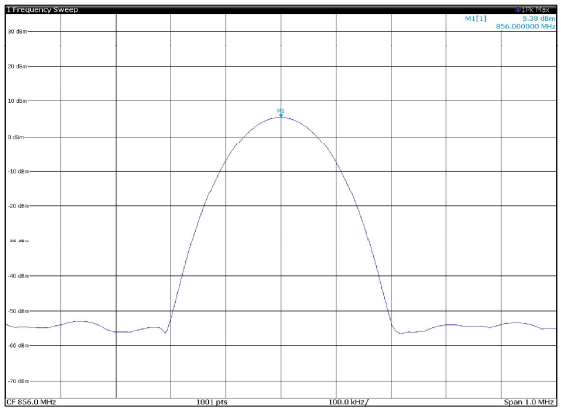
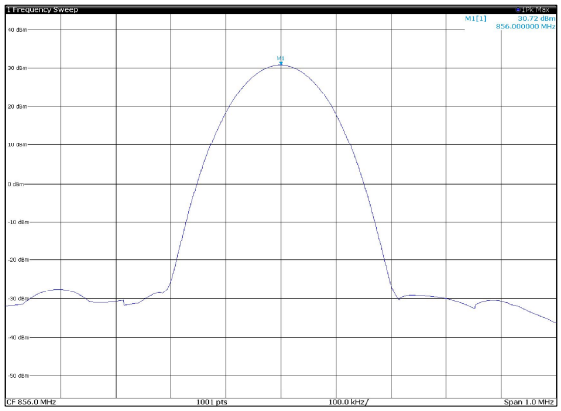
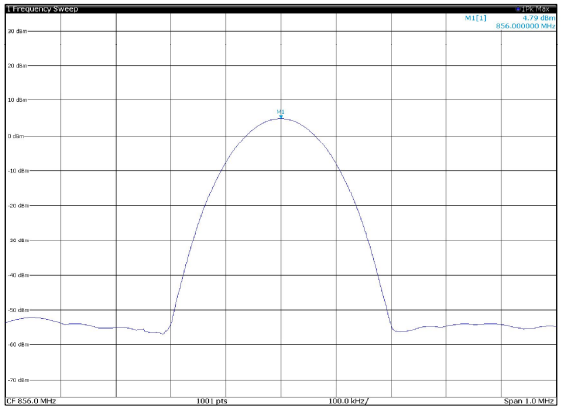
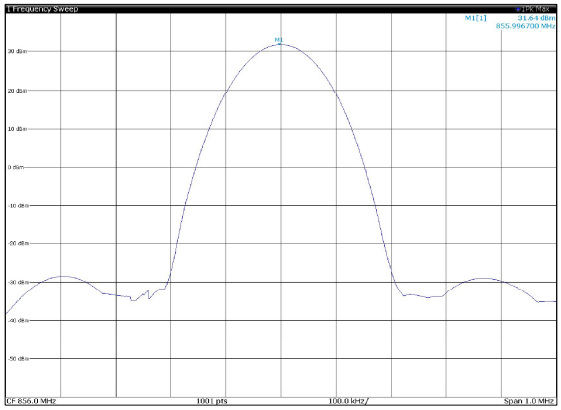
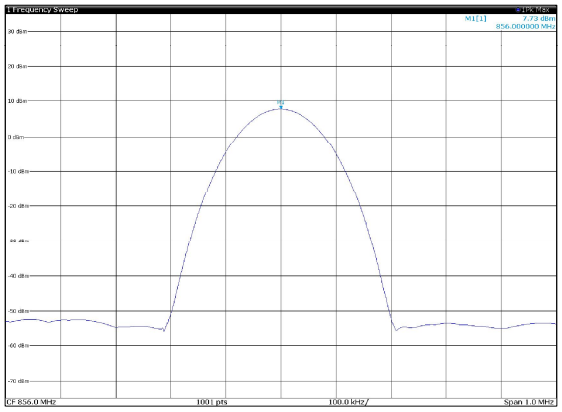
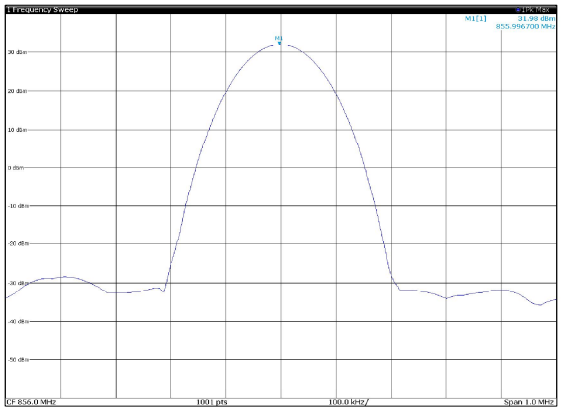
Test data	
	
Input	Output
Output power with input at AGC threshold + 3 dB with CW signal at 856 MHz	
Gain (dB) = output power (dBm) – input power (dBm) = 25.34	

Test data	
	
Input	Output
Output power with input at AGC threshold with 8K70D1W signal at 856 MHz	
Gain (dB) = output power (dBm) – input power (dBm) = 26.85	

Test data

	
Input	Output
Output power with input at AGC threshold + 3 dB with 8K70D1W signal at 856 MHz	
Gain (dB) = output power (dBm) – input power (dBm) = 24.25	

6.5 Noise figure measurements

FCC 90.219(e)(2)
The noise figure of a signal booster must not exceed 9 dB in either direction. As stated in the KDB 935210 D02 Signal Boosters Certification v04r02, for the remote unit of a conventional fiber-connected host/remote DAS booster system, it is acceptable to submit compliance information and test data consistent with Section 90.219(d)(6)(ii) (i.e., ERP of noise ≤ –43 dBm in 10 kHz RBW) for the downlink path only, in place of Section 90.219(e)(2) noise figure test data (i.e., NF ≤ 9 dB for both UL and DL). Test reports must provide explicit details about the instrumentation and test procedure used for Section 90.219(d)(6)(ii) testing.

RSS-131 clause 6.4
The ERP of noise within the passband should not exceed –43 dBm in a 10 kHz measurement bandwidth. The ERP of noise in spectrum more than 1 MHz outside of the passband should not exceed –70 dBm in a 10 kHz measurement bandwidth. The noise figure of a zone enhancer shall not exceed 9 dB in either direction.

Test date: 2019-06-26

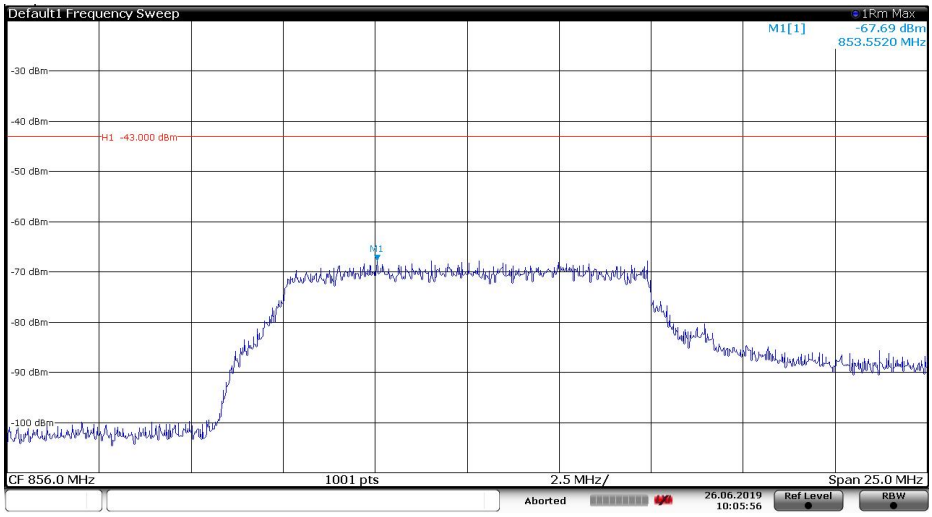
Test results: Pass

Special notes

Spectrum analyzer settings:

Resolution bandwidth	10 kHz
Video bandwidth	≥3 × RBW
Frequency span	25 MHz
Detector mode	Rms
Trace mode	Max Hold

Test data


Default1 Frequency Sweep
1Rm Max
M1[1]
-67.69 dBm
853.5520 MHz
-30 dBm
-40 dBm
H1 -43.000 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
-100 dBm
M1
CF 856.0 MHz
1001 pts
2.5 MHz/
Span 25.0 MHz
Aborted
26.06.2019
10:05:56
Ref Level
RBW
10:05:56 26.06.2019
Page 0/0

6.6 Out-of-band/out-of-block emissions conducted measurements

FCC 90.210(d)

Emission Mask D — 12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

(1) On any frequency from the center of the authorized bandwidth f_0 to 5.625 kHz removed from f_0: Zero dB.

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least 7.27(fd–2.88 kHz) dB.

(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz: At least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.

(4) The reference level for showing compliance with the emission mask shall be established using a resolution bandwidth sufficiently wide (usually two or three times the channel bandwidth) to capture the true peak emission of the equipment under test. In order to show compliance with the emission mask up to and including 50 kHz removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 Hz with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrument resolution bandwidth. For emissions beyond 50 kHz from the edge of the authorized bandwidth, see paragraph (o) of this section. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, an alternate procedure may be used provided prior Commission approval is obtained.

FCC 90.219(e)(3)

Spurious emissions from a signal booster must not exceed −13 dBm within any 100 kHz measurement bandwidth.

RSS-131 clause 6.5

The spurious emissions of a zone enhancer shall not exceed −13 dBm in any 100 kHz measurement bandwidth.

RSS-119 clause 5.8.3

Emission Mask D for Transmitters Equipped With or Without an Audio Low-Pass Filter. The power of any emission shall be attenuated below the transmitter output power P (dBW) as specified in Table 7.

Table 7 — Emission Mask D

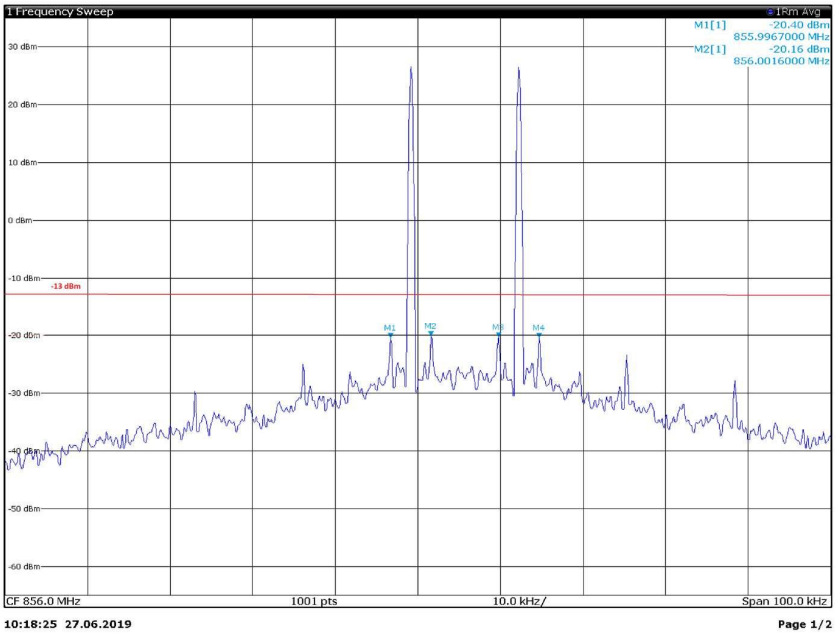
Displacement Frequency, f_d (kHz)	Minimum Attenuation (dB)	Resolution Bandwidth (Hz)
$5.625 < f_d \leq 12.5$	$7.27(f_d-2.88)$	Specified in Section 4.2.2
$f_d > 12.5$	Whichever is the lesser: 70 or $50 + 10 \log_{10}(p)$	Specified in Section 4.2.2

Test date: 2019-06-26 and 2019-06-27
Test results: Pass

Special notes

Modulation used: CW and 8K70D1W

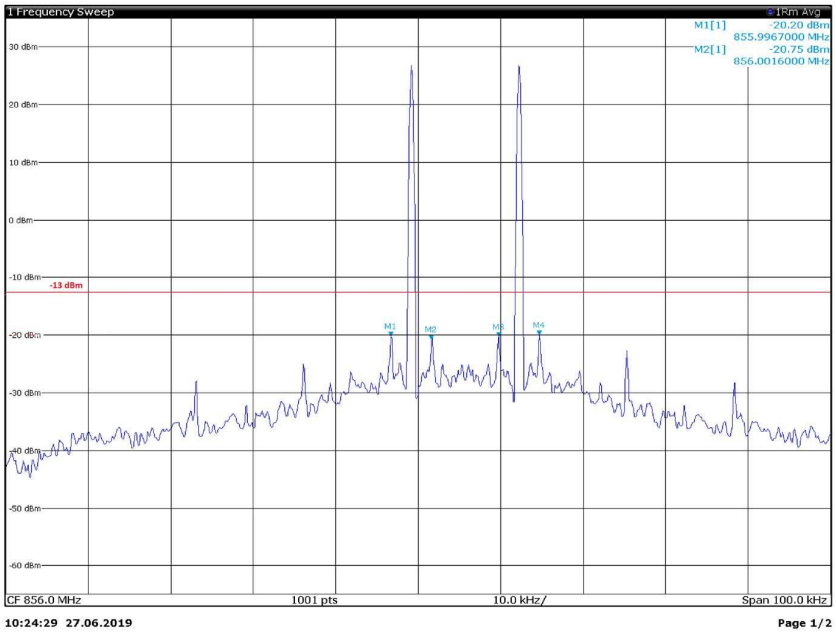
Test data



2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**855.9967 MHz**	**-20.40 dBm**		
M2		1	**856.0016 MHz**	**-20.16 dBm**		
M3		1	**856.00979 MHz**	**-20.28 dBm**		
M4		1	**856.01469 MHz**	**-20.49 dBm**		

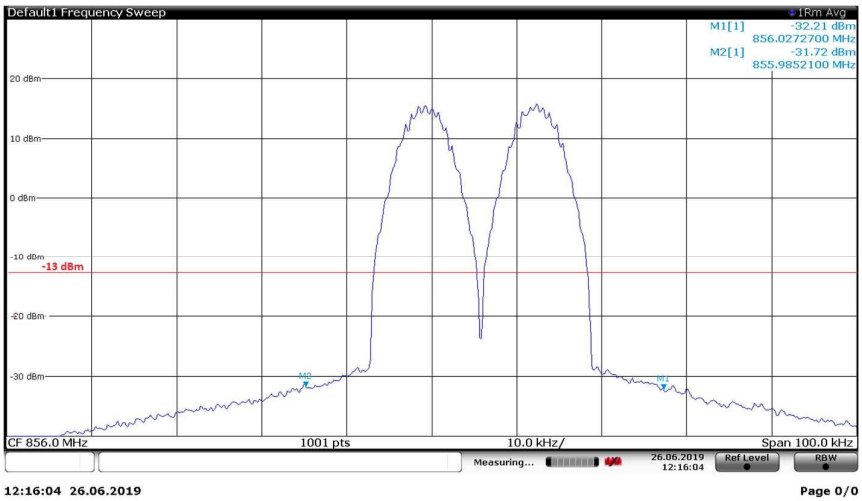
Out of band/out of block with input at AGC threshold with CW signal at 856 MHz



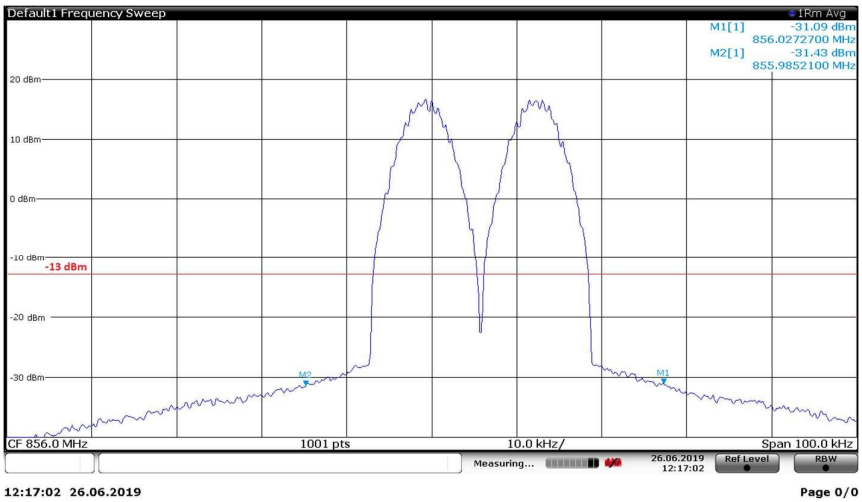
2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**855.9967 MHz**	**-20.20 dBm**		
M2		1	**856.0016 MHz**	**-20.75 dBm**		
M3		1	**856.00979 MHz**	**-20.34 dBm**		
M4		1	**856.01469 MHz**	**-20.01 dBm**		

Out of band/out of block with input at AGC threshold +3 dB with CW signal at 856 MHz



Out of band/out of block with input at AGC threshold with 8K70D1W signal at 856 MHz



Out of band/out of block with input at AGC threshold + 3 dB with 8K70D1W signal at 856 MHz

6.7 EUT spurious emissions conducted measurements

FCC 90.210(d)

Emission Mask D — 12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

(1) On any frequency from the center of the authorized bandwidth f_0 to 5.625 kHz removed from f_0: Zero dB.

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least 7.27(fd–2.88 kHz) dB.

(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz: At least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.

(4) The reference level for showing compliance with the emission mask shall be established using a resolution bandwidth sufficiently wide (usually two or three times the channel bandwidth) to capture the true peak emission of the equipment under test. In order to show compliance with the emission mask up to and including 50 kHz removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 Hz with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrument resolution bandwidth. For emissions beyond 50 kHz from the edge of the authorized bandwidth, see paragraph (o) of this section. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, an alternate procedure may be used provided prior Commission approval is obtained.

RSS-131 clause 6.6(2)

The retransmitted signals shall meet the unwanted emission limits in the RSS that applies to the equipment with which the zone enhancer is to be used.

RSS-119 clause 5.8.3

Emission Mask D for Transmitters Equipped With or Without an Audio Low-Pass Filter. The power of any emission shall be attenuated below the transmitter output power P (dBW) as specified in Table 7.

Table 7 — Emission Mask D

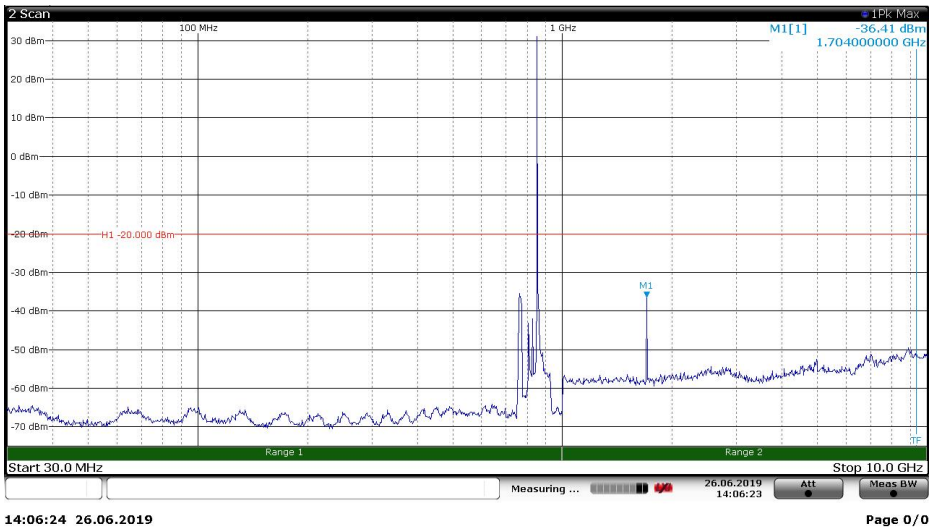
Displacement Frequency, f_d (kHz)	Minimum Attenuation (dB)	Resolution Bandwidth (Hz)
$5.625 < f_d \leq 12.5$	$7.27(f_d-2.88)$	Specified in Section 4.2.2
$f_d > 12.5$	Whichever is the lesser: 70 or $50 + 10 \log_{10}(p)$	Specified in Section 4.2.2

Test date: 2019-06-26
Test results: Pass

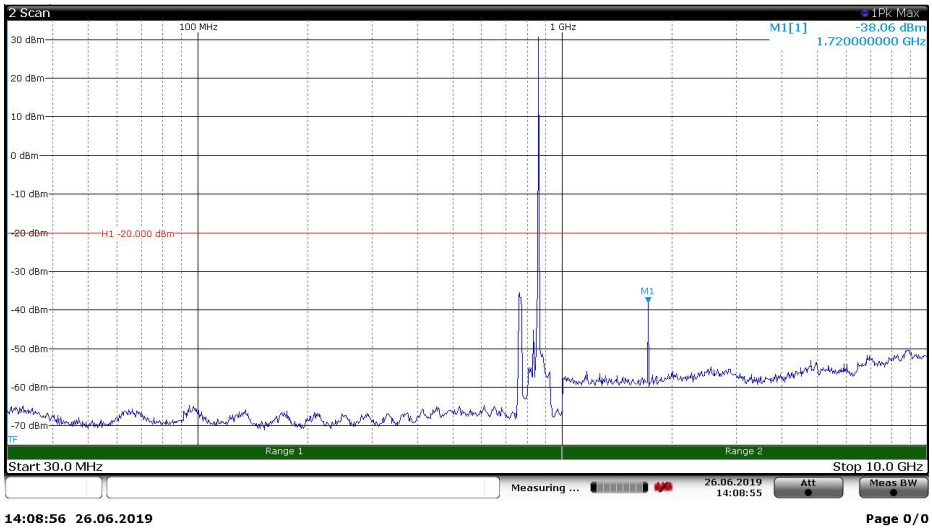
Special notes

Modulation used: CW and 8K70D1W.

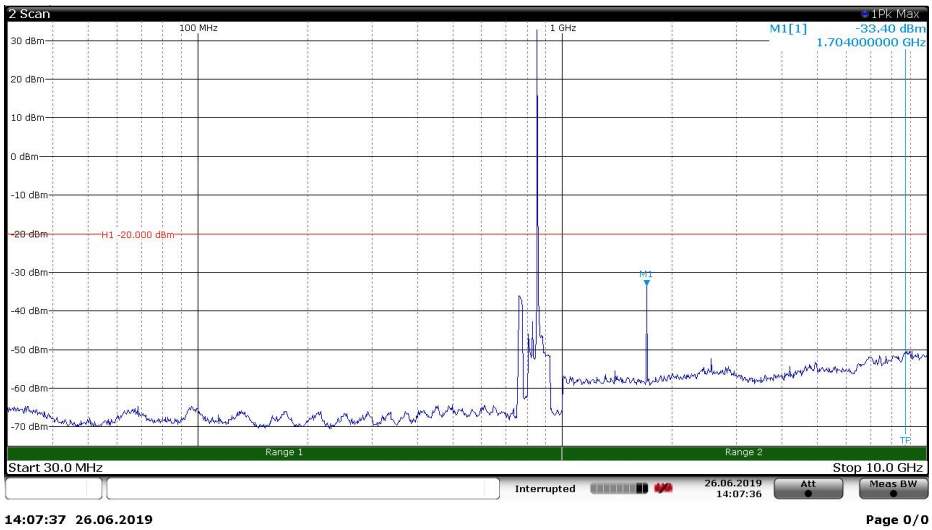
Test data



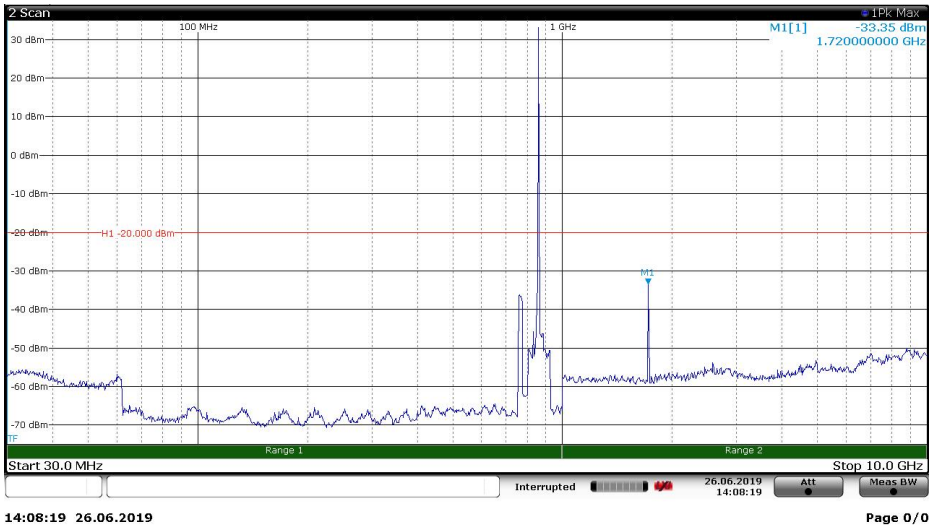
Spurious conducted emissions with input at AGC threshold with CW signal at 852 MHz



Spurious conducted emissions with input at AGC threshold with CW signal at 860 MHz



Spurious conducted emissions with input at AGC threshold with 8K70D1W signal at 852 MHz



Spurious conducted emissions with input at AGC threshold with 8K70D1W signal at 856 MHz

6.8 Frequency stability measurements

FCC 90.213

Unless noted elsewhere, transmitters used in the services governed by this part must have a minimum frequency stability as specified in the following table.

[Parts per million (ppm)]

Frequency range (MHz)	Fixed and base stations	Mobile stations	
		Over 2 watts output power	2 watts or less output power
Below 25	[1 2 3]100	100	200
25-50	20	20	50
72-76	5		50
150-174	[5 11]5	[6]5	[4 6]50
216-220	1.0		1.0
220-222[12]	0.1	1.5	1.5
421-512	[7 11 14]2.5	[8]5	[8]5
806-809	[14]1.0	1.5	1.5
809-824	[14]1.5	2.5	2.5
851-854	1.0	1.5	1.5
854-869	1.5	2.5	2.5
896-901	[14]0.1	1.5	1.5
902-928	2.5	2.5	2.5
902-928[13]	2.5	2.5	2.5
929-930	1.5		
935-940	0.1	1.5	1.5
1427-1435	[9]300	300	300
Above 2450[10]			

[1]Fixed and base stations with over 200 watts transmitter power must have a frequency stability of 50 ppm except for equipment used in the Public Safety Pool where the frequency stability is 100 ppm.

[2]For single sideband operations below 25 MHz, the carrier frequency must be maintained within 50 Hz of the authorized carrier frequency.

[3]Travelers information station transmitters operating from 530-1700 kHz and transmitters exceeding 200 watts peak envelope power used for disaster communications and long distance circuit operations pursuant to §§90.242 and 90.264 must maintain the carrier frequency to within 20 Hz of the authorized frequency.

[4]Stations operating in the 154.45 to 154.49 MHz or the 173.2 to 173.4 MHz bands must have a frequency stability of 5 ppm.

[5]In the 150-174 MHz band, fixed and base stations with a 12.5 kHz channel bandwidth must have a frequency stability of 2.5 ppm. Fixed and base stations with a 6.25 kHz channel bandwidth must have a frequency stability of 1.0 ppm.

[6]In the 150-174 MHz band, mobile stations designed to operate with a 12.5 kHz channel bandwidth or designed to operate on a frequency specifically designated for itinerant use or designed for low-power operation of two watts or less, must have a frequency stability of 5.0 ppm. Mobile stations designed to operate with a 6.25 kHz channel bandwidth must have a frequency stability of 2.0 ppm.

[7]In the 421-512 MHz band, fixed and base stations with a 12.5 kHz channel bandwidth must have a frequency stability of 1.5 ppm. Fixed and base stations with a 6.25 kHz channel bandwidth must have a frequency stability of 0.5 ppm.

[8]In the 421-512 MHz band, mobile stations designed to operate with a 12.5 kHz channel bandwidth must have a frequency stability of 2.5 ppm. Mobile stations designed to operate with a 6.25 kHz channel bandwidth must have a frequency stability of 1.0 ppm.
[9]Fixed stations with output powers above 120 watts and necessary bandwidth less than 3 kHz must operate with a frequency stability of 100 ppm. Fixed stations with output powers less than 120 watts and using time-division multiplex, must operate with a frequency stability of 500 ppm.
[10]Except for DSRCS equipment in the 5850-5925 MHz band, frequency stability is to be specified in the station authorization. Frequency stability for DSRCS equipment in the 5850-5925 MHz band is specified in subpart M of this part.
[11]Paging transmitters operating on paging-only frequencies must operate with frequency stability of 5 ppm in the 150-174 MHz band and 2.5 ppm in the 421-512 MHz band.
[12]Mobile units may utilize synchronizing signals from associated base stations to achieve the specified carrier stability.
[13]Fixed non-multilateration transmitters with an authorized bandwidth that is more than 40 kHz from the band edge, intermittently operated hand-held readers, and mobile transponders are not subject to frequency tolerance restrictions.
[14]Control stations may operate with the frequency tolerance specified for associated mobile frequencies.

(b) For the purpose of determining the frequency stability limits, the power of a transmitter is considered to be the maximum rated output power as specified by the manufacturer.

RSS-119 clause 5.3
The carrier frequency shall not depart from the reference frequency in excess of the values given in Table 1. For transmitters that have an output power of less than 120 mW, the frequency stability shall comply with the limits listed in Table 1 or, alternatively, with the conditions in Section 5.10.

For fixed and base station equipment, in lieu of meeting the frequency stability limit specified in Table 1, the test report can show that the frequency stability is met by demonstrating that the unwanted emission limits, related to the equipment's nominal carrier frequency measured under normal operation, are met when the equipment is tested at the temperature and supply voltage variations specified for the frequency stability measurement in RSS-Gen.

Frequency Band (MHz)	Channel Bandwidth (kHz)	Frequency Stability (ppm)		
		Base/Fixed	Mobile Station	
			Output Power > 2 W	Output Power ≤ 2 W
806-821/851-866 and 821-824/866-869 (Note 6)	25 (Note 2)	0.1	0.1	0.1
	25	1.5	2.5	2.5
	12.5	1	1.5	1.5
	6.25	0.1	0.4	0.4

Test date: 2019-06-18 and 2019-06-19
Test results: Pass

Special notes
Modulation used: CW.

Test data

Test conditions	Frequency, GHz	Drift, Hz	ppm
+50 °C, Nominal	855.999.361	9	0,01
+40 °C, Nominal	855.999.330	40	0,05
+30 °C, Nominal	855.999.297	73	0,09
+20 °C, +15 %	855.999.372	-2	0,00
+20 °C, Nominal	855.999.370	***Reference***	***Reference***
+20 °C, –15 %	855.999.378	-8	-0,01
+10 °C, Nominal	855.999.365	5	0,01
0 °C, Nominal	855.999.360	10	0,01
–10 °C, Nominal	855.999.333	37	0,04
–20 °C, Nominal	855.999.345	25	0,03
–30 °C, Nominal	855.999.310	60	0,07

6.9 Spurious emissions radiated measurements

FCC 90.210(d)

Emission Mask D — 12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

(1) On any frequency from the center of the authorized bandwidth f_0 to 5.625 kHz removed from f_0: Zero dB.

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least 7.27(fd–2.88 kHz) dB.

(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz: At least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.

(4) The reference level for showing compliance with the emission mask shall be established using a resolution bandwidth sufficiently wide (usually two or three times the channel bandwidth) to capture the true peak emission of the equipment under test. In order to show compliance with the emission mask up to and including 50 kHz removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 Hz with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrument resolution bandwidth. For emissions beyond 50 kHz from the edge of the authorized bandwidth, see paragraph (o) of this section. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, an alternate procedure may be used provided prior Commission approval is obtained.

RSS-131 clause 6.6(2)

The retransmitted signals shall meet the unwanted emission limits in the RSS that applies to the equipment with which the zone enhancer is to be used.

RSS-119 clause 5.8.3

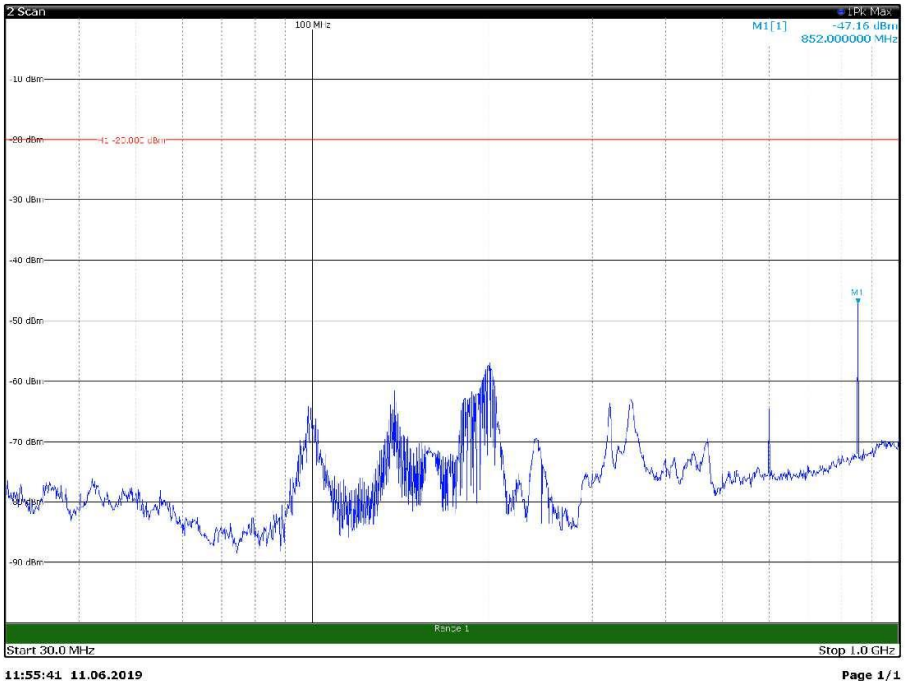
Emission Mask D for Transmitters Equipped With or Without an Audio Low-Pass Filter. The power of any emission shall be attenuated below the transmitter output power P (dBW) as specified in Table 7.

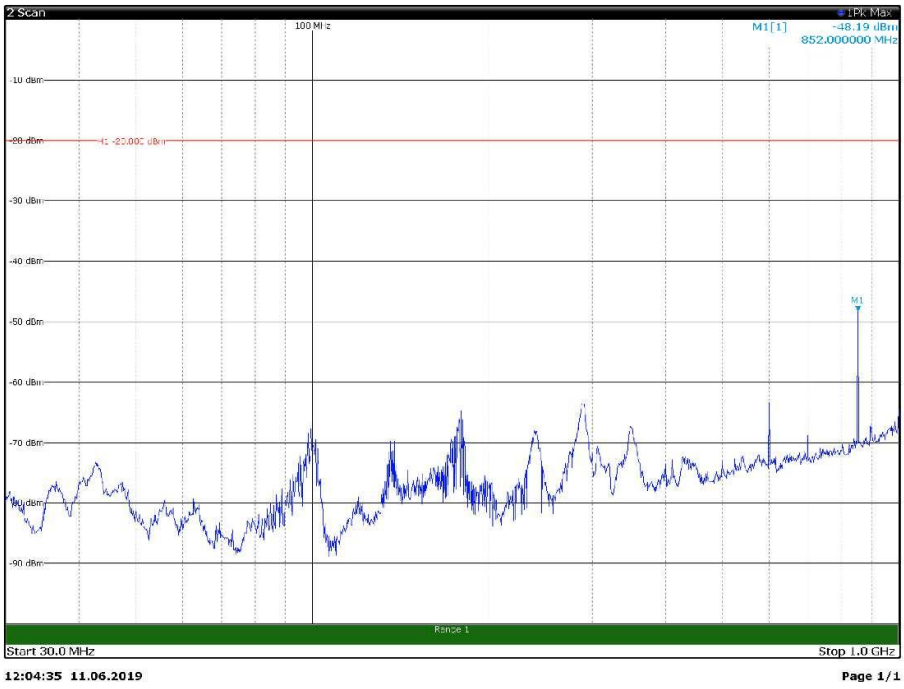
Table 7 — Emission Mask D

Displacement Frequency, f_d (kHz)	Minimum Attenuation (dB)	Resolution Bandwidth (Hz)
$5.625 < f_d \leq 12.5$	$7.27(f_d-2.88)$	Specified in Section 4.2.2
$f_d > 12.5$	Whichever is the lesser: 70 or $50 + 10 \log_{10}(p)$	Specified in Section 4.2.2

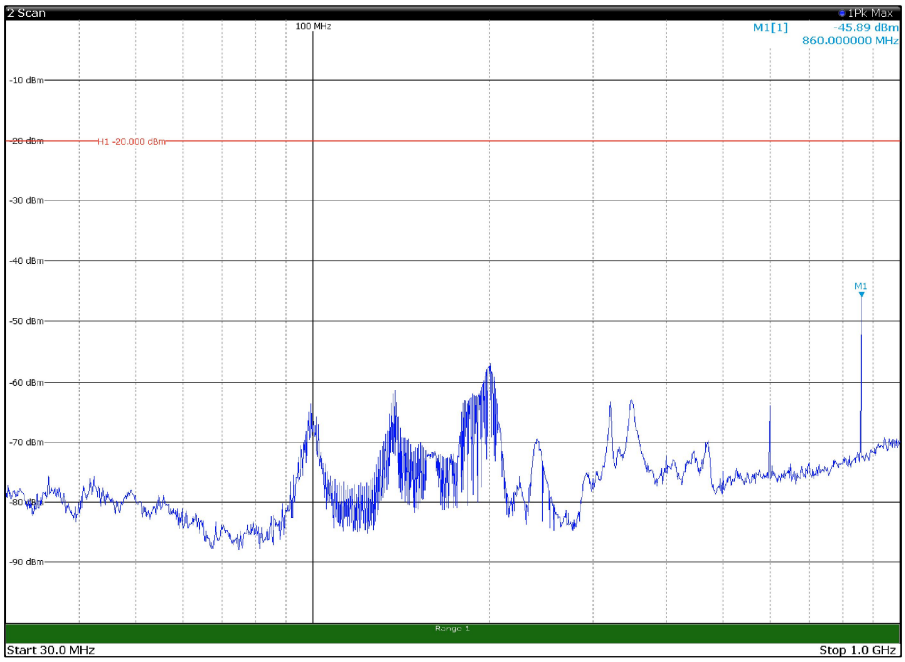
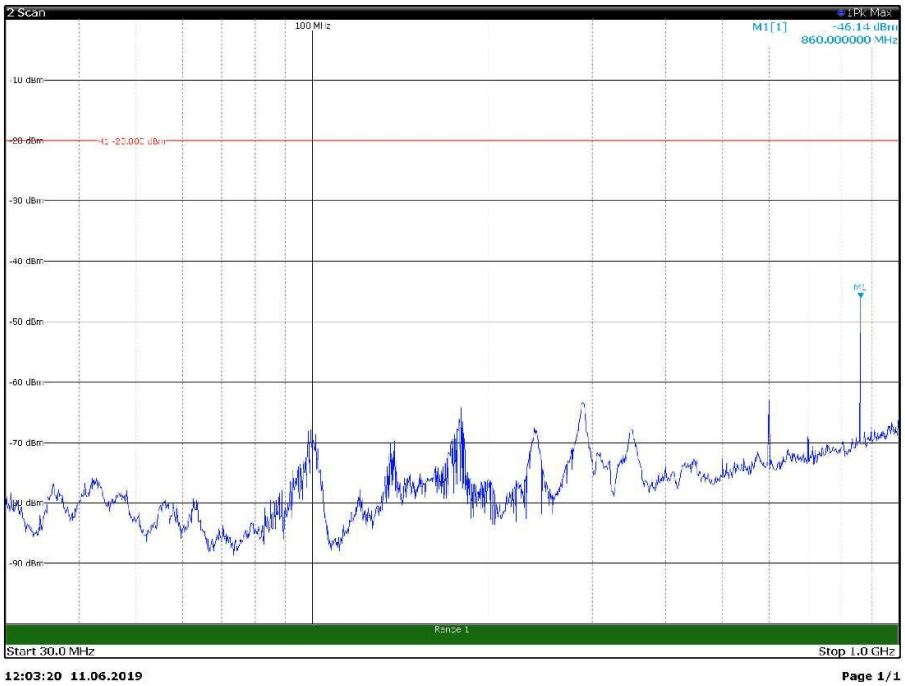
Test date: 2019-06-10 and 2019-06-11
Test results: Pass

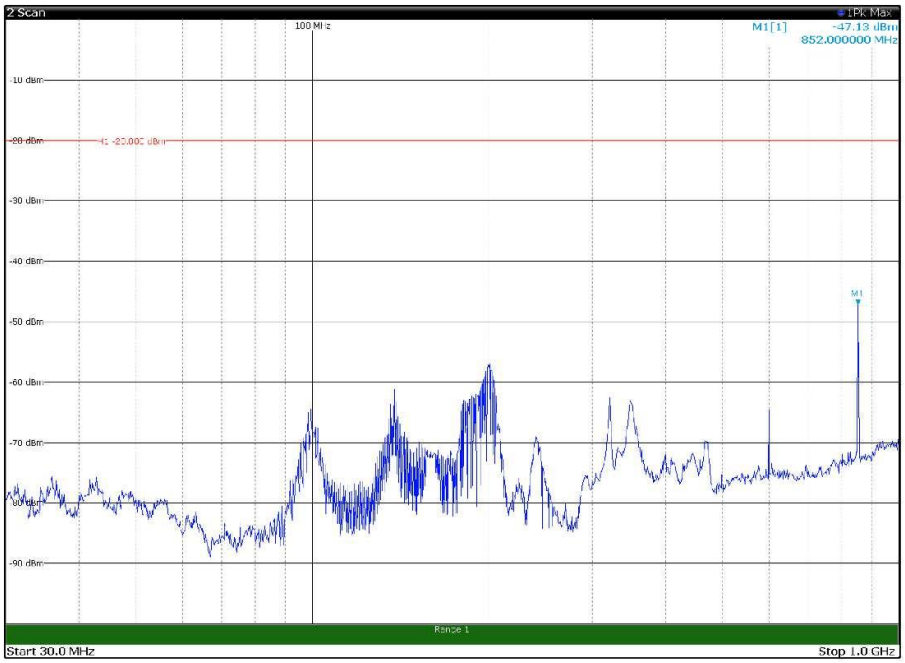
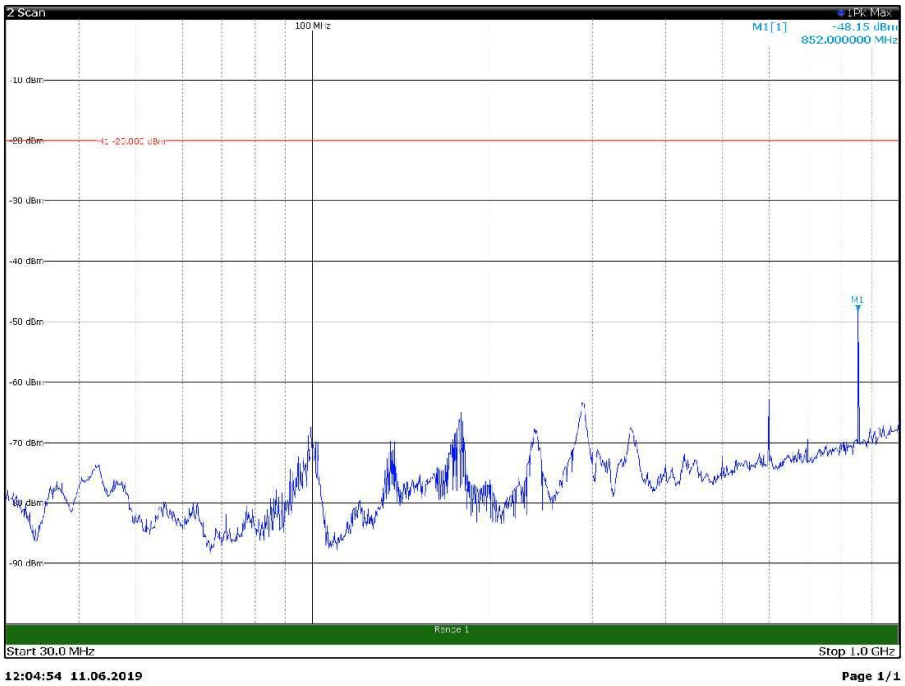
Special notes
Modulation used: CW and 8K70D1W.

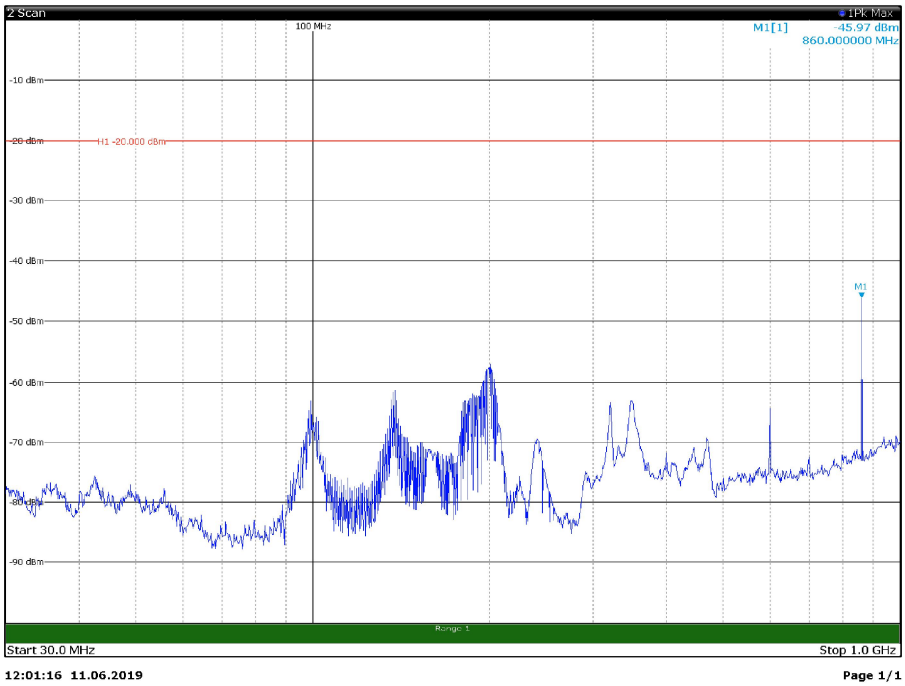
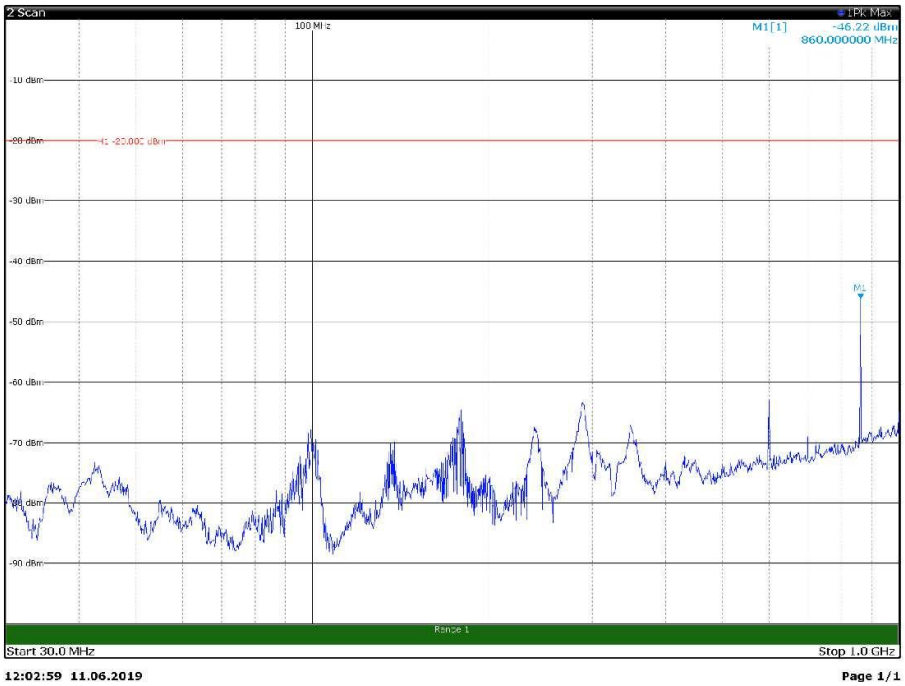
Test data
Spurious radiated emissions 30 MHz to 1 GHz
Spurious radiated emissions with input at AGC threshold with CW signal at 852 MHz

Horizontal polarization

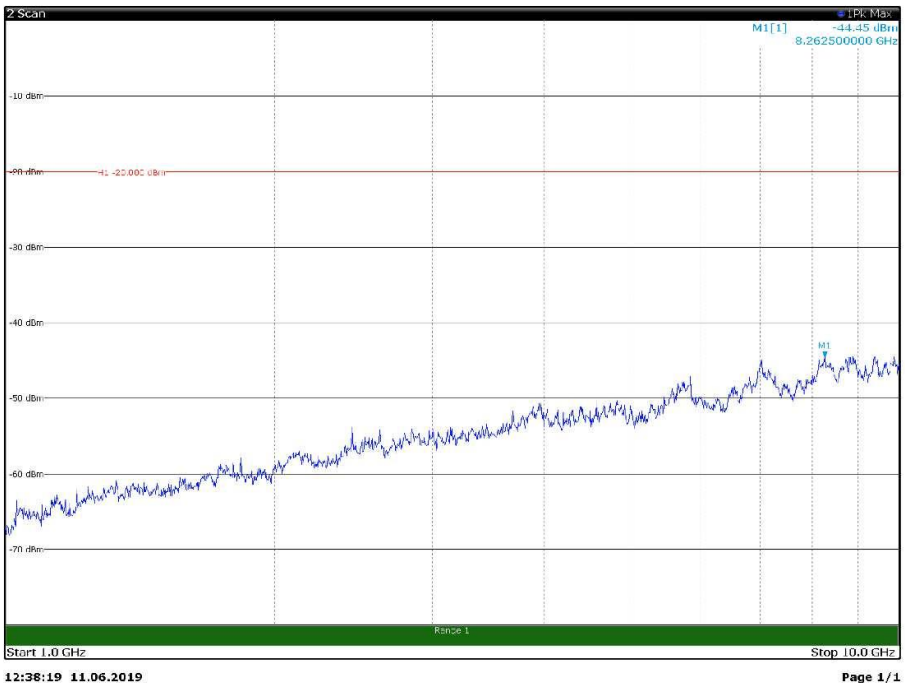
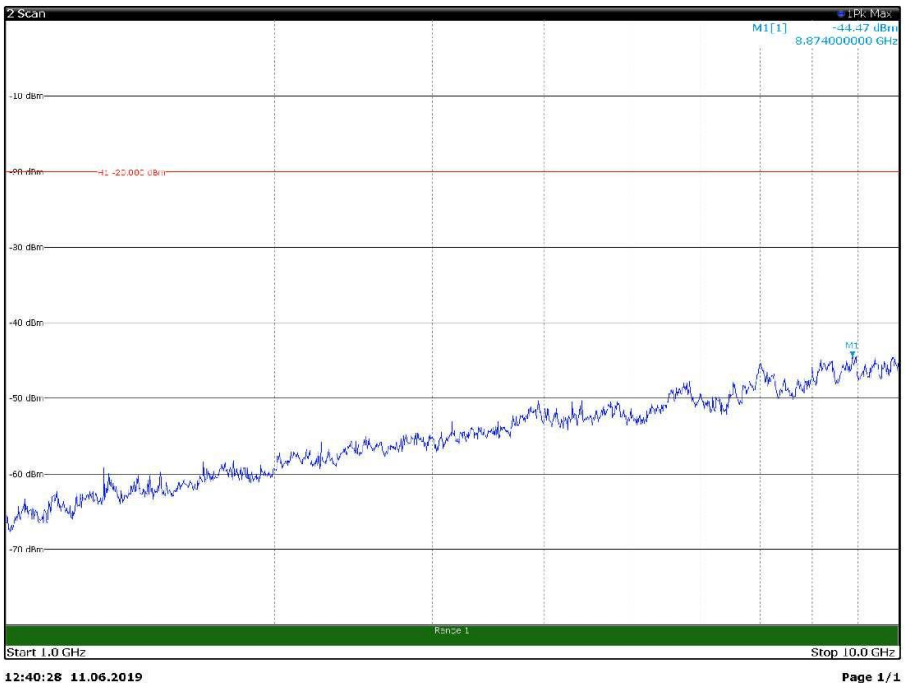


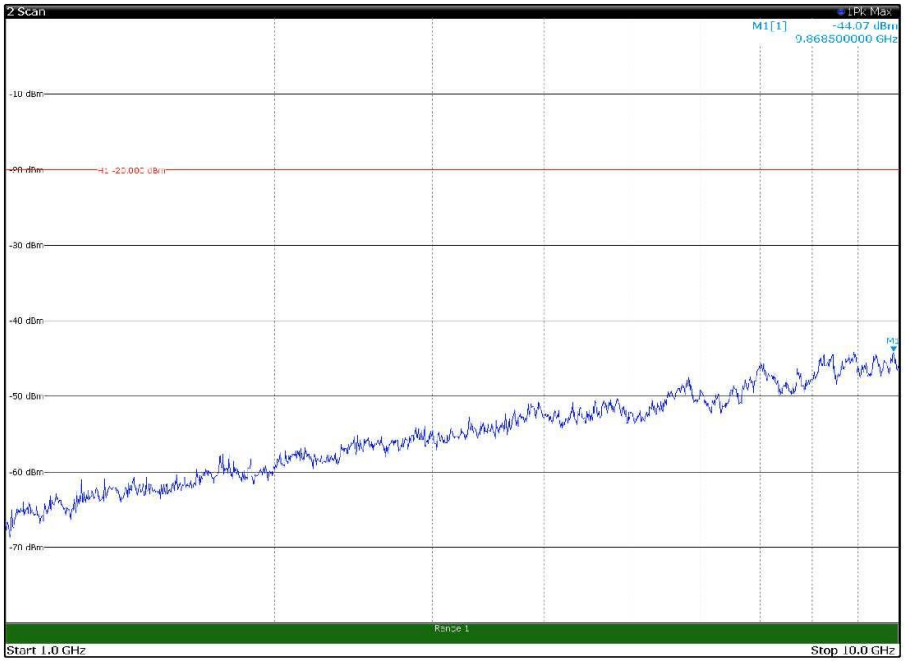
Vertical polarization

Spurious radiated emissions with input at AGC threshold with CW signal at 860 MHz

Horizontal polarization

Vertical polarization

Spurious radiated emissions with input at AGC threshold with 8K70D1W signal at 852 MHz

Horizontal polarization

Vertical polarization

Spurious radiated emissions with input at AGC threshold with 8K70D1W signal at 860 MHz

Horizontal polarization

Vertical polarization

Spurious radiated emissions 1 GHz to 10 GHz
Spurious radiated emissions with input at AGC threshold with CW signal at 852 MHz

Horizontal polarization

Vertical polarization

Spurious radiated emissions with input at AGC threshold with CW signal at 860 MHz

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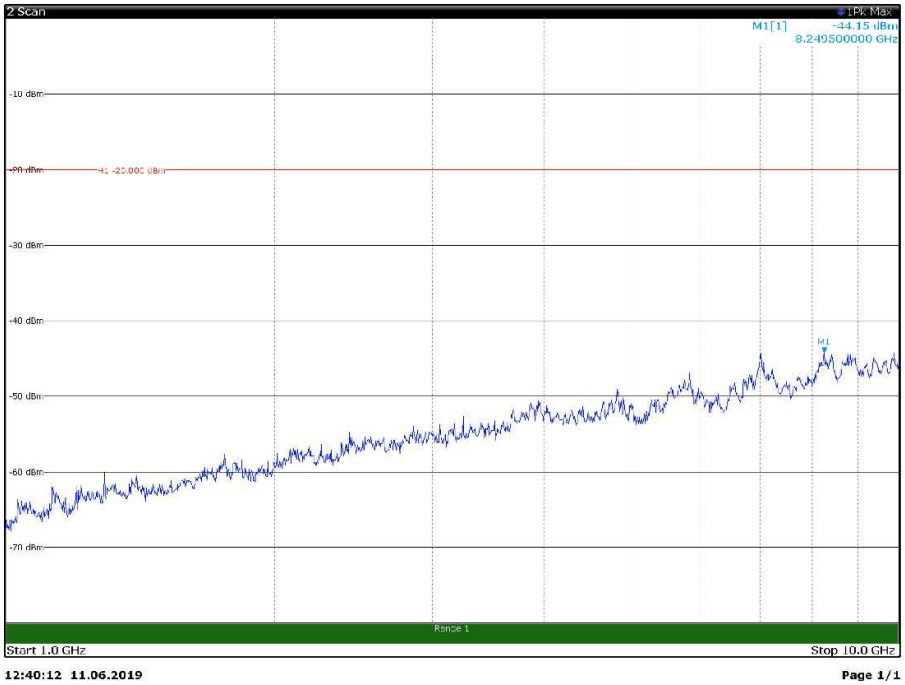
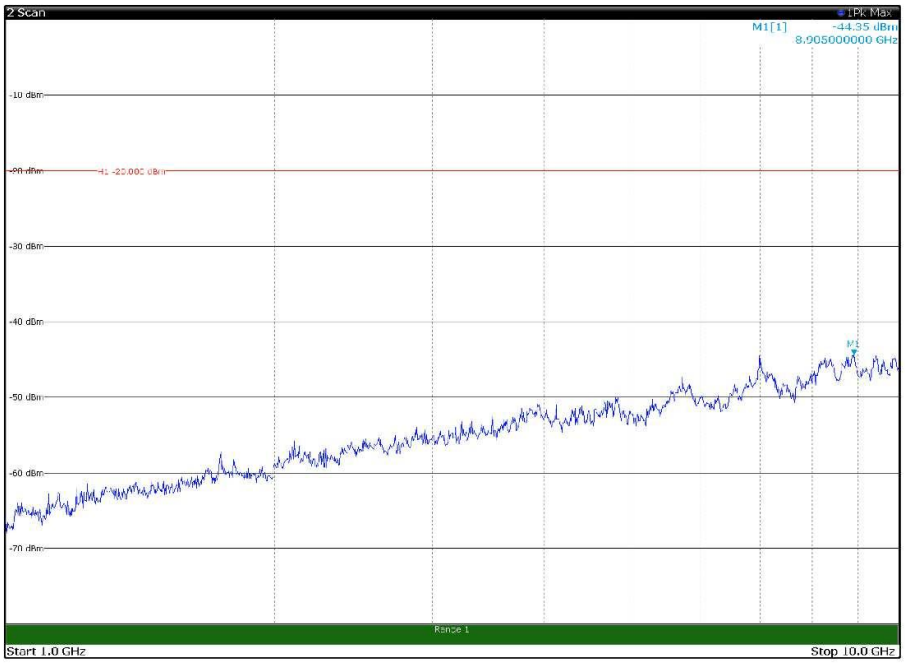
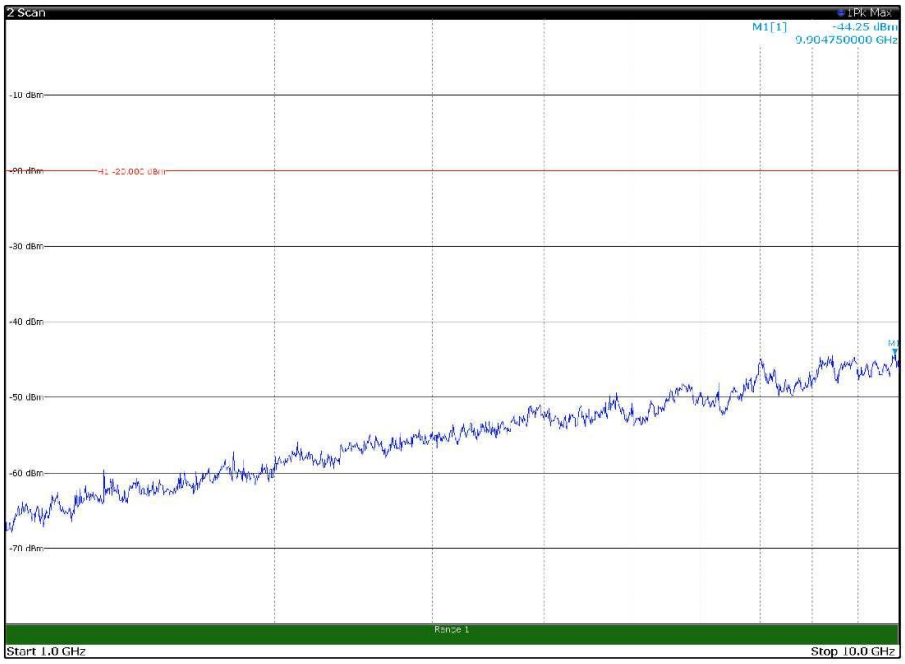
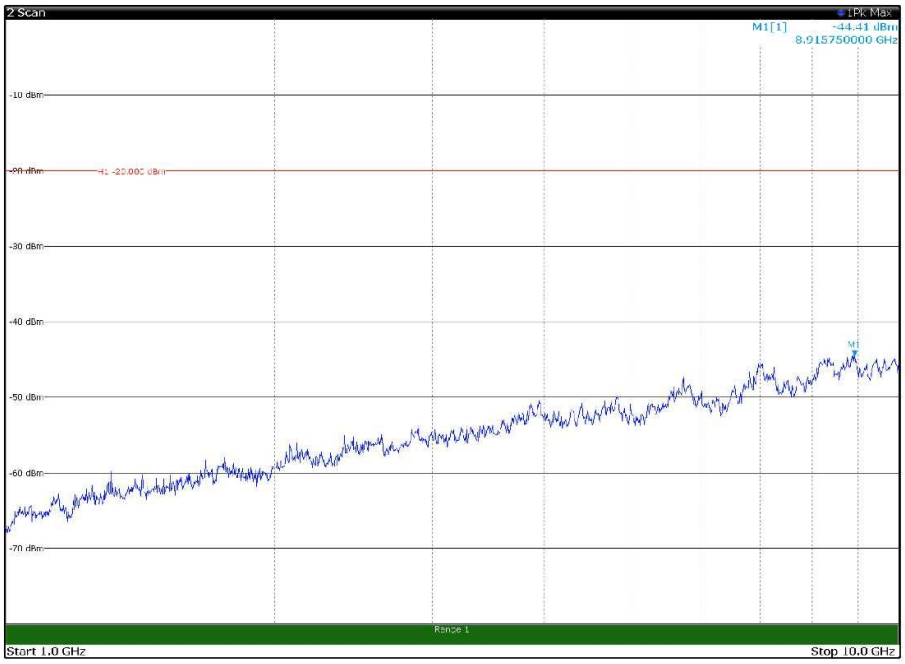
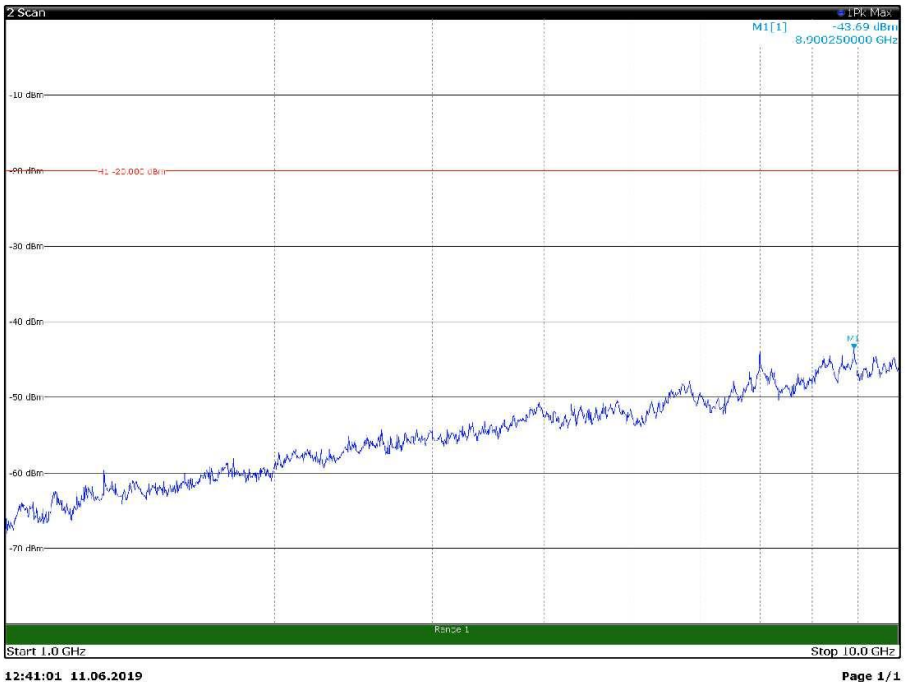
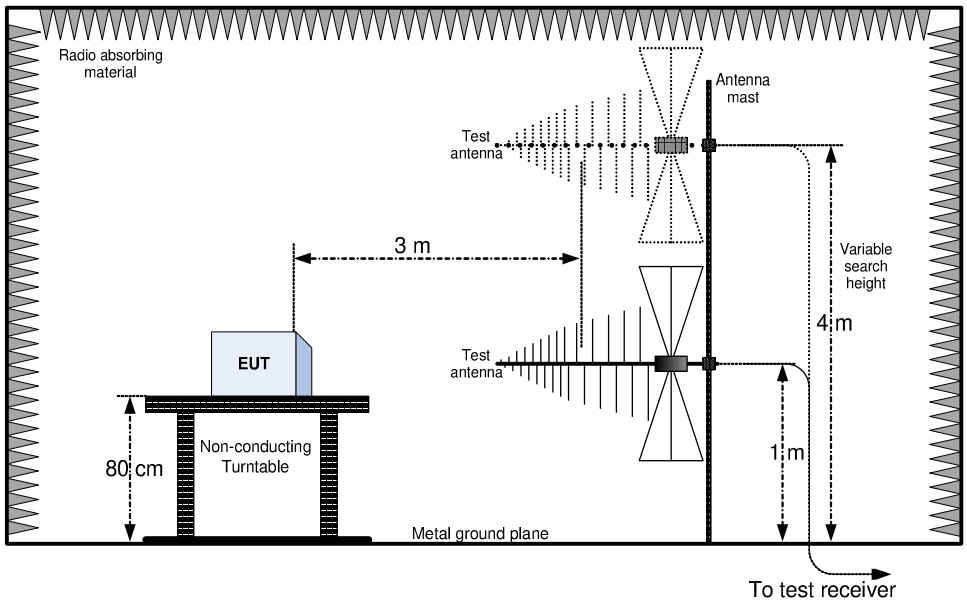

Vertical polarization

Spurious radiated emissions with input at AGC threshold with 8K7D1W signal at 852 MHz

Horizontal polarization

Vertical polarization

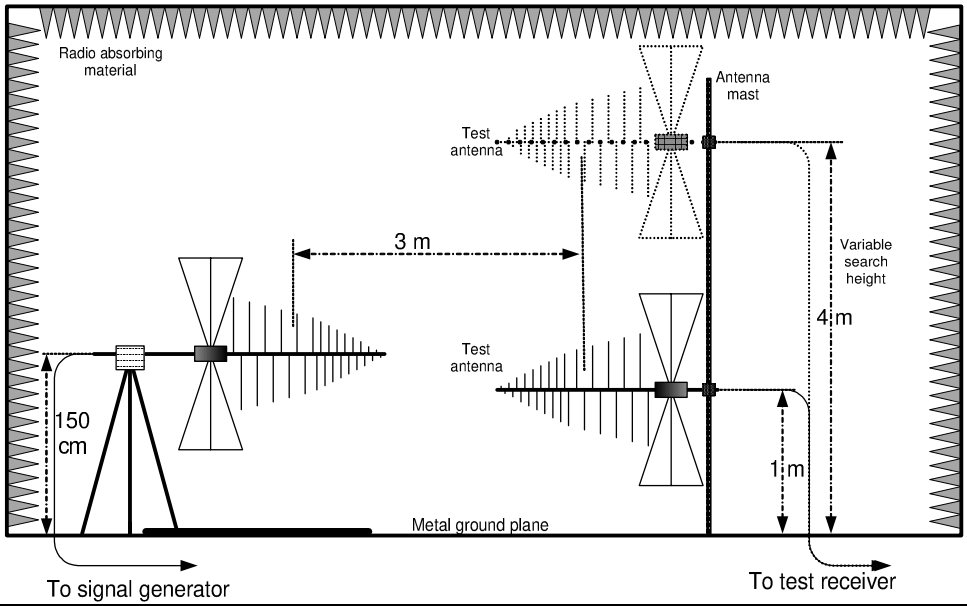
Spurious radiated emissions with input at AGC threshold with 8K7D1W signal at 860 MHz

Horizontal polarization

Vertical polarization

Appendix A: Block diagrams of test set-ups

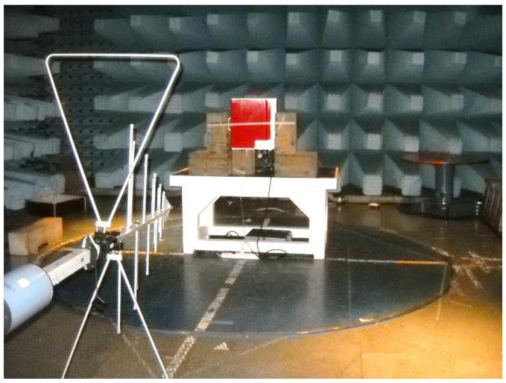
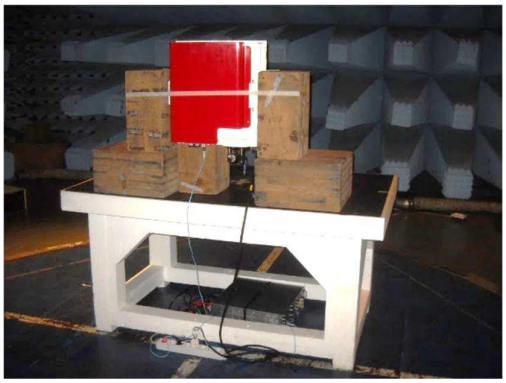
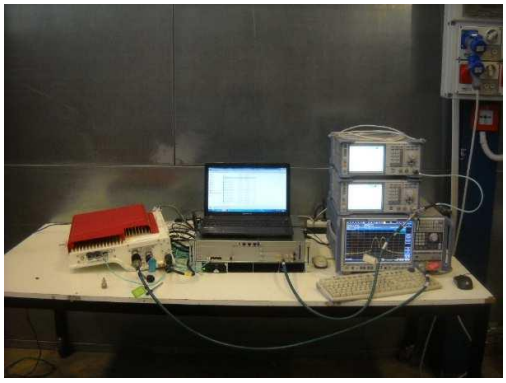
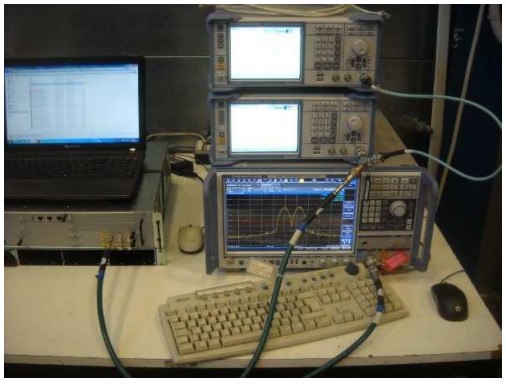
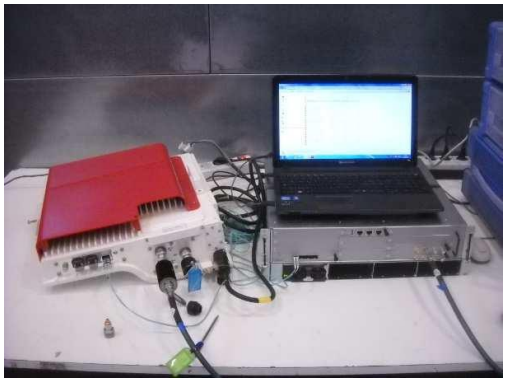
Radiated emissions set-up



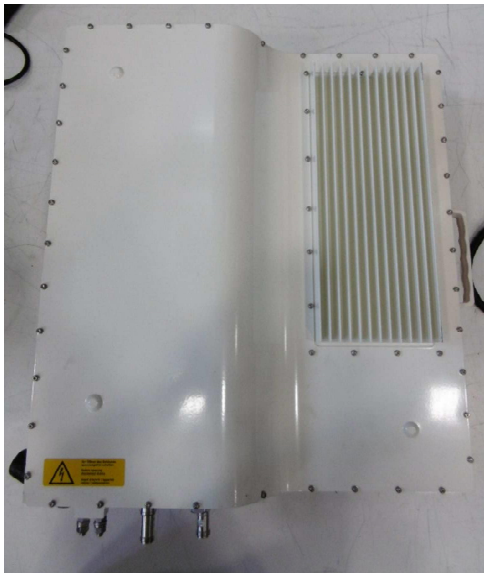
Substitution method set-up



Appendix B: Photos

Set-up photos	
	
	
	

EUT photos



End of report