

Test Report

Model : VHF300

Number : 001

Date : May 8, 2009

List of Equipments to Testing

Equipment Name	Manufacturer	Model Number	Serial Number
1. DC Power Supply	Kenwood	PD18-10A	2090005
2. Frequency Counter	Anritsu	MF1603A	M18965
3. Power Meter	Hewlett Packard	E4418B	GB38410794
4. Modulation Analyzer	Hewlett Packard	8901B	3704A05799
5. Spectrum Analyzer	Rohde & Schwarz	FSEB 30	91440056
6. Oscilloscope	Yokogawa	DL-1540	26WY1512
7. RF Signal Generator	Hewlett Packard	8664A	3744A01741
8. RF Signal Generator	Anritsu	MG3633A	M20866
9. RF Signal Generator	Anritsu	MG3633A	M20966
10. Audio Analyzer	Hewlett Packard	8903B	3729A18310
11. Bit Error Counter	Anritsu	MP1201C	M05358
12. RF Attenuator	Tamagawa	CFA-50NPJ-30	914291
13. High Pass Filter	Anritsu	MP526B	6200378104
14. RF Signal Combiner	Anritsu	MP659A	6200260875
15. Power Sensor	Hewlett Packard	8482B	3318A06656

Test Standard : ETSI EN301025

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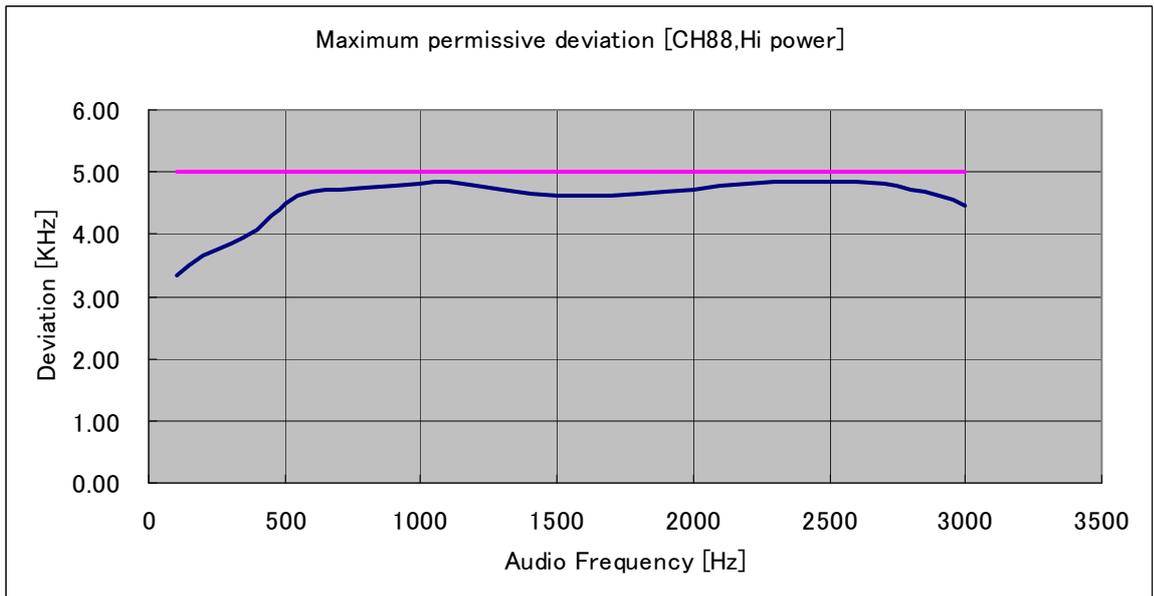
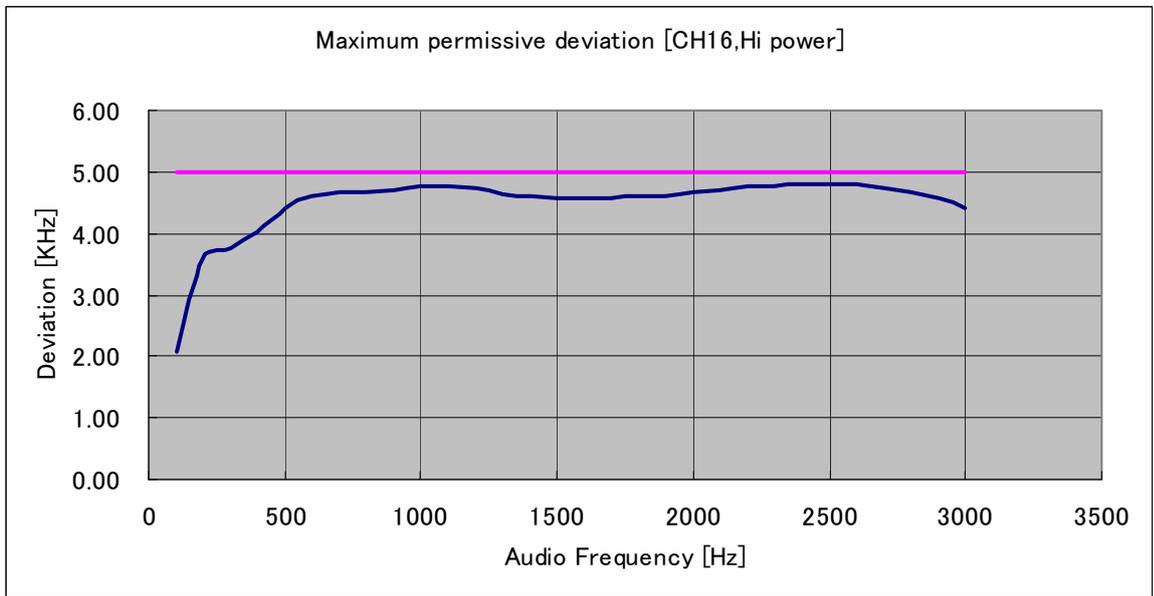
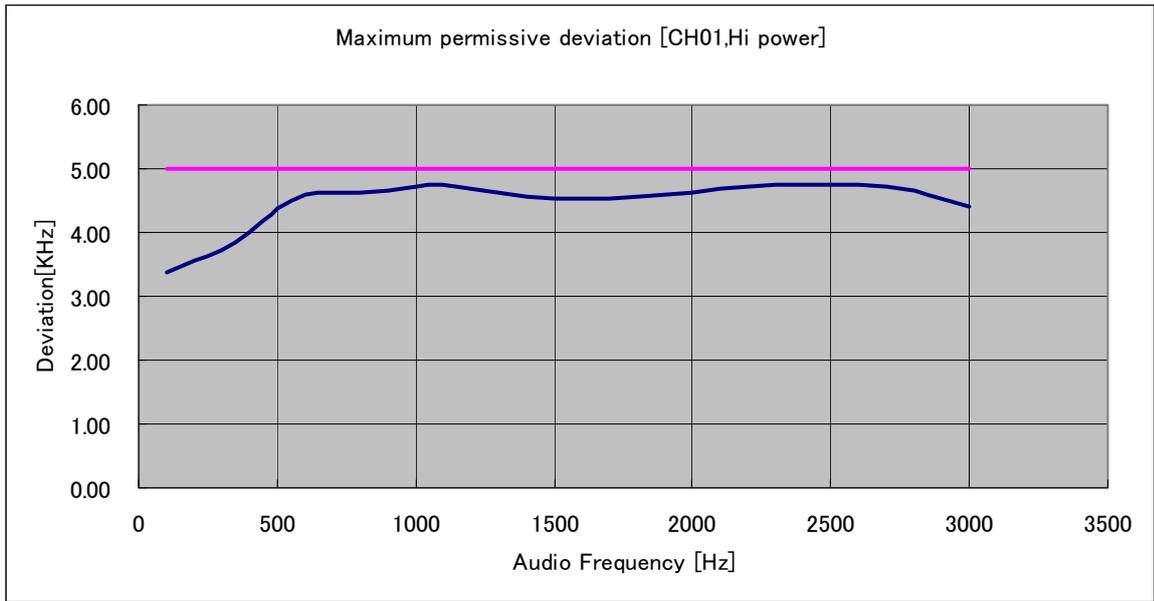
1. Transmitter Frequency Error

EN Requierments	Clause	Test Descripton				
EN301 025-1	8.1	EN301 025-1 , 8.1				
EN300 698-1	8.1					
	Temp.	Channel	Volt:12V	Volt:10.8V	Volt:15.6V	Unit
Hi Power	Norm	01	26	26	26	Hz
	-15	01	60	60	60	Hz
	55	01	-195	-195	-195	Hz
	Norm	16	26	26	26	Hz
	-15	16	60	60	60	Hz
	55	16	-195	-195	-195	Hz
	Norm	88	26	26	26	Hz
	-15	88	60	60	60	Hz
	55	88	-195	-195	-195	Hz
Lo Power	Norm	01	26	26	26	Hz
	-15	01	60	60	60	Hz
	55	01	-195	-195	-195	Hz
	Norm	16	26	26	26	Hz
	-15	16	60	60	60	Hz
	55	16	-195	-195	-195	Hz
	Norm	88	26	26	26	Hz
	-15	88	60	60	60	Hz
	55	88	-195	-195	-195	Hz
Limit	+/- 1500Hz					
Measuring Equipment	1,2,13					
Result	Pass					

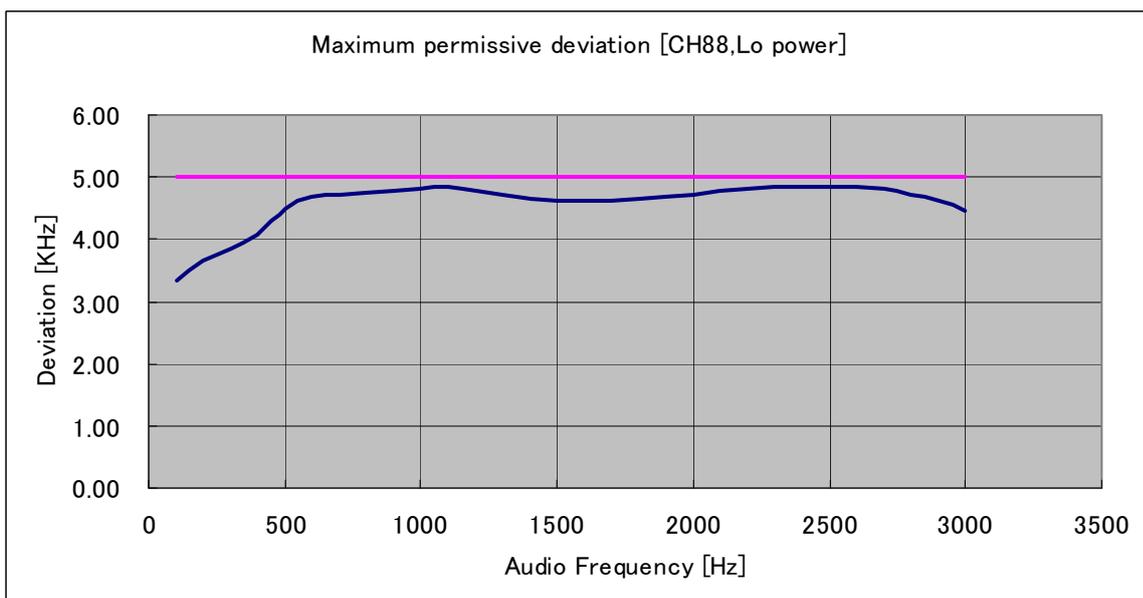
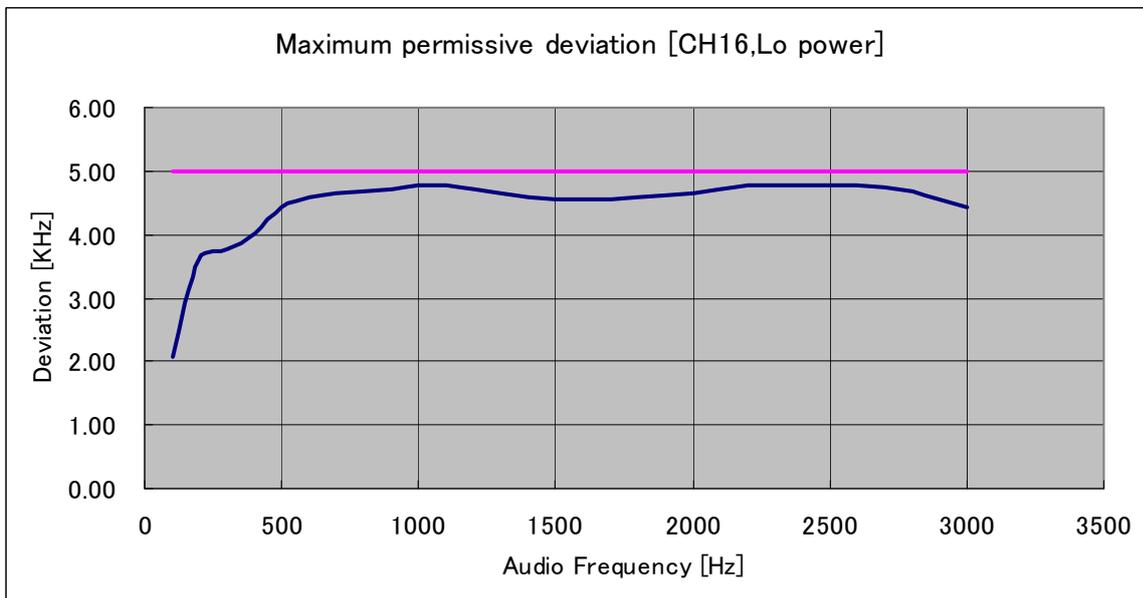
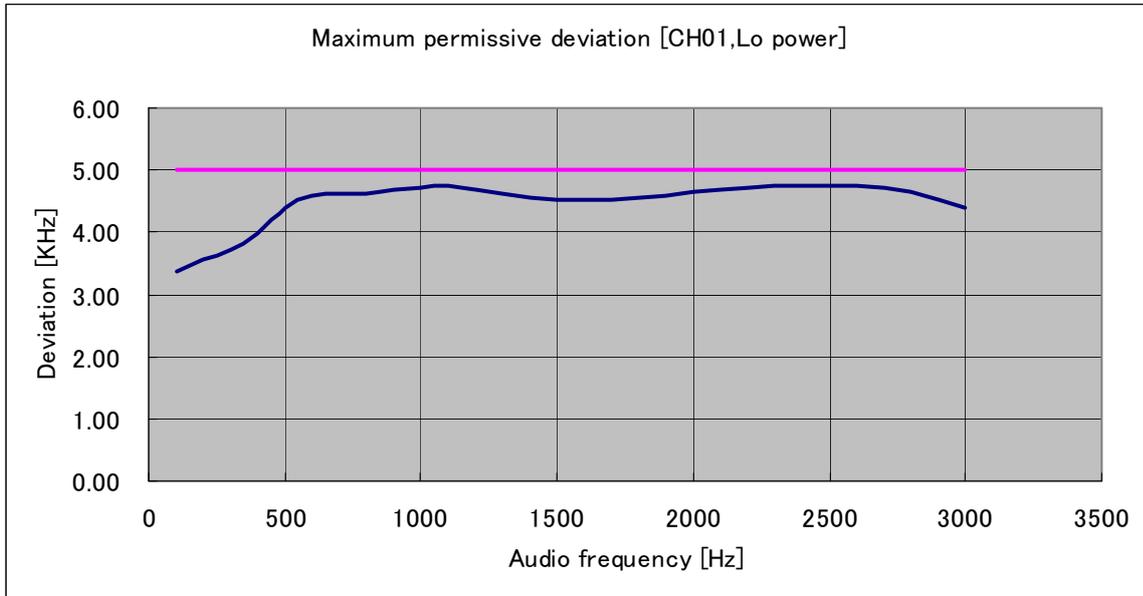
2. Transmitter Carrier power

EN Requierments	Clause	Test Descripton				
EN300 162-2	4.2.2	EN 300 162-1 , 8.2				
EN301 025-2	4.2.6					
EN300 698-2	4.2.2					
	Temp.	Channel	Volt:12V	Volt:10.8V	Volt:15.6V	Unit
High power	Norm	01	22.3	21.9	22.6	W
High power	Norm	16	22.3	21.8	22.6	W
High power	Norm	88	22.3	21.6	22.6	W
High power	-15	01	23.5	21.6	23.8	W
High power	-15	16	23.5	22.0	23.8	W
High power	-15	88	23.6	21.3	24.0	W
High power	55	01	21.4	20.3	21.7	W
High power	55	16	21.3	20.0	21.6	W
High power	55	88	21.3	19.8	21.5	W
Low power	Norm	01	0.87	0.87	0.87	W
Low power	Norm	16	0.87	0.87	0.87	W
Low power	Norm	88	0.87	0.87	0.87	W
Low power	-15	01	0.78	0.78	0.78	W
Low power	-15	16	0.78	0.78	0.78	W
Low power	-15	88	0.78	0.78	0.78	W
Low power	55	01	0.89	0.89	0.89	W
Low power	55	16	0.89	0.89	0.89	W
Low power	55	88	0.89	0.89	0.89	W
Limit	Hi power 6 to 25W / Lo power 0,1 to 1.0W					
Measuring Equipment	1,6,7					
Result	Pass					

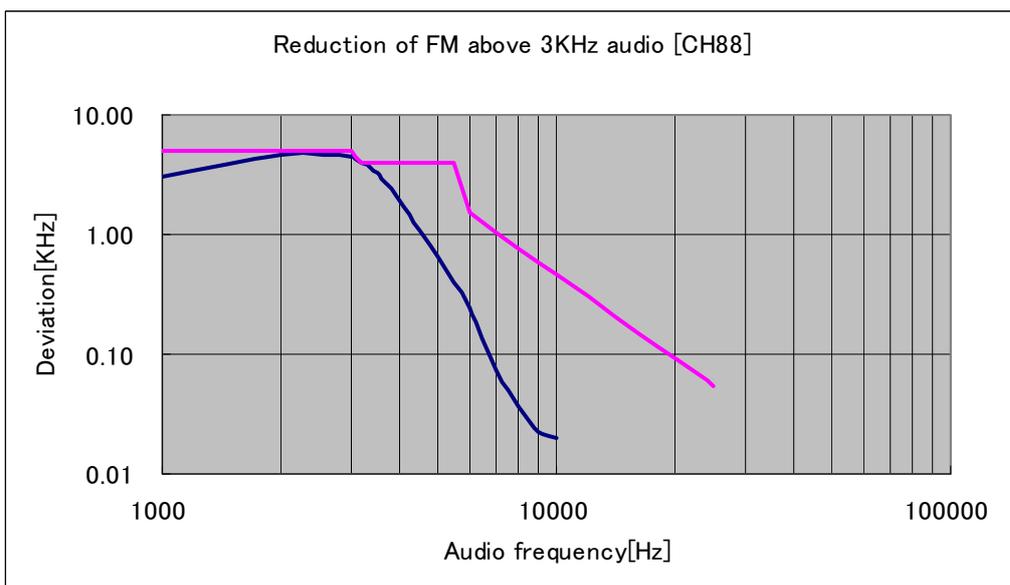
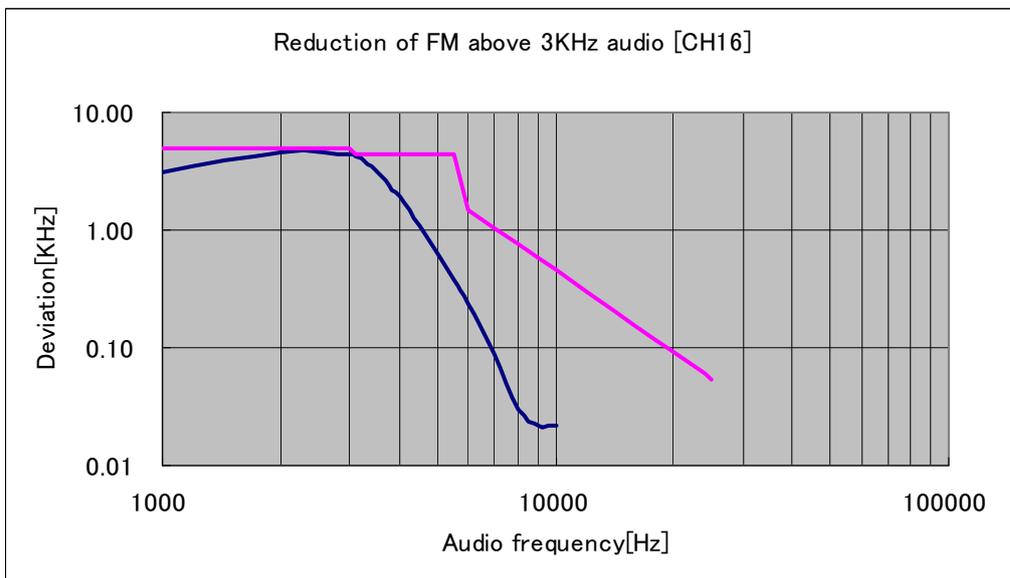
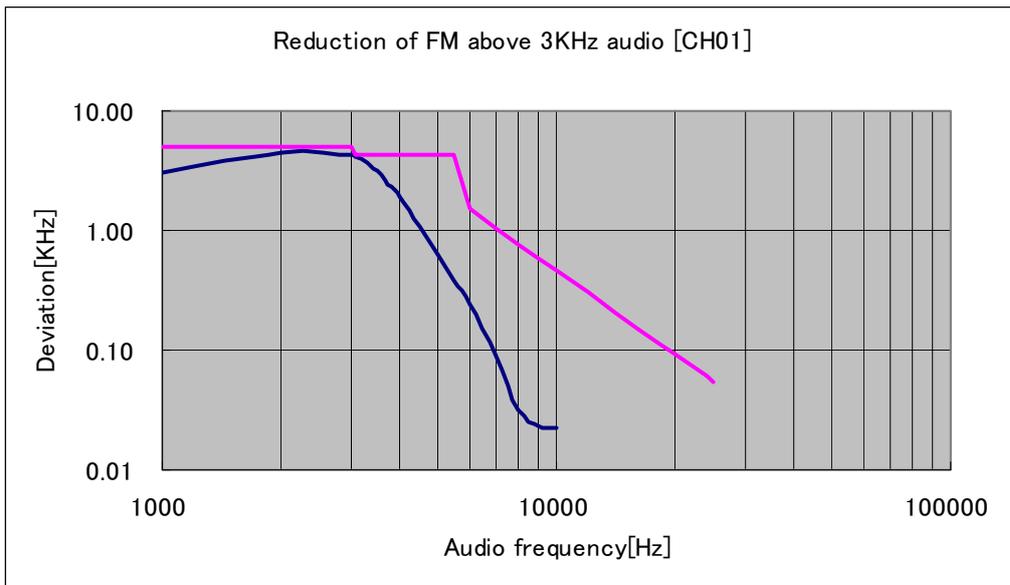
3. Maximum permissible Frequency deviation at Hi power



4. Maximum permissible Frequency deviation at Lo power



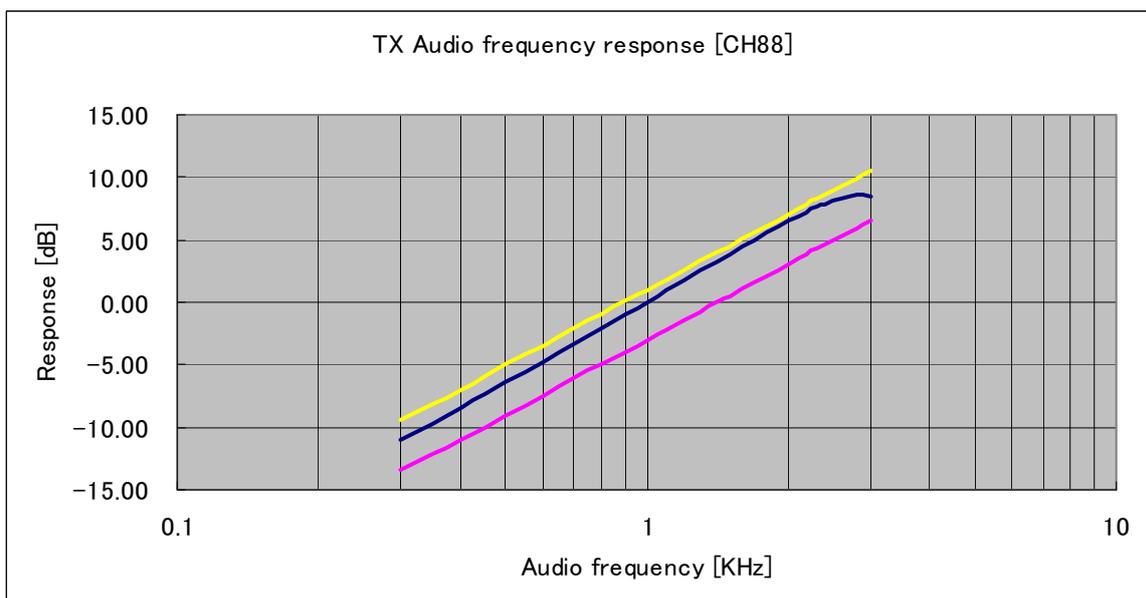
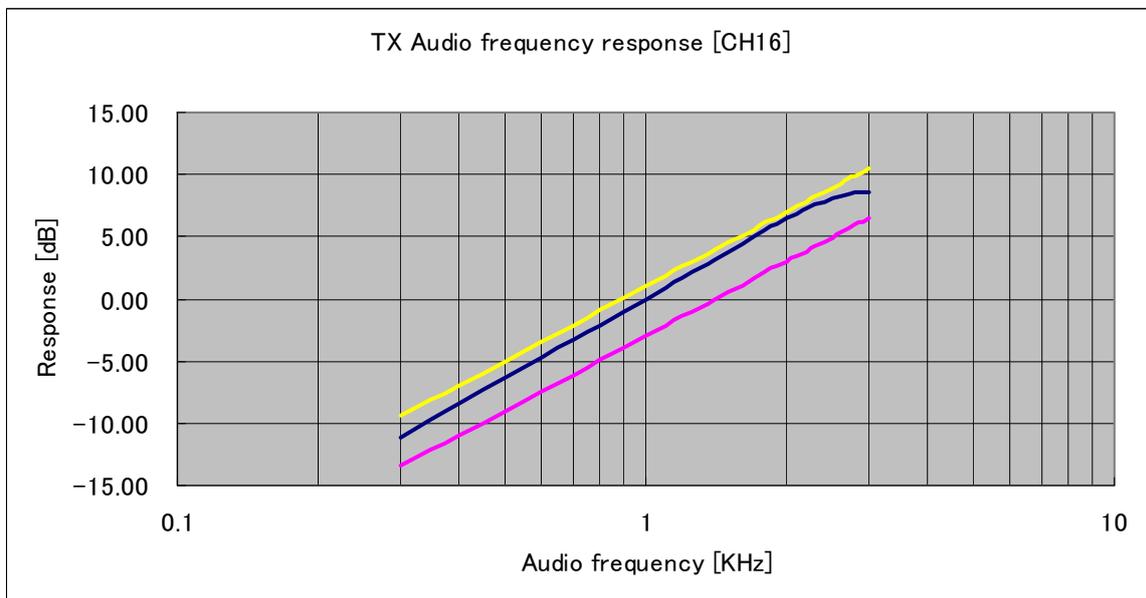
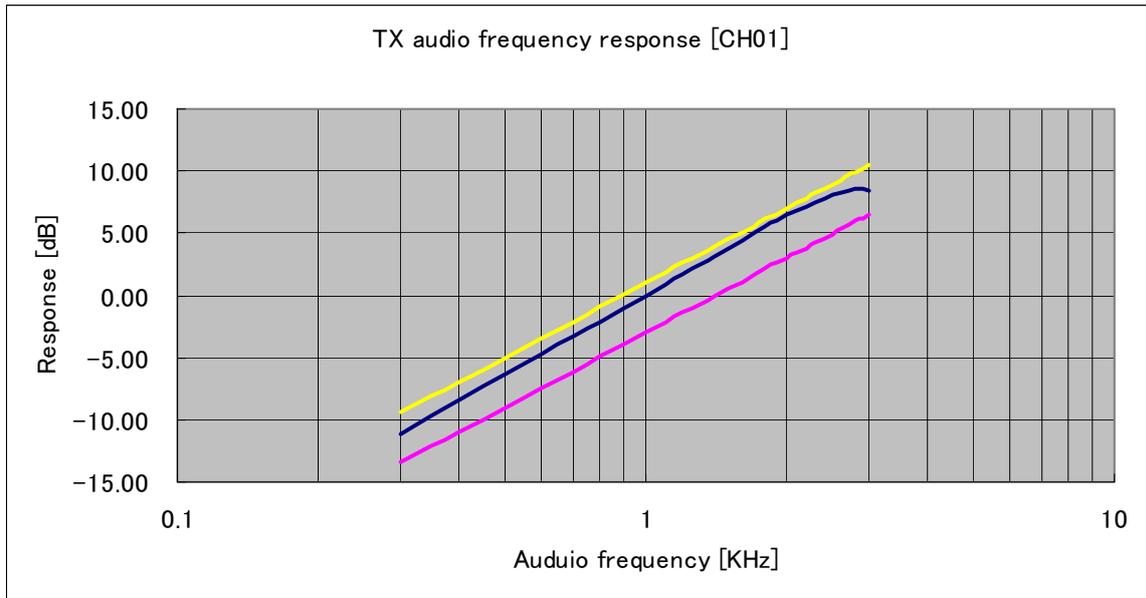
5. Reduction of FM above 3KHz audio



6. Sensitivity of the modulator including microphone

Requierments	Clause	Test Description		
EN301 025-1	8.4	EN301 025-1 8.4.2		
	Temp.	Channel	Volt:12V	Unit
	Norm	16	2.5	KHz
Acoustic level to the microphone : 94dBA at 1khz audio				
Limit	1.5 to 3KHz			
Measuring Equipment	1,8,12,17			
Result	Pass			

7. TX Audio Frequency Response

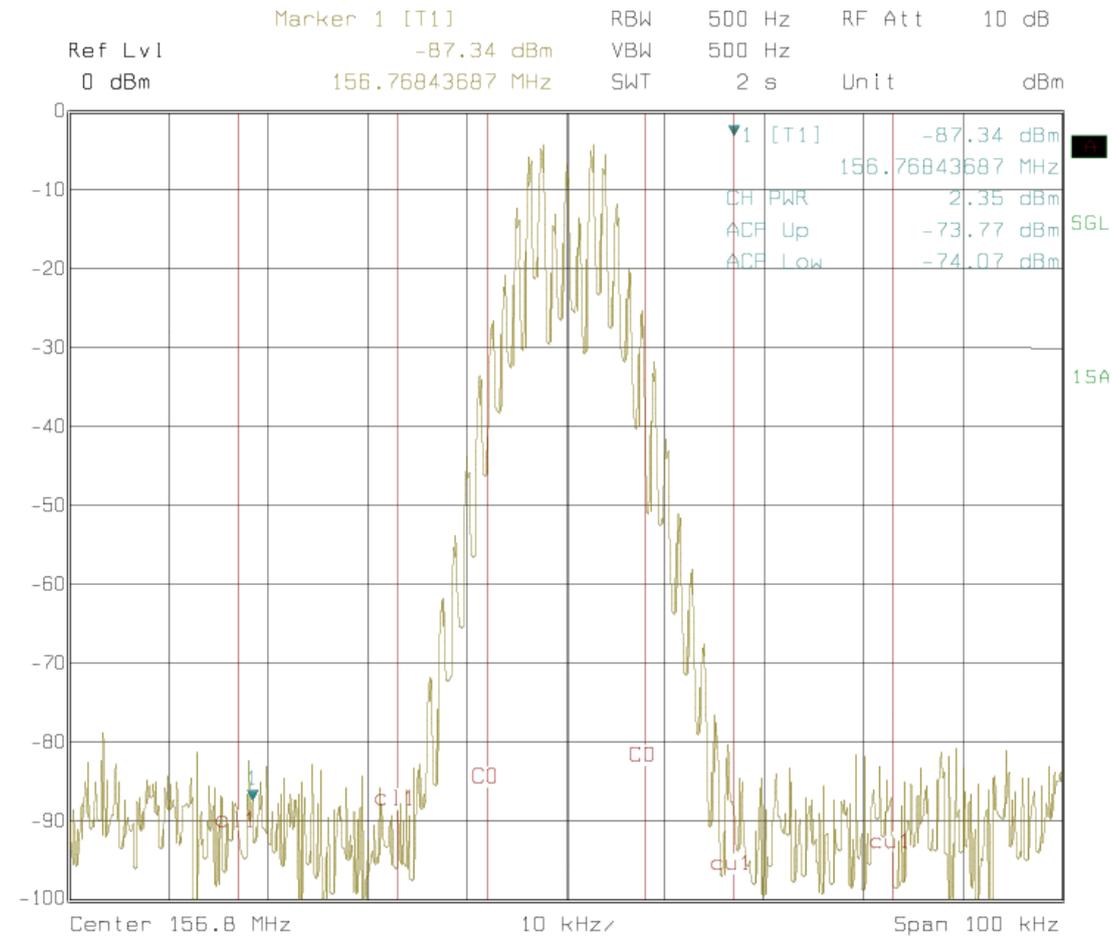


8. TX Audio Harmonic Distortion

EN Requirements	Clause	Test Description				
EN300 162-3	4.4.4	EN300 162-1 , 8.6				
EN301 025-3	4.4.3					
EN300 698-3	4.4.5					
Audio Frequency [KHz]	Temp.	Channel	Volt:12V	Volt:10.8V	Volt:15.6V	Unit
0.3	Norm	01	1.7	-	-	%
0.5	Norm	01	1.1	-	-	%
1.0	Norm	01	1.2	1.2	1.2	%
1.0	-15	01	1.2	1.2	1.2	%
1.0	55	01	1.2	1.2	1.2	%
0.3	Norm	16	1.2	-	-	%
0.5	Norm	16	1.7	-	-	%
1.0	Norm	16	1.1	1.1	1.1	%
1.0	-15	16	1.2	1.2	1.2	%
1.0	55	16	1.2	1.2	1.2	%
0.3	Norm	88	1.7	-	-	%
0.5	Norm	88	1.1	-	-	%
1.0	Norm	88	1.2	1.2	1.2	%
1.0	-15	88	1.2	1.2	1.2	%
1.0	55	88	1.2	1.2	1.2	%
Limit	<10%					
Measuring Equipment	1,8,9,12					
Result	Pass					

9. Adjacent channel power

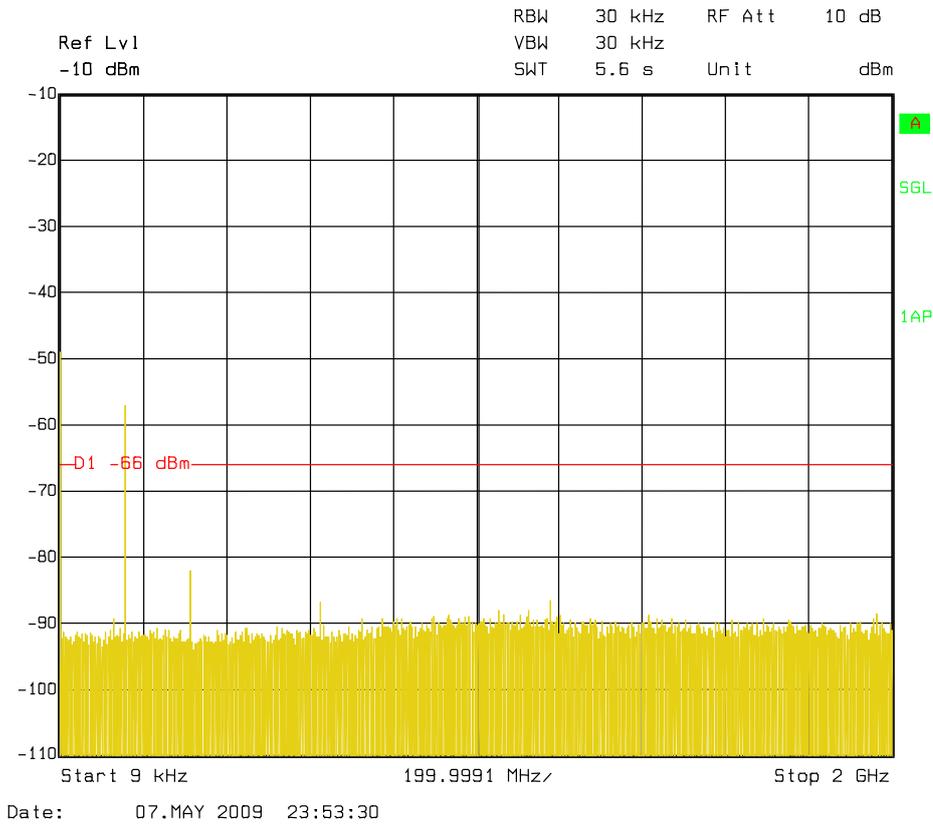
EN Requirements	Clause	Test Description		
EN300 162-2	4.2.4	EN300 162-1 , 8.7		
EN301 025-2	4.2.2			
EN300 698-2	4.2.4			
	Temp.	Channel	Volt:12V	Unit
Upper	Norm	16	-73.77	dB
Lower	Norm	16	-74.07	dB
Limit	<-70dB			
Measuring Equipment	1,9,10,12			
Result	Pass			



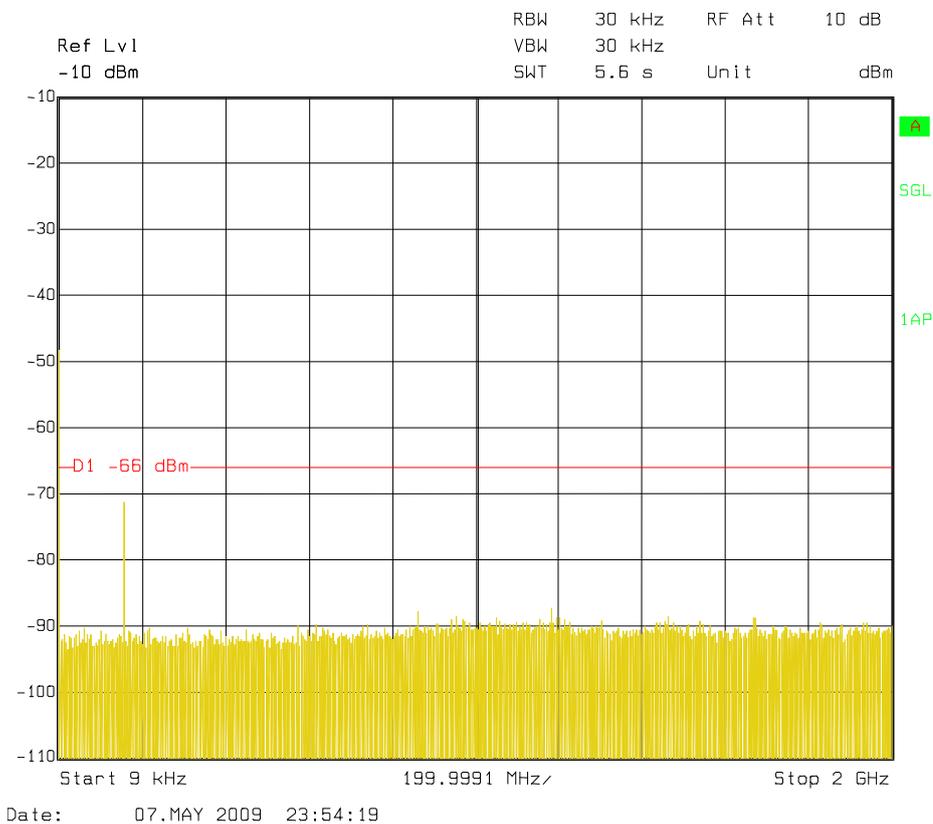
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10. TX Conducted spurious emissions conveyed to the antenna / Hi power

EN Requirements	Clause	Test Description
EN300 162-2	4.2.5	EN300 162-1 , 8.8
EN301 025-2	4.2.3	
EN300 698-2	4.2.5	



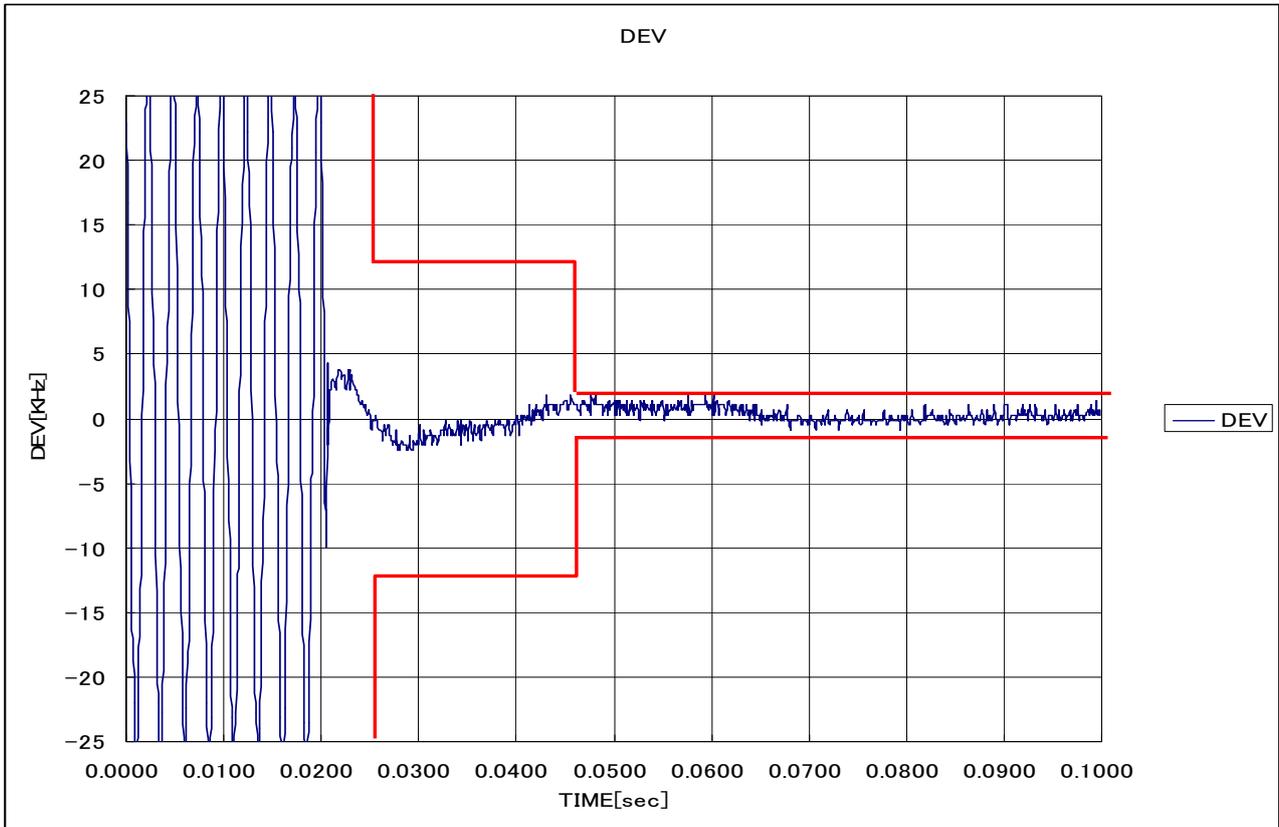
11. TX Conducted spurious emissions conveyed to the antenna / Lo power



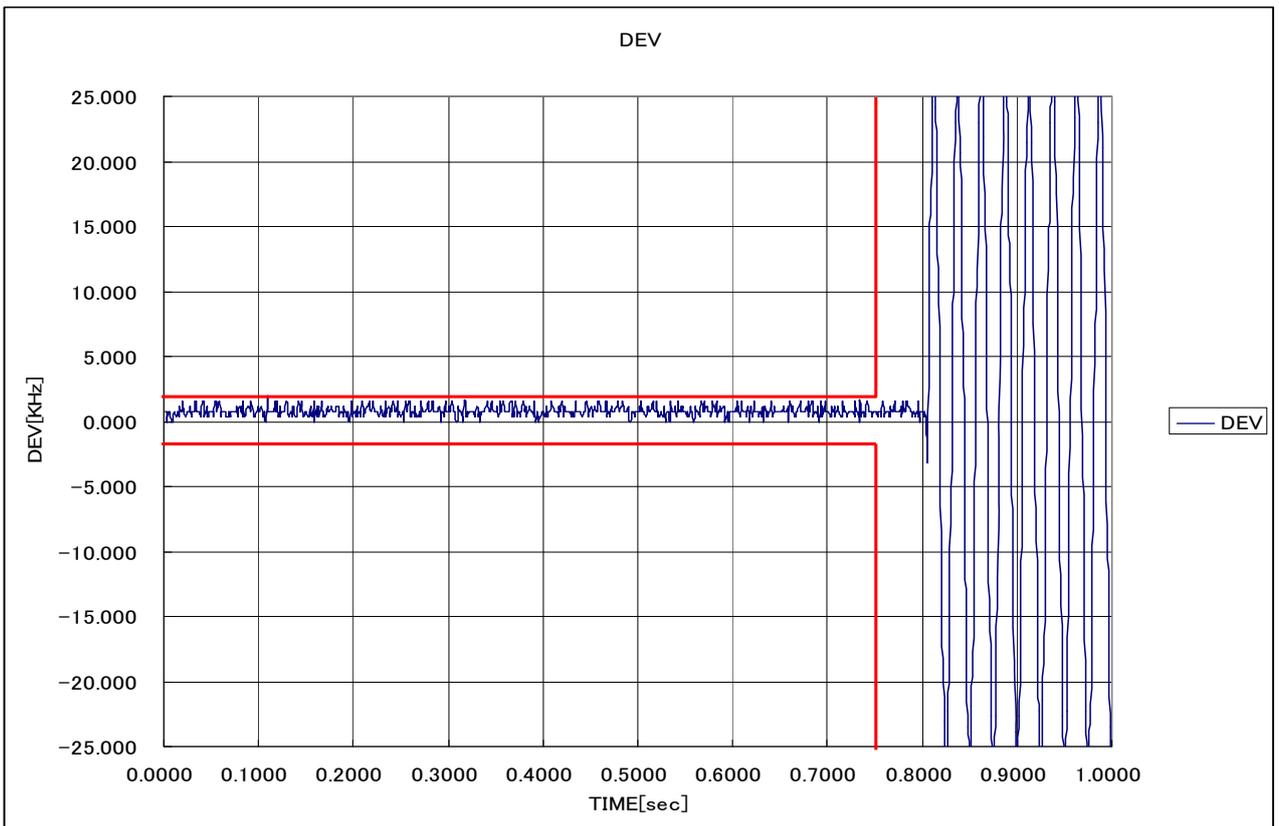
12. Transient Frequency Behaviour of the Transmitter

EN Requirements	Clause	Test Description
EN300 162-2	4.2.7	EN300 162-1 , 8.14
EN301 025-2	4.2.5	
EN300 698-2	4.2.6	

Switch on condition



Switch off condition



13. Residual modulation of the transmitter : RAY218 BASE

EN Requirements	Clause	Test Description				
EN300 162-3	4.4.5	EN300 162-1 , 8.10				
EN301 025-3	4.4.4					
EN300 698-3	4.4.6					
	Temp.	Channel	Volt:12V	Volt:10.8V	Volt:15.6V	Unit
		01	50.5	50.5	50.5	dB
	-15	01	46.0	46.0	46.0	dB
	55	01	48.0	48.0	48.0	dB
	Norm	16	50.5	50.5	50.5	dB
	-15	16	46.0	46.0	46.0	dB
	55	16	48.0	48.0	48.0	dB
	Norm	88	50.5	50.5	50.5	dB
	-15	88	46.0	46.0	46.0	dB
	55	88	48.0	48.0	48.0	dB
Limit	<-40dB					
Measuring Equipment	1,8,9,12					
Result	Pass					

14. Frequency error (Demodulated DSC signal)

EN Requirements	Clause	Test Description				
EN301 025-2	4.2.8	EN301 025-1 , 8.12				
EN301 025-3	4.4.5					
	Temp.	Channel	Volt:12V	Volt:10.8V	Volt:15.6V	Unit
B-State (2100Hz)	Norm	70	2102.4	2102.4	2102.4	Hz
Y-State (1300Hz)	Norm	70	1301.2	1301.2	1301.2	Hz
B-State (2100Hz)	-15	70	2102.4	2102.4	2102.4	Hz
Y-State (1300Hz)	-15	70	1301.2	1301.2	1301.2	Hz
B-State (2100Hz)	55	70	2102.4	2102.4	2102.4	Hz
Y-State (1300Hz)	55	70	1301.2	1301.2	1301.2	Hz
Limit	B-State:2090 to 2110Hz , Y-State:1290 to 1310Hz					
Measuring Equipment	1,8,11,12					
Result	Pass					

15. Frequency error (Demodulated ATIS signal)

EN Requirements	Clause	Test Description				
EN300 698-2	4.2.8	EN300 698-1 , B.2.2				
EN300 698-3	4.4.8					
	Temp.	Channel	Volt:12V	Volt:10.8V	Volt:15.6V	Unit
B-State (2100Hz)	Norm	01	2102.4	2102.4	2102.4	Hz
Y-State (1300Hz)	Norm	01	1301.2	1301.2	1301.2	Hz
B-State (2100Hz)	Norm	16	2102.4	2102.4	2102.4	Hz
Y-State (1300Hz)	Norm	16	1301.2	1301.2	1301.2	Hz
B-State (2100Hz)	Norm	88	2102.4	2102.4	2102.4	Hz
Y-State (1300Hz)	Norm	88	1301.2	1301.2	1301.2	Hz
B-State (2100Hz)	-15	01	2102.4	2102.4	2102.4	Hz
Y-State (1300Hz)	-15	01	1301.2	1301.2	1301.2	Hz
B-State (2100Hz)	-15	16	2102.4	2102.4	2102.4	Hz
Y-State (1300Hz)	-15	16	1301.2	1301.2	1301.2	Hz
B-State (2100Hz)	-15	88	2102.4	2102.4	2102.4	Hz
Y-State (1300Hz)	-15	88	1301.2	1301.2	1301.2	Hz
B-State (2100Hz)	55	01	2102.4	2102.4	2102.4	Hz
Y-State (1300Hz)	55	01	1301.2	1301.2	1301.2	Hz
B-State (2100Hz)	55	16	2102.4	2102.4	2102.4	Hz
Y-State (1300Hz)	55	16	1301.2	1301.2	1301.2	Hz
B-State (2100Hz)	55	88	2102.4	2102.4	2102.4	Hz
Y-State (1300Hz)	55	88	1301.2	1301.2	1301.2	Hz
Limit	B-State:2090 to 2110Hz , Y-State:1290 to 1310Hz					
Measuring Equipment	1,8,11,12					
Result	Pass					

16. Modulation index for DSC

EN301 025-2	4.2.9	EN301 025-1 , 8.13		
EN301 025-3	4.4.6			
	Temp.	Channel	Volt:12V	Unit
B-State (2100Hz)	Norm	70	-5.71	%
Y-State (1300Hz)	Norm	70	5.38	%
B-State (2100Hz)	-15	70	-8.33	%
Y-State (1300Hz)	-15	70	4.62	%
B-State (2100Hz)	55	70	-5.48	%
Y-State (1300Hz)	55	70	5.00	%
Limit	B-State:4200Hz +/-10% , Y-State:2600Hz +/-10%			
Measuring Equipment	1,8,11,12			
Result	Pass			

17. ATIS encoder modulation index

EN Requirements	Clause	Test Description		
EN300 698-2	4.2.9	EN300 698-1 , B.2.3		
EN300 698-3	4.4.9			
	Temp.	Channel	Volt:12V	Unit
B-State (2100Hz)	Norm	01	2.86	%
Y-State (1300Hz)	Norm	01	-2.31	%
B-State (2100Hz)	Norm	16	3.33	%
Y-State (1300Hz)	Norm	16	-1.54	%
B-State (2100Hz)	Norm	88	4.76	%
Y-State (1300Hz)	Norm	88	-0.77	%
B-State (2100Hz)	-15	01	1.90	%
Y-State (1300Hz)	-15	01	-3.08	%
B-State (2100Hz)	-15	16	2.86	%
Y-State (1300Hz)	-15	16	-2.31	%
B-State (2100Hz)	-15	88	3.81	%
Y-State (1300Hz)	-15	88	-2.31	%
B-State (2100Hz)	55	01	1.43	%
Y-State (1300Hz)	55	01	-3.08	%
B-State (2100Hz)	55	16	1.43	%
Y-State (1300Hz)	55	16	-3.08	%
B-State (2100Hz)	55	88	2.86	%
Y-State (1300Hz)	55	88	-1.54	%
Limit	B-State:2100Hz +/-10% , Y-State:1300Hz +/-10%			
Measuring Equipment	1,8,11,12			
Result	Pass			

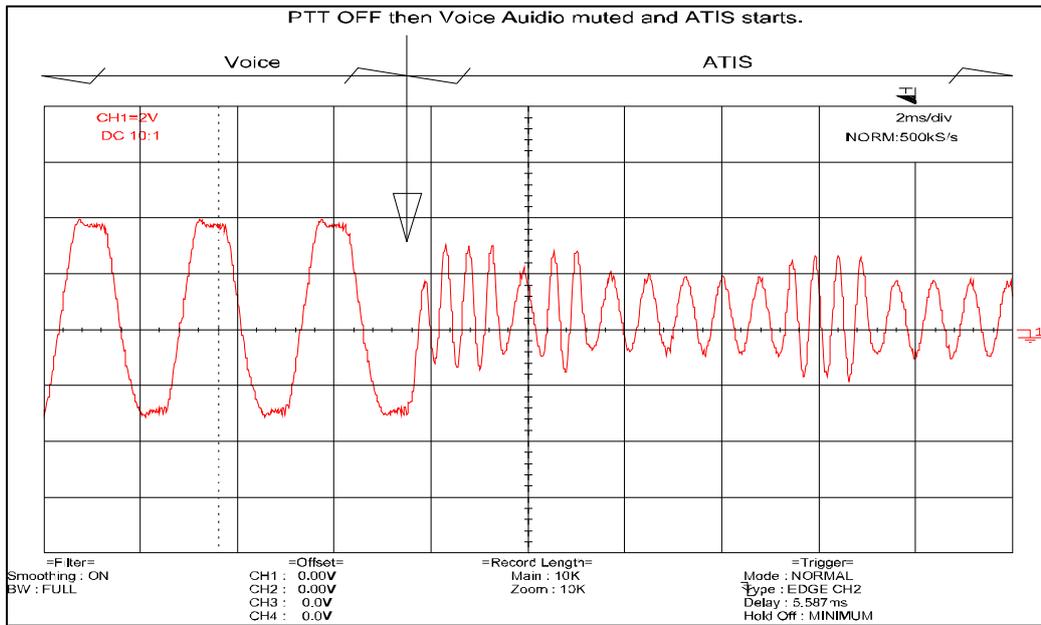
18. Modulation rate for DSC

EN Requirements	Clause	Test Description		
EN301 025-2	4.2.10	EN301 025-1 , 8.14		
EN301 025-3	4.4.7			
	Temp.	Channel	Volt:12V	Unit
	Norm	70	599.999	Hz
	-15	70	600.000	Hz
	55	70	600.000	Hz
Limit	600Hz +/-30ppm (600Hz +/-0.018Hz)			
Measuring Equipment	1,8,9,11,12			
Result	Pass			

19. ATIS encoder modulation rate.

EN Requirements	Clause	Test Description		
EN300 698-2	4.2.10	EN300 698-1 , B.2.4		
EN300 698-3	4.4.10			
	Temp.	Channel	Volt:12V	Unit
Continuous dot pattern	Norm	01	599.999	Hz
Continuous dot pattern	Norm	16	600.000	Hz
Continuous dot pattern	Norm	88	599.998	Hz
Continuous dot pattern	Norm	70	599.999	Hz
Continuous dot pattern	-15	01	599.999	Hz
Continuous dot pattern	-15	16	600.000	Hz
Continuous dot pattern	-15	88	599.998	Hz
Continuous dot pattern	-15	70	599.999	Hz
Continuous dot pattern	55	01	599.999	Hz
Continuous dot pattern	55	16	600.000	Hz
Continuous dot pattern	55	88	599.998	Hz
Continuous dot pattern	55	70	599.999	Hz
Limit	600Hz +/-30ppm (600Hz +/-0.018Hz)			
Measuring Equipment	1,8,9,11,12			
Result	Pass			

20. ATIS Transmission



21. Transmit outputpower / 7-specific channels when ATIS.

EN Requirements	Clause	Test Description		
EN300 698-3	4.4.1	EN300 698-3 , 4.4.1		
	Temp.	Channel	Volt:12V	Unit
	Norm	6	0.83	W
	Norm	8	0.83	W
	Norm	10	0.83	W
	Norm	11	0.83	W
	Norm	12	0.83	W
	Norm	13	0.83	W
	Norm	14	0.83	W
	Norm	15	0.83	W
	Norm	17	0.83	W
	Norm	71	0.83	W
	Norm	72	0.83	W
	Norm	74	0.85	W
	Norm	77	0.85	W
Limit	0.1 to 1.0W			
Measuring Equipment	1,6,7			

22. ATIS Format

ATIS Format
EN300 698-3

4.4.11

	Channel	Temp.	Volt:12V
	16	Norm	

Test Call Sing : ZPA1234

Converted MID : 9 244 01 1234

Calculated error check character : 89

	DX	RX
Dot pattern	125	
		111
	125	
		110
	125	
		109
	125	
		108
	125	
		107
	125	
		106
	121	
		105
	121	
		104
	92	
		121
	44	
		121
	01	
		92
	12	
		44
	34	
		01
	127	
		12
89		
	34	
127		
	127	
127		
	89	

	DX	RX	
Phasing sequence	125		Phasing sequence
		111	
	125		
		110	
	125		
		109	
	125		
		108	
	125		
		107	
format specifier		106	format specifier
	121		
		105	
Identification	121		Identification
		104	
	92		
		121	
	44		
End of sequence		121	format specifier
		92	
	12		
		44	
Error check	34		Identification
		01	
End of sequence	127		Identification
		12	
		44	
	34		
End of sequence		01	Identification
	127		
		12	
End of sequence	89		Identification
		34	
		01	
End of sequence	127		End of sequence
		127	
		89	
			Error check

23. ATIS Programming

ATIS programing

EN300 698-3

Clause
4.4.12

Store the ATIS ID	memorizable to the non volatile memory.
change the programming of the ATIS	inhibited.
Limit	It shall not be possible for the operator to disconnect or to change the programming of the ATIS facility.

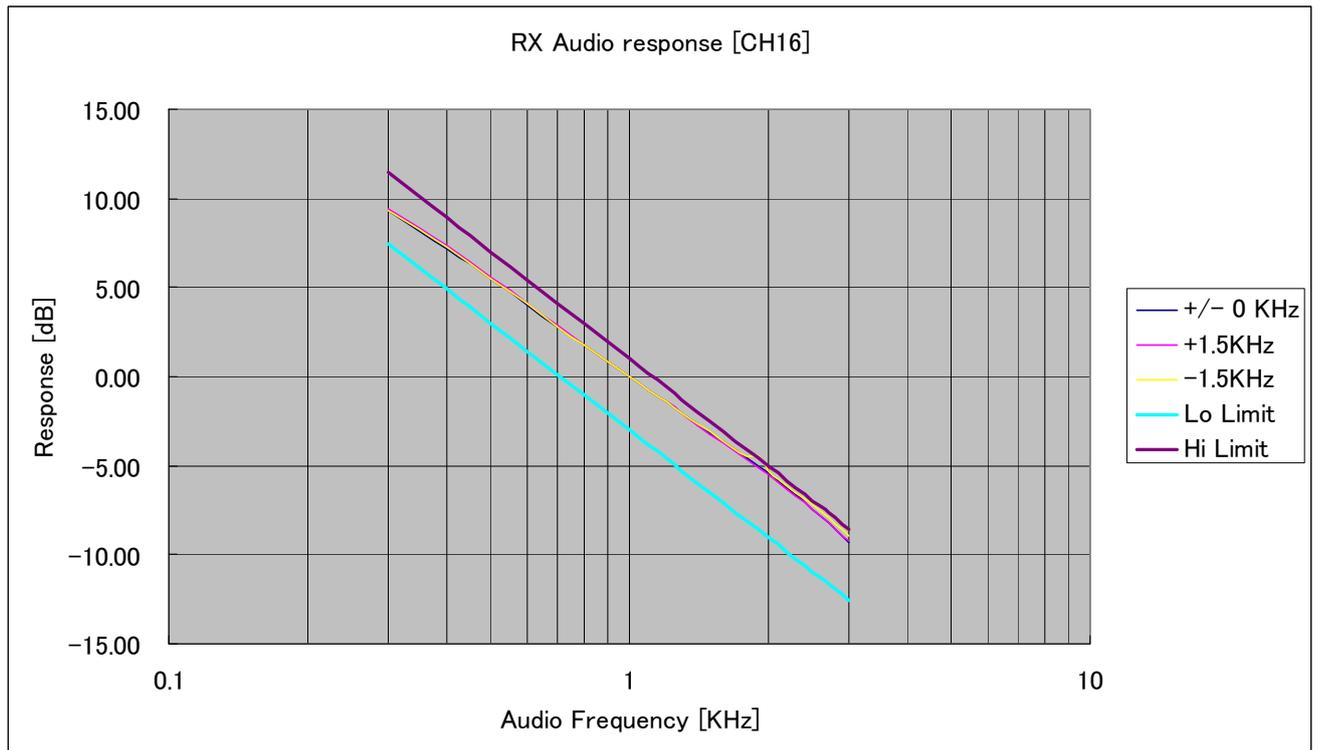
24. RX Audio Distortion of Active Speaker / RF input level :100dBuV/emf

EN Requierments	Clause	Test Description				
EN300 162-3	4.4.9	EN300 162-1 , 9.1				
EN301 025-3	4.4.9					
EN300 698-3	4.4.13					
	Temp.	Channel	Volt:12V	Volt:10.8V	Volt:15.6V	Unit
0.3KHz	Norm	06	6.6	6.9	6.5	%
0.5KHz	Norm	06	3.6	5.7	3.6	%
1.0KHz	Norm	06	2.7	6.0	2.8	%
Carrier offset:+1.5KHz	Norm	06	7.6	8.9	7.6	%
Carrier offset:-1.5KHz	Norm	06	4.4	5.0	5.2	%
No Carrier offset	-15	06	3.2	6.8	2.4	%
Carrier offset:+1.5KHz	-15	06	5.3	8.3	5.1	%
Carrier offset:-1.5KHz	-15	06	3.7	5.7	4.5	%
No Carrier offset	55	06	2.4	3.4	2.4	%
Carrier offset:+1.5KHz	55	06	3.8	4.7	3.7	%
Carrier offset:-1.5KHz	55	06	4.1	3.0	4.0	%
0.3KHz	Norm	16	6.6	7.2	6.5	%
0.5KHz	Norm	16	4.2	5.0	4.1	%
1.0KHz	Norm	16	2.9	5.9	2.9	%
Carrier offset:+1.5KHz	Norm	16	7.6	8.9	7.6	%
Carrier offset:-1.5KHz	Norm	16	4.4	5.0	5.2	%
No Carrier offset	-15	16	3.2	6.8	2.4	%
Carrier offset:+1.5KHz	-15	16	5.3	8.3	5.1	%
Carrier offset:-1.5KHz	-15	16	3.7	5.7	4.5	%
No Carrier offset	55	16	2.4	3.4	2.4	%
Carrier offset:+1.5KHz	55	16	3.8	4.7	3.7	%
Carrier offset:-1.5KHz	55	16	4.1	3.0	4.0	%
0.3KHz	Norm	28	7.6	7.8	7.6	%
0.5KHz	Norm	28	6.8	7.0	6.8	%
1.0KHz	Norm	28	2.7	6.0	2.8	%
Carrier offset:+1.5KHz	Norm	28	7.5	8.4	7.5	%
Carrier offset:-1.5KHz	Norm	28	4.6	7.9	4.2	%
No Carrier offset	-15	28	3.2	6.8	2.4	%
Carrier offset:+1.5KHz	-15	28	5.3	8.3	5.1	%
Carrier offset:-1.5KHz	-15	28	3.7	5.7	4.5	%
No Carrier offset	55	28	2.4	3.4	2.4	%
Carrier offset:+1.5KHz	55	28	3.8	4.7	3.7	%
Carrier offset:-1.5KHz	55	28	4.1	3.0	4.0	%
Limit						<10%
Measuring Equipment						1,2,9
Result						Pass

25. RX Audio Distortion of Active Speaker/ RF input level : 60dBuV/emf

EN Requirements	Clause	Test Description				
EN300 162-3	4.4.9	EN300 162-1 , 9.1				
EN301 025-3	4.4.9					
EN300 698-3	4.4.13					
	Temp.	Channel	Volt:12V	Volt:10.8V	Volt:15.6V	Unit
0.3KHz	Norm	06	7.0	6.3	7.9	%
0.5KHz	Norm	06	4.8	5.5	4.8	%
1.0KHz	Norm	06	4.1	6.3	4.4	%
Carrier offset:+1.5KHz	Norm	06	6.1	7.5	6.1	%
Carrier offset:-1.5KHz	Norm	06	3.6	5.3	4.5	%
No Carrier offset	-15	06	5.7	8.4	5.4	%
Carrier offset:+1.5KHz	-15	06	7.0	8.9	7.0	%
Carrier offset:-1.5KHz	-15	06	3.0	6.5	3.9	%
No Carrier offset	55	06	2.4	3.4	2.4	%
Carrier offset:+1.5KHz	55	06	3.8	4.7	3.7	%
Carrier offset:-1.5KHz	55	06	4.1	3.0	4.0	%
0.3KHz	Norm	16	7.1	7.7	7.1	%
0.5KHz	Norm	16	5.4	6.1	5.4	%
1.0KHz	Norm	16	4.3	6.4	4.3	%
Carrier offset:+1.5KHz	Norm	16	6.1	7.5	6.1	%
Carrier offset:-1.5KHz	Norm	16	3.6	5.4	4.5	%
No Carrier offset	-15	16	5.7	8.4	5.4	%
Carrier offset:+1.5KHz	-15	16	7.0	8.9	7.0	3.3
Carrier offset:-1.5KHz	-15	16	3.0	6.5	3.9	%
No Carrier offset	55	16	2.7	5.5	2.7	%
Carrier offset:+1.5KHz	55	16	4.8	5.9	4.7	%
Carrier offset:-1.5KHz	55	16	3.2	3.1	3.2	%
0.3KHz	Norm	28	7.1	7.4	7.0	%
0.5KHz	Norm	28	5.0	5.5	4.9	%
1.0KHz	Norm	28	4.2	6.3	4.3	%
Carrier offset:+1.5KHz	Norm	28	6.0	7.5	6.0	%
Carrier offset:-1.5KHz	Norm	28	3.6	5.4	4.6	%
No Carrier offset	-15	28	5.7	8.4	5.4	%
Carrier offset:+1.5KHz	-15	28	7.0	8.9	7.0	%
Carrier offset:-1.5KHz	-15	28	3.0	6.5	3.9	%
No Carrier offset	55	28	2.4	3.4	2.4	%
Carrier offset:+1.5KHz	55	28	3.8	4.7	3.7	%
Carrier offset:-1.5KHz	55	28	4.1	3.0	4.0	%
Limit						<10%
Measuring Equipment						1,2,9
Result						Pass

26. RX Audio Response of Active Speaker



27. Maximum usable sensitivity

EN Requirements	Clause	Test description				
EN300 162-3	4.4.11	EN300 162-1 , 9.3				
EN301 025-2	4.2.11					
EN300 698-2	4.2.11					
EN300 698-3	4.4.18					
Loud speaker	Temp.	Channel	Volt:12V	Volt:10.8V	Volt:15.6V	Unit
	Norm	06	-5.0	-5.0	-5.0	dBuV(emf)
	Norm	16	-5.1	-5.1	-5.1	dBuV(emf)
	Norm	28	-5.5	-5.5	-5.5	dBuV(emf)
	-15	06	-6.9	-6.9	-6.9	dBuV(emf)
	-15	16	-6.9	-6.9	-6.9	dBuV(emf)
	-15	28	-7.2	-7.2	-7.2	dBuV(emf)
	55	06	-3.7	-3.7	-3.7	dBuV(emf)
	55	16	-3.7	-3.7	-3.7	dBuV(emf)
	55	28	-3.9	-3.9	-3.9	dBuV(emf)
Limit	Normal condition:<+6dBuV/emf , Extreme condition:<+12dBuV/emf					
Measuring Equipment	1,3,9					
Result	Pass					

28. Co-channel rejection

EN Requirements	Clause	Test description		
EN300 162-2	4.2.9	EN300 162-1 , 9.4		
EN301 025-2	4.2.12			
EN300 698-2	4.2.12			
Loud speaker	Temp.	Channel	Volt:12V	Unit
Carrier upper : 3KHz	Norm	06	-9.0	dB
Carrier lower : 3KHz	Norm	06	-9.0	dB
Carrier upper : 3KHz	Norm	16	-9.0	dB
Carrier lower : 3KHz	Norm	16	-9.0	dB
Carrier upper : 3KHz	Norm	27	-9.0	dB
Carrier lower : 3KHz	Norm	27	-9.0	dB
Limit	>-10dB			
Measuring Equipment	1,3,4,9,15			
Result	Pass			

29. Adjacent channel selectivity

EN Requirements	Clause	Test description				
EN300 162-2	4.2.10	EN300 162-2 , 9.5				
EN301 025-2	4.2.13					
EN300 698-2	4.2.13					
Loud speaker	Temp.	Channel	Volt:12V	Volt:10.8V	Volt:15.6V	Unit
Upper	Norm	06	82.5	82.5	82.5	dB
Lower	Norm	06	82.5	82.5	82.5	dB
Upper	Norm	16	82.5	82.5	82.5	dB
Lower	Norm	16	82.5	82.5	82.5	dB
Upper	Norm	28	82.5	82.5	82.5	dB
Lower	Norm	28	82.5	82.5	82.5	dB
Upper	-15	06	82.0	82.0	82.0	dB
Lower	-15	06	82.0	82.0	82.0	dB
Upper	-15	16	82.0	82.0	82.0	dB
Lower	-15	16	82.0	82.0	82.0	dB
Upper	-15	28	82.0	82.0	82.0	dB
Lower	-15	28	82.0	82.0	82.0	dB
Upper	55	06	80.0	80.0	80.0	dB
Lower	55	06	80.0	80.0	80.0	dB
Upper	55	16	80.0	80.0	80.0	dB
Lower	55	16	80.0	80.0	80.0	dB
Upper	55	28	80.0	80.0	80.0	dB
Lower	55	28	80.0	80.0	80.0	dB
Limit	Normal condition:>70dB , Extreme condition:>60dB					
Measuring Equipment	1,3,4,9,15					
Result	Pass					

30. Spurious response rejection

EN Requirements	Clause	Test description		
EN300 162-2	4.2.11	EN300 162-1 , 9.6		
EN301 025-2	4.2.14			
EN300 698-2	4.2.14			
	Temp.	Channel	Volt:12V	Unit
-1/2 IF1 (-10.8MHz)	Norm	06	91.0	dB
-IF1 (-21.6MHz)	Norm	06	92.0	dB
-2IF1 (-43.2MHz)	Norm	06	91.0	dB
-1F2 (-0455KHz)	Norm	06	90.5	dB
-2IF2 (-910KHz)	Norm	06	90.5	dB
-1/2 IF1 (-10.8MHz)	Norm	16	91.0	dB
-IF1 (-21.6MHz)	Norm	16	92.0	dB
-2IF1 (-43.2MHz)	Norm	16	91.0	dB
-1F2 (-0455KHz)	Norm	16	90.5	dB
-2IF2 (-910KHz)	Norm	16	90.5	dB
-1/2 IF1 (-10.8MHz)	Norm	28	93.0	dB
-IF1 (-21.6MHz)	Norm	28	93.0	dB
-2IF1 (-43.2MHz)	Norm	28	91.0	dB
-1F2 (-0455KHz)	Norm	28	90.5	dB
-2IF2 (-910KHz)	Norm	28	90.5	dB
Limit	>70dB			
Measuring Equipment	1,3,4,9,15			
Result	Pass			

31. Intermodulation response

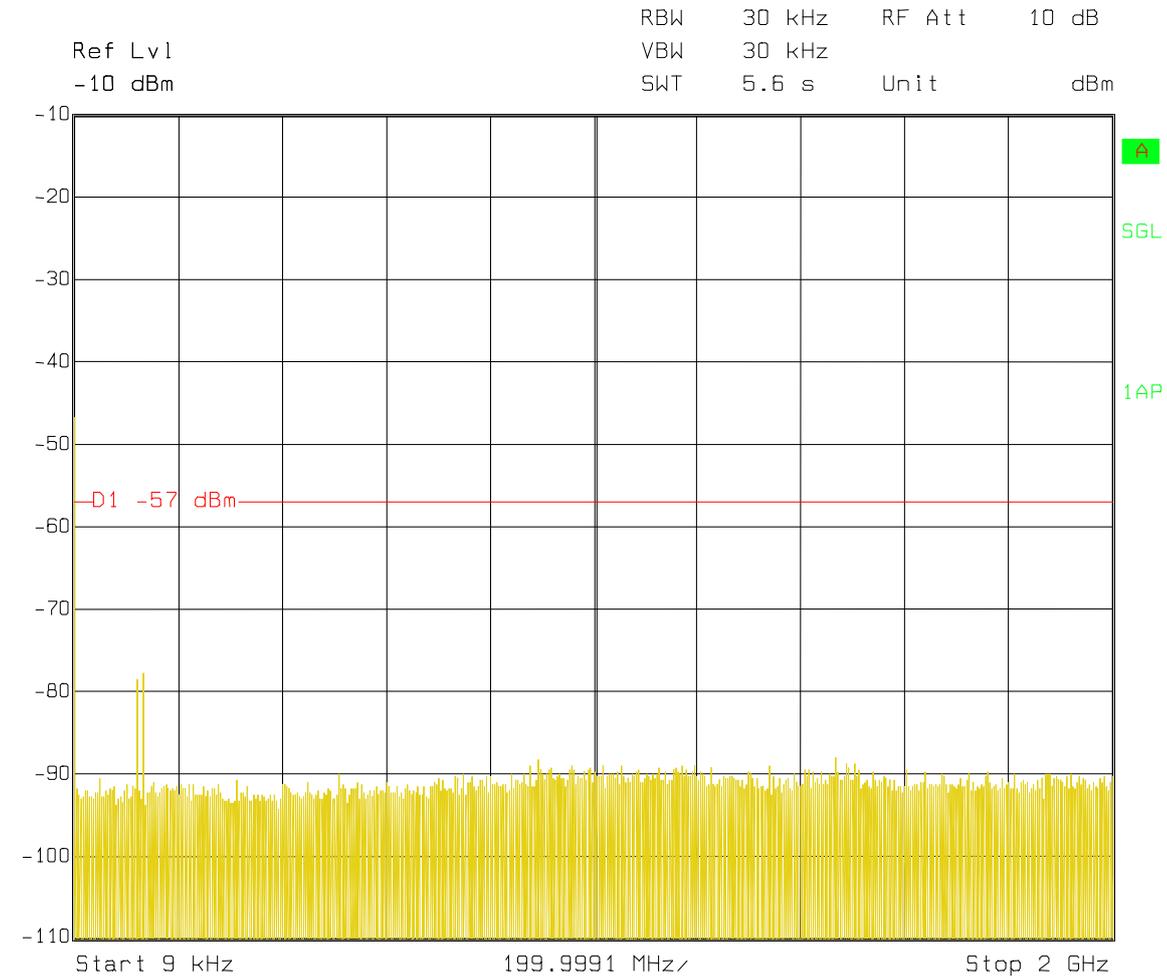
EN Requirements	Clause	Test description		
EN300 162-2	4.2.12	EN300 162-1 , 9.7		
EN301 025-2	4.2.15			
EN300 698-2	4.2.15			
	Temp.	Channel	Volt:12V	Unit
Upper	Norm	06	80.0	dB
Lower	Norm	06	80.0	dB
Upper	Norm	16	80.0	dB
Lower	Norm	16	80.0	dB
Upper	Norm	28	80.0	dB
Lower	Norm	28	80.0	dB
Limit	>68dB			
Measuring Equipment	1,3,4,5,9,15			
Result	Pass			

32. Blocking or desensitization

EN Requirements	Clause	Test description		
EN300 162-2	4.2.13	EN300 162-1 , 9.8		
EN301 025-2	4.2.16			
EN300 698-2	4.2.16			
	Temp.	Channel	Volt:12V	Unit
+1MHz	Norm	06	91.1	dBuV / emf
-1MHz	Norm	06	91.0	dBuV / emf
+1MHz	Norm	16	91.0	dBuV / emf
-1MHz	Norm	16	91.0	dBuV / emf
+1MHz	Norm	27	91.0	dBuV / emf
-1MHz	Norm	27	91.0	dBuV / emf
Limit	>90dBuV/emf			
Measuring Equipment	1,3,4,9,15			
Result	Pass			

33. Receiver conducted spurious emissions

EN Requirements	Clause	Test description
EN300 162-2	4.2.14	EN300 162-1 , 9.9
EN301 025-2	4.2.17	
EN300 698-2	4.2.17	



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34. RX Noise and Hum Level

EN Requirements	Clause	Test description		
EN300 162-3	4.4.12	EN300 162-1 , 9.11		
EN301 025-3	4.4.11			
EN300 698-3	4.4.15			
	Temp.	Channel	Volt:12V	Unit
	Norm	06	50.0	dB
	Norm	16	50.0	dB
	Norm	28	50.0	dB
Limit	<-40dB			
Measuring Equipment	1,3,9			
Result	Pass			

35. Squelch operation

EN Requirements	Clause	Test description		
EN300 162-3	4.4.13	EN300 162-1 , 9.12		
EN301 025-3	4.4.12			
EN300 698-3	4.4.16			
	Temp.	Channel	Volt:12V	Unit
Step a)	Norm	16	-50.0	dB
Step b-1)	Norm	16	5.3	dBuV / emf
Step b-2)	Norm	16	32.8	dB SINAD
Step c)	Norm	16	5.3	dBuV / emf
Limit in step a)	<-40dB			
Limit in step b-1)	<+6dBuV/emf			
Limit in step b-2)	>20dB SINAD			
Limit in step c)	<+6dBuV/emf			
Measuring Equipment	1,3,9			
Result	Pass			

36. Squelch hysteresis

EN Requirements	Clause	Test description		
EN300 162-3	4.4.14	EN300 162-1 , 9.13		
EN301 025-3	4.4.13			
EN300 698-3	4.4.17			
Loud speaker	Temp.	Channel	Volt:12V	Unit
Closing Level	Norm	16	0.9	dBuV / emf
Opening Level	Norm	16	5.3	dBuV / emf
Hysteresis	Norm	16	4.4	dB
Limit of squelch hysteresis	3 to 6dB			
Measuring Equipment	1,3,9			
Result	Pass			

37. Multiple watch characteristic

EN Requirements	Clause	Test description			
EN300 162-1	9.14	EN300 162-1 , 9.14			
EN301 025-1	9.14				
EN301 025-3	4.2.2.8				
Scanning period					
	Temp.	12V	10.8V	15.6V	Unit
Priority Channel with simplex Channel	Norm	1.5	1.5	1.5	Sec.
	-15	1.5	1.5	1.5	Sec.
	+55	1.5	1.5	1.5	Sec.
Priority Channel with duplex Channel	Norm	1.5	1.5	1.5	Sec.
	-15	1.5	1.5	1.5	Sec.
	+55	1.5	1.5	1.5	Sec.
Dwell time on the priority channel					
	Temp.	12V	10.8V	15.6V	Unit
Priority Channel with simplex Channel	Norm	137	137	137	ms
	-15	137	137	137	ms
	+55	137	137	137	ms
Priority Channel with duplex Channel	Norm	137	137	137	ms
	-15	137	137	137	ms
	+55	137	137	137	ms
Dwell time on the additional channel					
	Temp.	12V	10.8V	15.6V	Unit
Priority Channel with simplex Channel	Norm	1.33	1.33	1.33	Sec.
	-15	1.33	1.33	1.33	Sec.
	+55	1.33	1.33	1.33	Sec.
Priority Channel with duplex Channel	Norm	1.33	1.33	1.33	Sec.
	-15	1.33	1.33	1.33	Sec.
	+55	1.33	1.33	1.33	Sec.
Limit of scanning period	<2sec				
Limit of dwell time on the priority CH	<150ms				
Limit of dwell time on the additional CH	850ms to 2sec				
Measuring Equipment	1,2,3,9				
Result	Pass				

38. Maximum usable sensitivity of the DSC receiver.

EN Requirements	Clause	Test description				
EN301 025-2	4.2.19	EN301 025-1 , 10.1				
	Temp.	Channel	Volt:12V	Volt:10.8V	Volt:15.6V	Unit
No carrier offset	Norm	70	Less than 10 ⁻²	Less than 10 ⁻²	Less than 10 ⁻²	Bit error ratio
Carrier offset : +1.5KHz	Norm	70	Less than 10 ⁻²	Less than 10 ⁻²	Less than 10 ⁻²	Bit error ratio
Carrier offset : -1.5KHz	Norm	70	Less than 10 ⁻²	Less than 10 ⁻²	Less than 10 ⁻²	Bit error ratio
No carrier offset	-15	70	Less than 10 ⁻²	Less than 10 ⁻²	Less than 10 ⁻²	Bit error ratio
No carrier offset	55	70	Less than 10 ⁻²	Less than 10 ⁻²	Less than 10 ⁻²	Bit error ratio
Limit	Normal condition:<0dBuV/emf , Extreme condition:<+6dBuV/emf					
Measuring Equipment	1,3,9,16					

39. Co-channel rejection of the DSC receiver

EN Requirements	Clause	Test description		
EN301 025-2	4.2.20	EN301 025-1 , 10.2		
	Temp.	Channel	Volt:12V	Unit
Carrier upper : 3KHz	Norm	70	Less than 10 ⁻²	Bit error ratio
Carrier lower : 3KHz	Norm	70	Less than 10 ⁻²	Bit error ratio
Limit	>-5dBuV/emf			
Measuring Equipment	1,3,4,9,15,16			

40. Adjacent channel selectivity of the DSC receiver

EN Requirements	Clause	Test Description				
EN301 025-2	4.2.13	EN301 025-1 , 10.3				
	Temp.	Channel	Volt:12V	Volt:10.8V	Volt:15.6V	Unit
Upper	Norm	70	Less than 10 ⁻²	Less than 10 ⁻²	Less than 10 ⁻²	Bit error ratio
Lower	Norm	70	Less than 10 ⁻²	Less than 10 ⁻²	Less than 10 ⁻²	Bit error ratio
Upper	-15	70	Less than 10 ⁻²	Less than 10 ⁻²	Less than 10 ⁻²	Bit error ratio
Lower	-15	70	Less than 10 ⁻²	Less than 10 ⁻²	Less than 10 ⁻²	Bit error ratio
Upper	55	70	Less than 10 ⁻²	Less than 10 ⁻²	Less than 10 ⁻²	Bit error ratio
Lower	55	70	Less than 10 ⁻²	Less than 10 ⁻²	Less than 10 ⁻²	Bit error ratio
Limit	Normal condition:>73dBuV/emf , Extreme condition:>63dBuV/emf					
Measuring Equipment	1,3,4,9,15,16					

41. Spurious rejection of the DSC receiver

EN Requirements	Clause	Test Description		
EN301 025-2	4.2.21	EN301 025-1 , 10.4		
	Temp.	Channel	Volt:12V	Unit
-1/2 IF1 (-22.55MHz)	Norm	70	Less than 10 ⁻²	Bit error ratio
-IF1 (-45.1MHz)	Norm	70	Less than 10 ⁻²	Bit error ratio
-2IF1 (-90.2MHz)	Norm	70	Less than 10 ⁻²	Bit error ratio
-1F2 (-455KHz)	Norm	70	Less than 10 ⁻²	Bit error ratio
-2IF2 (-910KHz)	Norm	70	Less than 10 ⁻²	Bit error ratio
Limit	>73dBuV/emf			
Measuring Equipment	1,3,4,9,15,16			

42. Blocking immunity of the DSC receiver

EN Requirements	Clause	Test Description		
EN301 025-2	4.2.21	EN301 025-1 , 10.4		
	Temp.	Channel	Volt:12V	Unit
+1MHz	Norm	70	Less than 10 ⁻²	Bit error ratio
-1MHz	Norm	70	Less than 10 ⁻²	Bit error ratio
Limit	<10 ⁻²			
Measuring Equipment	1,3,4,9,15,16			

43. Intermodulation response of the DSC receiver

EN Requirements	Clause	Test Description		
EN301 025-2	4.2.15	EN301 025-1 ,10.5		
	Temp.	Channel	Volt:12V	Unit
Upper	Norm	70	Less than 10 ⁻²	Bit error ratio
Lower	Norm	70	Less than 10 ⁻²	Bit error ratio
Limit	>73dBuV/emf			
Measuring Equipment	1,3,4,9,15,16			

44. Dynamic range

EN Requirements	Clause	Test Description		
EN301 025-3	4.4.14	EN301 025-1 , 10.6		
	Temp.	Channel	Volt:12V	Unit
0dBuV / emf	Norm	70	Less than 10 ⁻²	Bit error ratio
100dBuV / emf	Norm	70	Less than 10 ⁻²	Bit error ratio
Limit	<10 ⁻²			
Measuring Equipment	1,3,4,9,15,16			

45. Reaction to VTS and AIS channel management DSC transmissions

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10.9

Frequency of AIS or VTS channels	Temp.	Volt:12V	Unit
161.975MHz	Norm	No Reaction	N/A
162.025MHz	Norm	No Reaction	N/A
Limit	The equipment shall not sound an alarm, display a message (an accurate, informative display is permissible but not required), transmit a response or suggest a transmitted response, lock up, or require operator intervention.		
Measuring Equipments	1,7,10,12		

46. Simultaneous reception

IEC62238

10.10

Receiver	Temp.	Volt:12V	Unit
Radio Telephone Receiver	Norm	39.0	dB/SINAD
DSC CH70 Receiver	Norm	Less than 10 ⁻²	Bit error ratio
Limit	For radiotelephony operation the SINAD ratio shall be no less than 20 dB in the presence of the DSC test signal. The DSC bit error ratio shall be equal to or less than 10 ⁻² .		
Measuring Equipments	1,7,10,12		