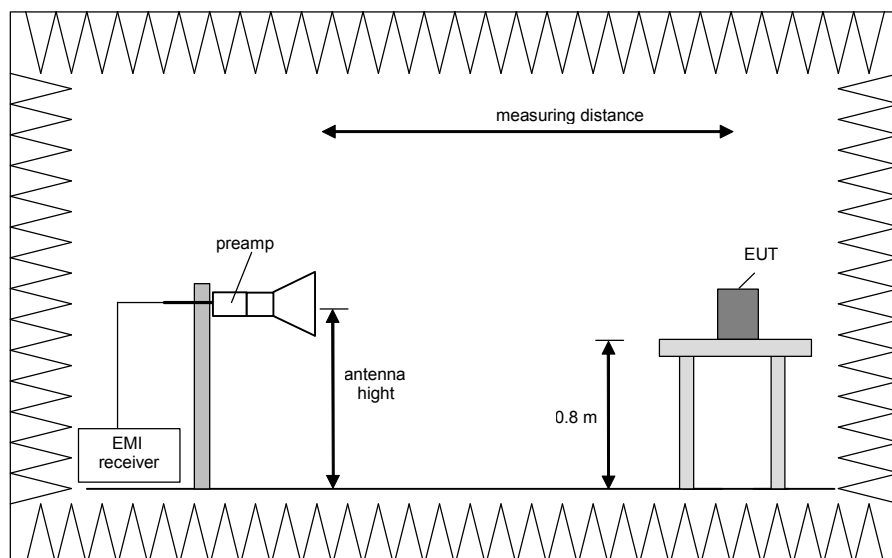


Final measurement (1 GHz to 25 GHz)

The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to peak and average mode and a resolution bandwidth of 1 MHz. The measurement will be performed in horizontal and vertical polarisation of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 ° to 360 ° in order to have the antenna inside the cone of radiation.

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
1 GHz to 4 GHz	1 MHz
4 GHz to 12 GHz	1 MHz
12 GHz to 18 GHz	1 MHz
18 GHz to 25 GHz	1 MHz



TEST REPORT REFERENCE: R70695 Edition 1

Procedure of measurement:

The measurements were performed in the frequency range 1 GHz to 4 GHz, 4 GHz to 12 GHz, 12 GHz to 18 GHz and 18 GHz to 25 GHz.

The following procedure will be used:

- 1) Monitor the frequency range at horizontal polarisation and move the antenna over all sides of the EUT (if necessary move the EUT to another orthogonal axis).
- 2) Change the antenna polarisation and repeat 1) with vertical polarisation.
- 3) Make a hardcopy of the spectrum.
- 4) Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
- 5) Change the analyser mode to Clear / Write and found the cone of emission.
- 6) Rotate and move the EUT, so that the measuring distance can be enlarged to 3 m and the antenna will be still inside the cone of emission.
- 7) Measure the level of the detected frequency with the correct resolution bandwidth, with the antenna polarisation and azimuth and the peak and average detector, which causes the maximum emission.
- 8) Repeat steps 1) to 7) for the next antenna spot if the EUT is larger than the antenna beamwidth.

Step 1) to 6) are defined as preliminary measurement.

TEST REPORT REFERENCE: R70695 Edition 1

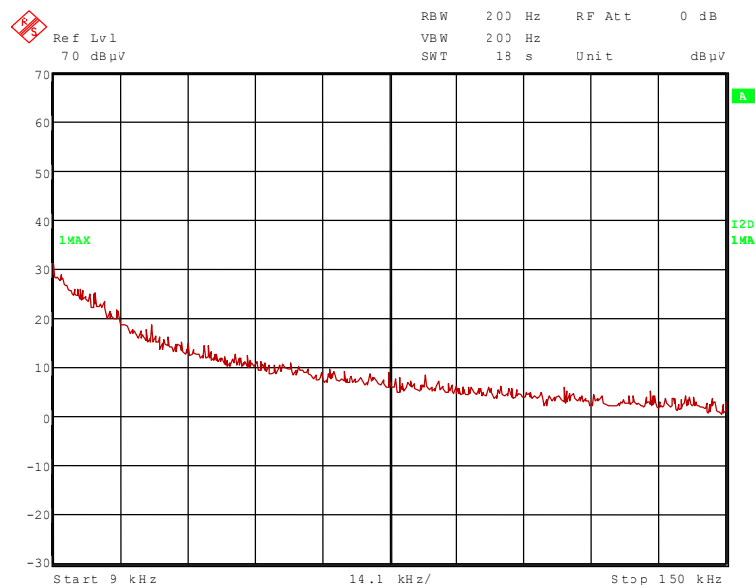
5.7.2 TEST RESULTS (RADIATED EMISSIONS)

5.7.2.1 PRELIMINARY MEASUREMENT (9 kHz to 25 GHz)

Ambient temperature	21 °C	Relative humidity	45 %
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- Position of EUT: The EUT was set-up on a non-conducting table of a height of 0.8 m. The distance between EUT and antenna was 3 m in the range 9 kHz to 1 GHz and 1 m above 1 GHz.
- Cable guide: The cable of the EUT was fixed on the non-conducting table. For further information of the cable guide refer to the pictures in annex A of this test report.
- Test record: Where not otherwise stated the test was carried out in test mode 2 of the EUT, because there was no difference to the other test modes. All results are shown in the following.
- Supply voltage: During all measurements the EUT was supplied with 12.0 V DC.

70695 11.wmf: (9 kHz to 150 kHz):

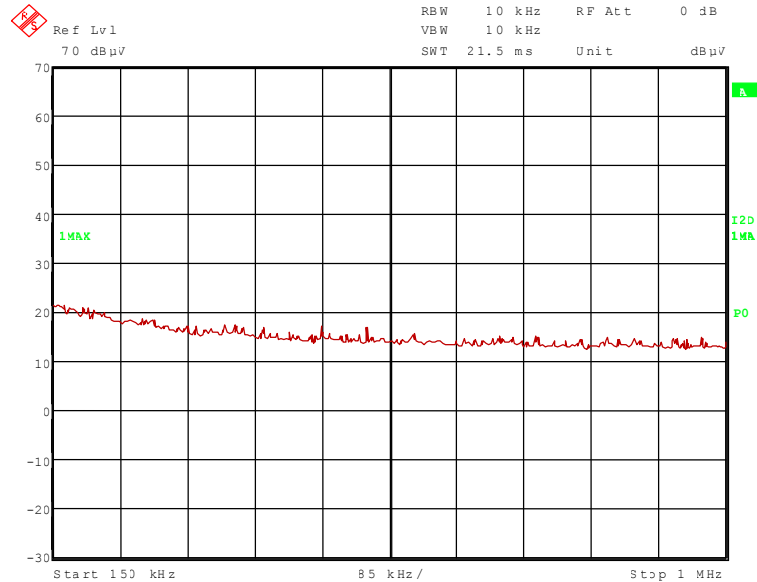


TEST EQUIPMENT USED FOR THE TEST:

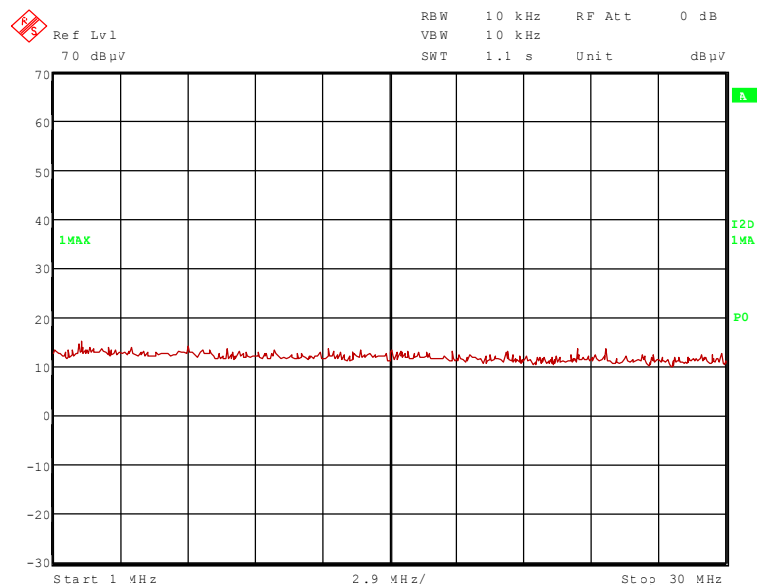
29, 31 – 37, 39, 43, 46, 49 – 51, 54

TEST REPORT REFERENCE: R70695 Edition 1

70695_12.wmf: (150 kHz to 1 MHz):



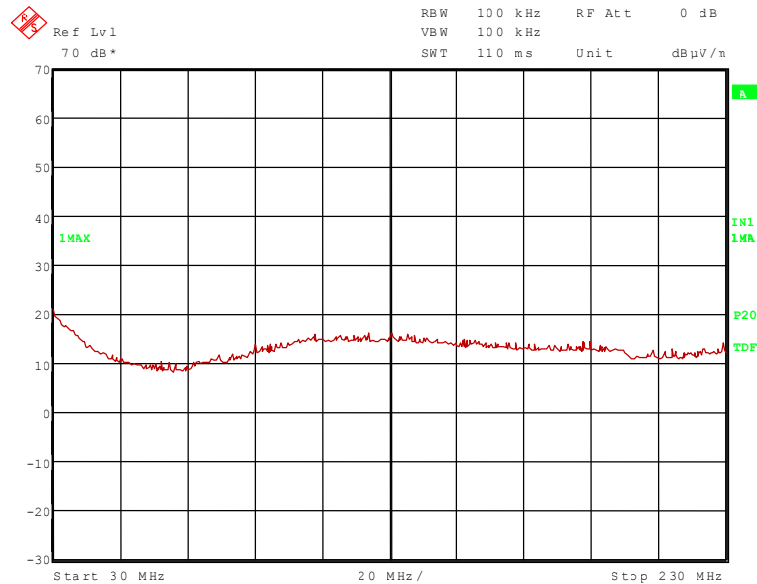
70695_13.wmf: (1 MHz to 30 MHz)



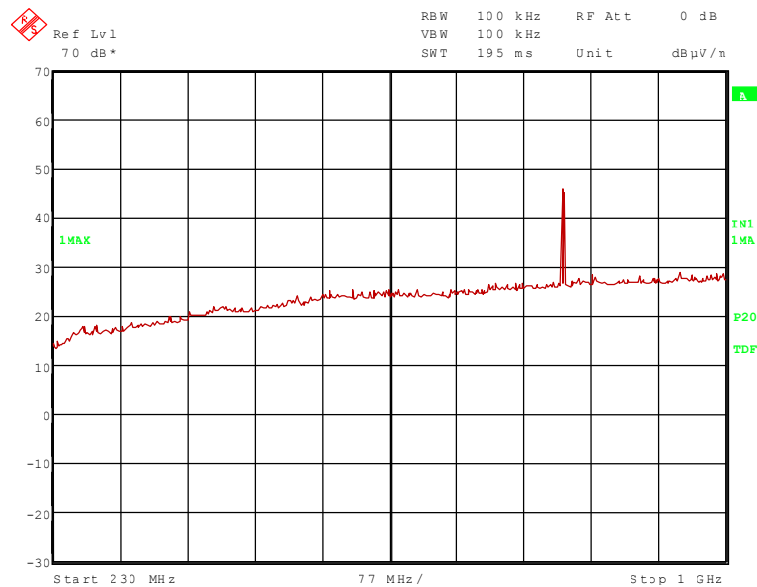
No significant frequencies above the noise floor of the system were found during the preliminary radiated emission test, so no measurements were carried out on the outdoor test site.

TEST REPORT REFERENCE: R70695 Edition 1

70695_37.wmf (30 MHz to 230 MHz):



70695_38.wmf (230 MHz to 1 GHz):



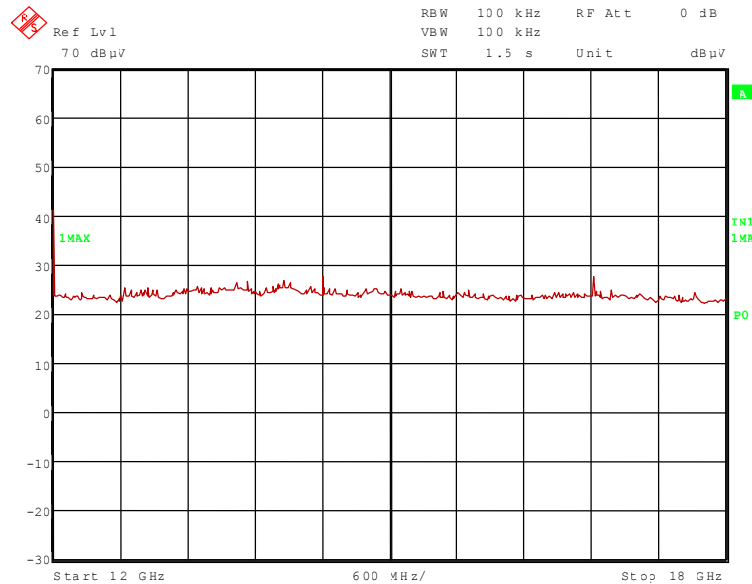
The following frequency was found outside the restricted bands during the preliminary radiated emission test:

813.00 MHz

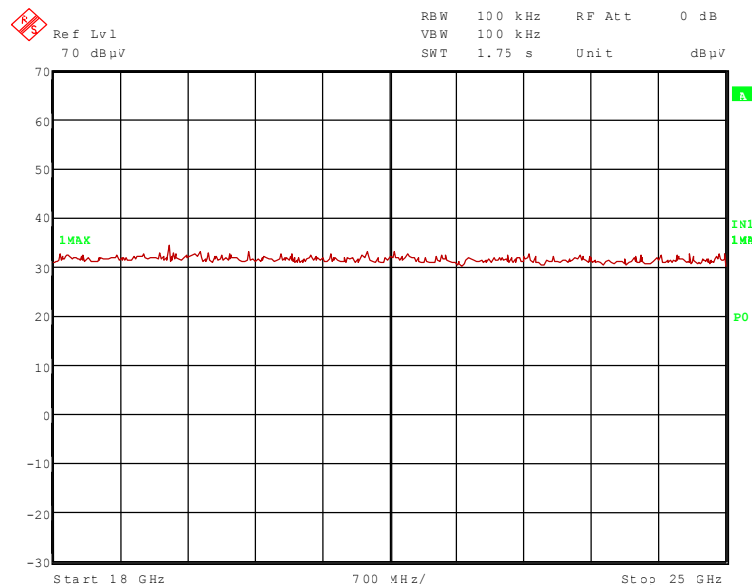
This frequency has to be measured on the open area test site. The result of this final measurement are shown in subclause 5.7.2.2 of this test report.

TEST REPORT REFERENCE: R70695 Edition 1

70695_27.wmf (12 GHz to 18 GHz):



70695_32.wmf (18 GHz to 25 GHz):



The following frequencies were found inside the restricted bands during the preliminary radiated emission test:

- 1.602 GHz, 4.804 GHz, and 12.010 GHz.

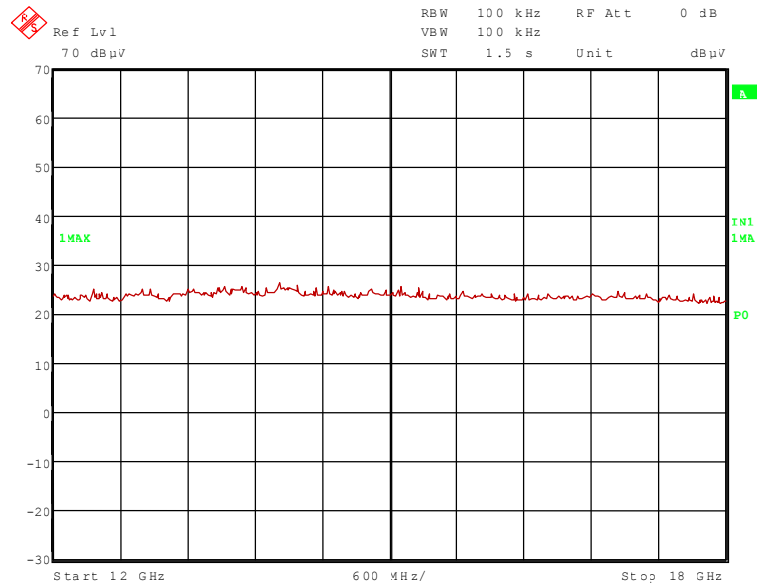
The following frequencies were found outside the restricted bands during the preliminary radiated emission test:

- 2.402 GHz, 7.206 GHz and 9.608 GHz.

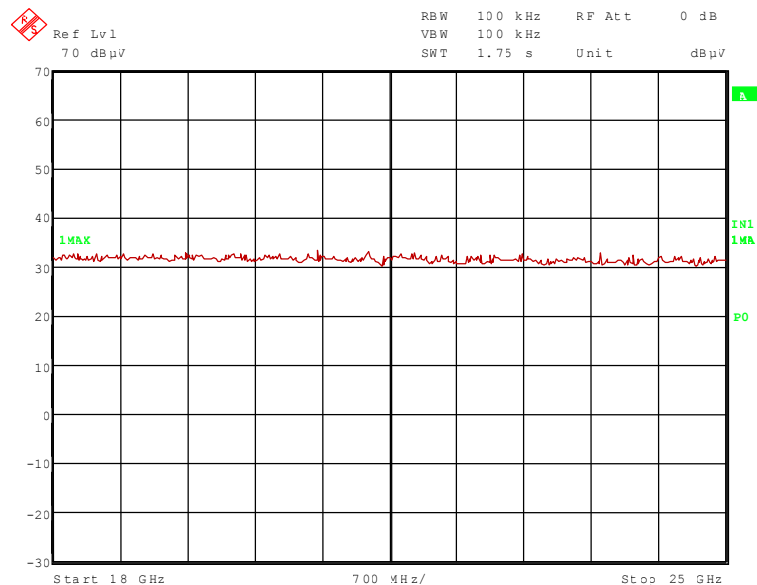
These frequencies have to be measured in a final measurement. The results were presented in the following.

TEST REPORT REFERENCE: R70695 Edition 1

70695_29.wmf (12 GHz to 18 GHz):



70695_30.wmf (18 GHz to 25 GHz):



The following frequencies were found inside the restricted bands during the preliminary radiated emission test:

- 4.960 GHz

The following frequencies were found outside the restricted bands during the preliminary radiated emission test:

- 1.654 GHz and 2.480 GHz.

These frequencies have to be measured in a final measurement. The results were presented in the following.

TEST REPORT REFERENCE: R70695 Edition 1

5.7.2.2 FINAL RADIATED EMISSION TEST (30 MHz to 1 GHz)

Ambient temperature	20 °C	Relative humidity	45 %
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Position of EUT: The EUT was set-up on a non-conducting table of a height of 0.8 m. The distance between EUT and antenna was 3 m.

Cable guide: The cable of the EUT was fixed on the non-conducting table. For further information of the cable guide refer to the pictures in annex A of this test report.

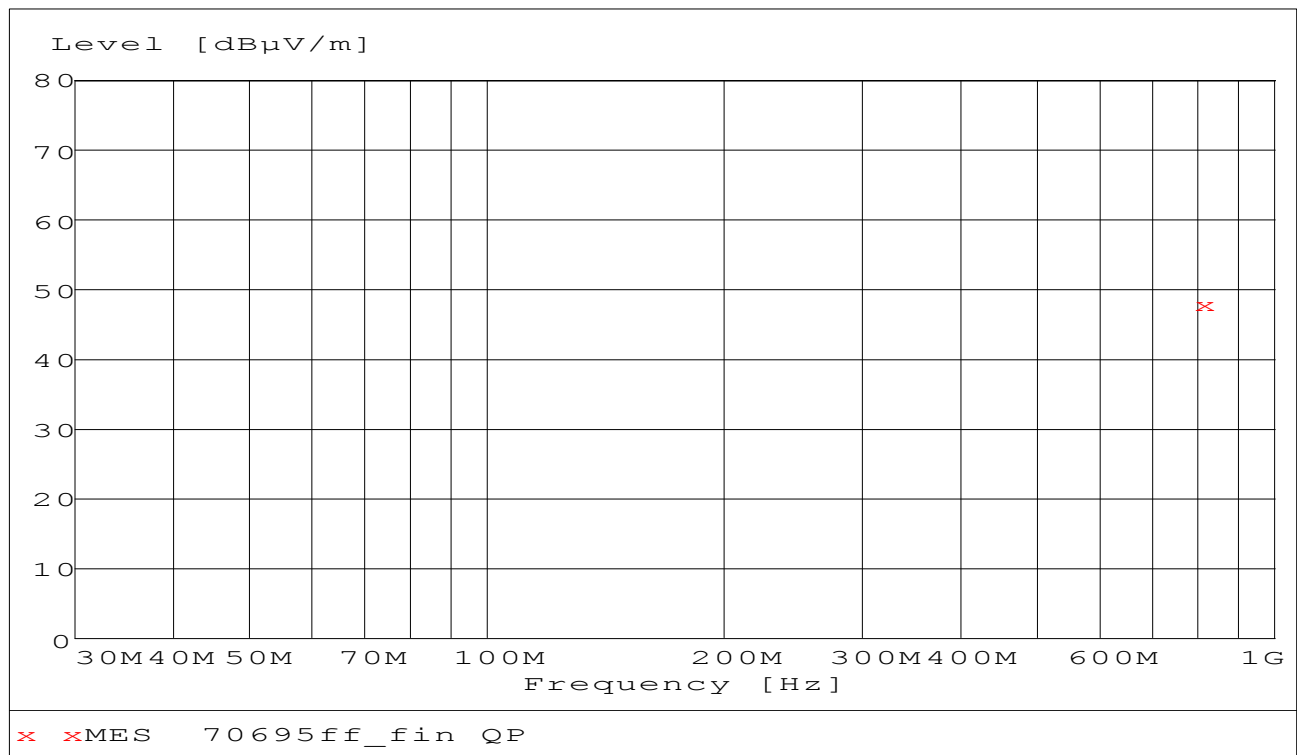
Test record: The test was carried out in normal operation mode 2 of the EUT. All results are shown in the following.

Supply voltage: The EUT was supplied with 12.0 V DC.

Test results: The test results were calculated with the following formula:

$$\text{Result [dB}\mu\text{V/m]} = \text{reading [dB}\mu\text{V]} + \text{cable loss [dB]} + \text{antenna factor [dB/m]}$$

The measured point in the following diagram refer to the standard measurement of the emitted interference in compliance with the above-mentioned standard. The measured point marked with x is the measured result of the standard final measurement on the open area test site.



Data record name: 70695ff

TEST REPORT REFERENCE: R70695 Edition 1

The results of the standard final measurement on the open area test site are indicated in the table below. The limits as well as the measured results (levels) refer to the above-mentioned standard while taking account of the specified requirements for a 3 m measuring distance.

The measurement time with the quasi-peak measuring detector is 1 second.

Spurious emissions outside restricted bands									
Frequency	Result	Limit	Margin	Readings	Antenna factor	Cable loss	Height	Azimuth	Pol.
MHz	dB μ V/m	dB μ V/m	dB	dB μ V	dB/m	dB	cm	deg	
813.000	48.0	69.1*	21.1	23.1	23.1	1.8	100.0	146.0	Hor.
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
Spurious emissions in restricted bands									
Frequency	Result	Limit	Margin	Readings	Antenna factor	Cable loss	Height	Azimuth	Pol.
MHz	dB μ V/m	dB μ V/m	dB	dB μ V	dB/m	dB	cm	deg	
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
Measurement uncertainty				+2.2 dB / -3.6 dB					

The test results were calculated with the following formula:

$$\text{Result [dB}\mu\text{V/m]} = \text{reading [dB}\mu\text{V]} + \text{cable loss [dB]} + \text{antenna factor [dB/m]}$$

* The limit is calculated according chapter 5.7.2.3 (20 dBc).

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:
14 – 20

TEST REPORT REFERENCE: R70695 Edition 1

5.7.2.3 FINAL MEASUREMENT (1 GHz to 25 GHz)

Ambient temperature	21 °C	Relative humidity	45 %
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Position of EUT: The EUT was set-up on a non-conducting table of a height of 0.8 m. The distance between EUT and antenna was 3 m.

Cable guide: The cable of the EUT was fixed on the non-conducting table. For further information of the cable guide refer to the pictures in annex A of this test report.

Supply voltage: During all measurements the EUT was supplied with 12.0 V DC.

Resolution bandwidth: For all measurements a resolution bandwidth of 1 MHz was used.

Transmitter operates at the lower end of the assigned frequency band (operation mode 1)

Result measured with the peak detector:

Frequency GHz	Corr. value dB μ V/m	Limit dB μ V/m	Margin dB	Readings dB μ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band
1.602	53.4	74.0	20.6	24.4	26.0	0.0	3.0	150	Hor.	Yes
2.402	98.7	-	-	67.4	28.8	0.0	2.8	150	Hor.	-
4.804	52.3	74.0	21.7	41.1	33.1	25.7	3.8	150	Vert.	Yes
7.206	60.9	78.7	17.8	44.3	36.3	24.6	4.9	150	Hor.	No
9.608	58.3	78.7	20.4	38.6	37.9	23.9	5.7	150	Vert.	No
12.010	52.5	74.0	21.5	43.8	33.6	25.9	1.0	100	Vert.	Yes
Measurement uncertainty							+2.2 dB / -3.6 dB			

Result measured with the average detector:

Frequency GHz	Corr. value dB μ V/m	Limit dB μ V/m	Margin dB	Readings dB μ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band
1.602	44.4	54.0	9.6	15.4	26.0	0.0	3.0	150	Hor.	Yes
2.402	88.8	-	-	57.5	28.8	0.0	2.8	150	Vert.	-
4.804	38.0	54.0	16.0	26.8	33.1	25.7	3.8	150	Vert.	Yes
7.206	48.2	68.8	20.6	31.6	36.3	24.6	4.9	150	Hor.	No
9.608	45.4	68.8	23.4	25.7	37.9	23.9	5.7	150	Vert.	No
12.010	36.7	54.0	17.3	28.0	33.6	25.9	1.0	100	Vert.	Yes
Measurement uncertainty							+2.2 dB / -3.6 dB			

TEST REPORT REFERENCE: R70695 Edition 1

Transmitter operates at the middle of the assigned frequency band (operation mode 2)

Result measured with the peak detector:

Frequency GHz	Corr. value dB μ V/m	Limit dB μ V/m	Margin dB	Readings dB μ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	
1.628	51.4	77.7	26.3	24.3	26.1	0	1.0	150	Hor.	No	
2.441	97.7	-	-	66.2	28.7	0	2.8	150	Hor.	-	
4.882	53.6	74.0	20.4	42.1	33.4	25.7	3.8	150	Vert.	Yes	
7.323	58.6	74.0	15.4	42.0	36.3	24.6	4.9	150	Hor.	Yes	
12.205	48.8	74.0	25.2	40.0	33.6	25.8	1.0	100	Vert.	Yes	
Measurement uncertainty							+2.2 dB / -3.6 dB				

Result measured with the average detector:

Frequency GHz	Corr. value dB μ V/m	Limit dB μ V/m	Margin dB	Readings dB μ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	
1.628	42.6	67.8	25.2	15.5	26.1	0.0	1.0	150	Hor.	No	
2.441	87.8	-	-	56.3	28.7	0.0	2.8	150	Hor.	-	
4.882	37.7	54.0	16.3	26.2	33.4	25.7	3.8	150	Vert.	Yes	
7.323	45.3	54.0	8.7	28.7	36.3	24.6	4.9	150	Hor.	Yes	
12.205	32.4	54.0	21.6	23.6	33.6	25.8	1.0	100	Vert.	Yes	
Measurement uncertainty							+2.2 dB / -3.6 dB				

TEST REPORT REFERENCE: R70695 Edition 1

Transmitter operates at the upper end of the assigned frequency band (operation mode 3)

Result measured with the peak detector:

Frequency GHz	Corr. value dB μ V/m	Limit dB μ V/m	Margin dB	Readings dB μ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	
1.654	53.8	77.5	23.7	24.5	26.2	0.0	3.1	150	Hor.	No	
2.480	97.5	-	-	64.7	29.0	0.0	3.8	150	Hor.	-	
4.960	58.1	74.0	15.9	44.4	34.0	25.6	5.3	150	Vert.	Yes	
Measurement uncertainty							+2.2 dB / -3.6 dB				

Result measured with the average detector:

Frequency GHz	Corr. value dB μ V/m	Limit dB μ V/m	Margin dB	Readings dB μ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band	
1.654	45.1	67.3	22.2	15.8	26.2	0.0	3.1	150	Hor.	No	
2.480	87.3	-	-	54.5	29.0	0.0	3.8	150	Hor.	-	
4.960	44.0	54.0	10.0	30.3	34.0	25.6	5.3	150	Vert.	Yes	
Measurement uncertainty							+2.2 dB / -3.6 dB				

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:
29, 31 – 37, 39, 43, 46, 49 – 51, 54

TEST REPORT REFERENCE: R70695 Edition 1

6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

TEST REPORT REFERENCE: R70695 Edition 1

Emission measurement at AC mains and DC in / out ports at M4					
No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
1	Shielded chamber M4	-	Siemens	B83117S1-X158	480088
2	Measuring receiver	ESAI	Rohde & Schwarz	831953/001 833181/018	480025 480026
3	LISN	NSLK8128	Schwarzbeck	8128155	480058
4	DC-filter	B84266-A21-E13	Siemens	940164525	480099
5	AC-filter	B84299-D87-E3	Siemens	930262292	480097
6	EMI-Software	ES-K1	Rohde & Schwarz	-	480111

Radiated emission measurement at M5					
No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
7	Fully anechoic chamber M5	-	Siemens	B83177-S1-X156	480073
8	Measuring receiver	ESVS30	Rohde & Schwarz	829673/012	480024
9	Controller	HD100	Deisel	100/324	480067
10	Antenna support	MA240	Deisel	228/314	480069
11	Turntable	DS412	Deisel	412/317	480070
12	Antenna	CBL6112C	Chase	2689	480327
13	EMI Software	ES-K1	Rohde & Schwarz	-	480111

Radiated emission measurement at M6					
No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
14	Open area test site	-	Phoenix Test-Lab	-	480085
15	Measuring receiver	ESCS30	Rohde & Schwarz	828985/014	480270
16	Controller	HD100	Deisel	100/670	480139
17	Turntable	DS420HE	Deisel	420/620/80	480087
18	Antenna support	AS615P	Deisel	615/310	480086
19	Antenna	CBL6111 A	Chase	1643	480147
20	EMI Software	ES-K1	Rohde & Schwarz	-	480111

TEST REPORT REFERENCE: R70695 Edition 1

Radiated emission measurement at M8					
No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
21	Fully anechoic chamber M8	-	Siemens	B83117-E7019-T231	480190
22	Measuring receiver	ESMI	Rohde & Schwarz	843977/001 843530/018	480179 480180
23	Measuring receiver	ESCS 30	Rohde & Schwarz	828985/014	480270
24	Controller	HD100	Deisel	100/427	480181
25	Turntable	DS420	Deisel	420/435/97	480186
26	Antenna support	AS615P	Deisel	615/310	480187
27	Antenna	CBL6112 A	Chase	2034	480185
28	EMI Software	ES-K1	Rohde & Schwarz	-	480111

Radiated emission measurement at M20					
No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
29	Fully anechoic chamber M20	-	Albatross Projects	B83107-E2439-T232	480303
30	Measuring receiver	ESMI	Rohde & Schwarz	843977/001 843530/018	480179 480180
31	Measuring receiver	ESI 40	Rohde & Schwarz	100064	480355
32	Controller	HD100	Deisel	100/670	480326
33	Turntable	DS420HE	Deisel	420/620/80	480315
34	Antenna support	AS615P	Deisel	615/310	480187
35	Antenna	CBL6112 B	Chase	2688	480328
36	Antenna	3115 A	EMCO	9609-4918	480183
37	Standard Gain Horn 11.9 GHz – 18 GHz	18240-20	Flann Microwave	483	480294
38	Standard Gain Horn 11.9 GHz – 18 GHz	18240-20	Flann Microwave	482	480295
39	Standard Gain Horn 17.9 GHz – 26.7 GHz	20240-20	Flann Microwave	411	480297
40	Standard Gain Horn 17.9 GHz – 26.7 GHz	20240-20	Flann Microwave	410	480296
41	Standard Gain Horn 26.4 GHz – 40.1 GHz	22240-20	Flann Microwave	469	480299

TEST REPORT REFERENCE: R70695 Edition 1

No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
42	Standard Gain Horn 26.4 GHz – 40.1 GHz	22240-20	Flann Microwave	468	480298
43	RF-cable No. 30	RTK 081	Rosenberger	-	410141
44	RF-cable No. 31	RTK 081	Rosenberger	-	410142
45	RF-cable 1m	KPS-1533- 400-KPS	Insulated Wire	-	480300
46	RF-cable 1m	KPS-1533- 400-KPS	Insulated Wire	-	480301
47	RF-cable 2m	KPS-1533- 400-KPS	Insulated Wire	-	480302
48	RF-cable No. 5	RTK 081	Rosenberger		410097
49	Preamplifier	JS3- 00101200- 23-5A	Miteq	681851	480337
50	Preamplifier	JS3- 12001800- 16-5A	Miteq	571667	480343
51	Preamplifier	JS3- 18002600- 20-5A	Miteq	658697	480342
52	Preamplifier	JS3- 26004000- 25-5A	Miteq	563593	480344
53	EMI Software	ES-K1	Rohde & Schwarz	-	480111

Ancillary equipment used for testing					
No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
54	Power supply	TOE 8852	Toellner	51712	480233
55	Audio analyser	UPL	Rohde & Schwarz	845646/019	480226
-	-	-	-	-	-
-	-	-	-	-	-

All used measurement equipment was calibrated (if necessary). The calibration intervals and the calibration history will be given out on request.

TEST REPORT REFERENCE: R70695 Edition 1

7 LIST OF ANNEXES

ANNEX A	PHOTOGRAPHS OF THE TEST SET-UPS:	6 pages
	CC9051, test set-up fully anechoic chamber	70695_f.jpg
	CC9051, test set-up fully anechoic chamber	70695_d.jpg
	CC9051, test set-up fully anechoic chamber	70695_a.jpg
	CC9051, test set-up fully anechoic chamber	70695_e.jpg
	CC9051, test set-up fully anechoic chamber	70695_b.jpg
	CC9051, test set-up open area test-site	70695_11.jpg
ANNEX B	INTERNAL PHOTOGRAPHS OF THE TEST SAMPLE:	5 pages
	CC9051, internal view	70695_4.jpg
	CC9051, PCB, top view	70695_2.jpg
	CC9051, PCB, bottom view	70695_3.jpg
	CC9051, PCB, detail view to RF part with internal antenna	70695_1.jpg
	CC9051, PCB, detail view to RF part with temporary antenna connector	70695_8.jpg
ANNEX C	EXTERNAL PHOTOGRAPHS OF THE TEST SAMPLE:	3 pages
	CC9051, 3D view 1	70695_7.jpg
	CC9051, 3D view 2	70695_6.jpg
	CC9051, type plate view 1	70695_5.jpg
ANNEX D	MEASUREMENT RESULTS OF THE UNINTENTIONAL RADIATOR PART	
	In this Annex the results of the spurious emission measurement of the handsfree kit in accordance to the FCC CFR 47 Part 15 section 109 are documented. This Annex is not intended to be part of the documentation, which will be reviewed by a TCB.	