RRA-EMIESS23E444DAV-05Av0

Certification Radio test report

According to the standard:

CFR 47 FCC PART 15

RSS GEN – Issue 5
RSS 210 - Issue 10

Equipment under test:

DAVEY TRONIC 5 REMOTE BLASTER

FCC ID: *2AUQC-DT5GRB*
IC NUMBER: *25586-DT5GRB*

Company:

DAVEY BICKFORD

Distribution: Mrs STOJANOVIC (**Company:** DAVEY BICKFORD)

Number of pages: 29 with 2 appendixes

Ed.	Date	Modified Page(s)	Technical Verification and Quality Approval Name and Function	Visa
0	18-Apr-24	Creation	M. DUMESNIL, Radio Laboratory Manager	

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Information in italics are declared by the manufacturer/customer and are under his responsibility

S51 RTY 000 INT 00014 [03]

DESIGNATION OF PRODUCT:	***DAVEY TRONIC 5 REMOTE BLASTER***
Serial number (S/N):	*9203*
Reference / model (P/N):	*RB*
Firmware version:	*0x17 (LoRa Module)*
MANUFACTURER:	*DAVEY BICKFORD*

COMPANY SUBMITTING THE PRODUCT:

Company:	DAVEY BICKFORD
Address:	LE MOULIN GASPARD CHEMIN DE LA PYROTECHNIE 89550 HERY FRANCE
Responsible:	Mrs STOJANOVIC
DATES OF TEST:	From 27-Sep-23 to 10-Oct-23
TESTING LOCATION:	EMITECH ANGERS laboratory at JUIGNE SUR LOIRE (49) FRANCE FCC Accredited under US-EU MRA Designation Number: FR0009 Test Firm Registration Number: 873677 ISED Accredited under CANADA-EU MRA Designation Number: FR0001 Industry Canada Registration Number: 4452A
TESTED BY:	B. VOVARD **VISA:**
WRITTEN BY:	B. VOVARD

CONTENTS

REVISIONS HISTORY

Revision	Date	Modified pages	Modifications
0	**26-Oct-23**	/	Creation

1. INTRODUCTION

This report presents the results of radio test carried out on the following radio equipment: ***DAVEY TRONIC 5 REMOTE BLASTER***, in accordance with normative reference.

The equipment under test integrates:

- LoRa 2.4 GHz transceiver radio module not already certified,
- RFID Reader not already certified,
- GNSS module operational in the band 1559MHz – 1610MHz

This report concerns only RFID Radio part.

2. PRODUCT DESCRIPTION

Category of equipment (ISED):	I
Class:	A
Utilization:	Industrial
Antenna type and gain:	integral antenna (unknown gain)
Operating frequency range:	From 13.11 MHz to 14.01 MHz
Number of channels:	1
Channel spacing:	Not concerned
Modulation:	ASK
Power source:	Rechargeable Internal battery 7.4Vdc 4200mAh AC/DC adapter (120Vac 60Hz / 19Vdc)

The radio is operational during charge mode.

Power level, frequency range and channels characteristics are not user adjustable.
The details pictures of the product and the circuit boards are joined with this file.

3. NORMATIVE REFERENCE

The standards and testing methods related throughout this report are those listed below.
They are applied on the whole test report even though the extensions (version, date and amendment) are not repeated.

CFR 47 FCC Part 15 (2023)	Radio Frequency Devices
ANSI C63.10	2013 Procedures for ComplianceTesting of Unlicensed Wireless Devices.
RSP-100	Issue 12, August 2019 Certification of Radio Apparatus and Broadcasting equipment
RSS-Gen	Issue 5, April 2018 General Requirements for Compliance of Radio Apparatus
RSS-210	Issue 10, December 2019 Licence-Exempt Radio Apparatus: Category I equipment.

4. TEST METHODOLOGY

Radio performance tests procedures given in CFR 47 part 15:

Subpart C – Intentional Radiators

- Paragraph 203: Antenna requirement
- Paragraph 205: Restricted bands of operation
- Paragraph 207: Conducted limits
- Paragraph 209: Radiated emission limits; general requirements
- Paragraph 215: Additional provisions to the general radiated emission limitations
- Paragraph 225: Operation within the band 13.110-14.010 MHz

Radio performance tests procedures given in RSS-Gen:

- Paragraph 2 - General
- Paragraph 3 - Normative publications and related documents
- Paragraph 4 - Labelling requirements
- Paragraph 6 - General administrative and technical requirements

Radio performance tests procedures given in RSS-210:

- Paragraph 5 – RSS-Gen compliance
- Paragraph 7 - Technical specifications
- Annex B - Devices Operating in Frequency Bands for Any Application
  - Annex B.6 Band 13.110-14.010 MHz

5. TEST EQUIPMENT CALIBRATION DATES

Emitech Number	Model	Type	Last calibration	Calibration interval (years)	Next calibration due
0	BAT-EMC V3.18.0.26	Software	/	/	/
1406	EMCO 6502	Loop antenna	11/04/2023	1	10/04/2024
4088	R&S FSP40	Spectrum Analyzer	13/05/2022	2	12/05/2024
7190	R&S HL223	Antenna	17/03/2022	3	16/03/2025
7240	Emco 3110	Biconical antenna	17/03/2022	3	16/03/2025
7566	Testo 608-H1	Meteo station	12/12/2022	2	11/12/2024
8508	California instruments 1251RP	Power source	(1)	(1)	(1)
8528	Schwarzbeck VHA 9103	Biconical antenna	19/05/2022	3	18/05/2025
8548	Midwest Microwave 10dB	Attenuator	08/02/2023	3	07/02/2026
8590	RG214 N-5m	Cable	23/02/2022	2	23/02/2024
8719	Thurbly Thandar Instruments 1600	LISN	24/02/2022	2	24/02/2024
8732	Emitech	OATS	28/03/2022	3	27/03/2025
8750	La Crosse Technology WS-9232	Meteo station	24/10/2022	1	24/10/2023
8783	EMCO 3147	Log periodic antenna	17/03/2022	3	16/03/2025
8855	EMITECH	Turntable and mat controller	/	/	/
8864	Champ libre Juigné. V3.5	Software	/	/	/
8896	ACQUISYS GPS8	Satellite synchronized frequency standard	/	/	/
9398	N-1.5m	cable	22/07/2022	2	21/07/2024
10523	EMITECH	Absorber sheath current	24/02/2022	2	24/02/2024
10730	Mini-circuit ZFL-1000LN	Low-noise amplifier	30/11/2022	1	30/11/2023
10759	COMTEST Cage 3	Anechoic chamber	/	/	/
10771	EMCO 3117	Antenna	30/11/2022	3	30/11/2025
10788	Emitech	Outside room Hors cage	/	/	/
10789	MATURO	Turntable and mat controller NCD	/	/	/
11535	R&S EZ-25	High pass filter	02/01/2023	3	01/01/2026
12590	LUCIX Corp S005180M3201	Low-noise amplifier	21/06/2023	1	20/06/2024
14303	SUCOFLEX N-2m	cable	01/12/2022	2	30/11/2024

(1) The equipment is not verified; instead, the output voltage is checked before each measurement with the calibrated multimeter.

Emitech Number	Model	Type	Last calibration	Calibration interval (years)	Next calibration due
14475	Oregon Scientific BAR206	Meteo station	11/04/2023	1	10/04/2024
14716	GMH 3710	Precision Thermometer -30°C/+100°C	28/03/2023	1	27/03/2024
14903	Fluke 177	Multimeter	01/02/2022	2	01/02/2024
15666	R&S FSV40	Spectrum Analyzer	27/09/2022	2	26/09/2024
15883	SUCOFLEX	cable N 5m	08/02/2023	2	07/02/2025
15913	SUCOFLEX SF104 N 2.5m	Cable	01/12/2022	2	30/11/2024
16059	CLIMATS EXCAL² 1411-TA	Climatic chamber	/	/	/
17008	R&S ESW44	Test receiver	08/02/2023	1	08/02/2024
//	RS Commander V2.4.2	Software	/	/	/

6. TESTS RESULTS SUMMARY

6.1 CFR 47 part 15 requirements

Test procedure	Description of test	Respected criteria?				Comment
		Yes	No	NAp	NAs	
FCC Part 15.203	ANTENNA REQUIREMENT			X		Note 1
FCC Part 15.205	RESTRICTED BANDS OF OPERATION	X				
FCC Part 15.207	CONDUCTED LIMITS	X				Supplied by AC Adapter
FCC Part 15.209	RADIATED EMISSION LIMITS; general requirements	X				Note 2
FCC part 15.215	ADDITIONAL PROVISIONS TO THE GENERAL RADIATED EMISSION LIMITATIONS					
	(a) Alternative to general radiated emission limits	X				
	(b) Unwanted emissions outside of §15.225 frequency bands	X				Note 3
	(c) 20 dB bandwidth and band-edge compliance	X				
FCC Part 15.225	OPERATION WITHIN THE BAND 13.110-14.010 MHZ					
	(a) Field strength within the band 13.553-13.567 MHz	X				
	(b) Field strength within the bands 13.410-13.553 MHz and 13.567-13.710 MHz	X				
	(c) Field strength within the bands 13.110-13.410 MHz and 13.710-14.010 MHz	X				
	(d) Field strength outside the band 13.110-14.010 MHz	X				
	(e) Carrier frequency tolerance	X				
	(f) Powered tags			X		

NAp: Not Applicable NAs: Not Asked

Note 1: Professionnally installed equipment

Note 2: See FCC part 15.225 (d).

Note 3: See FCC part 15.209. Unwanted emissions levels are all below the fundamental emission field strength level.

6.2 RSS-Gen requirements

Test procedure	Description of test	Criteria respected ?				Comment
		Yes	No	NAp	NAs	
Paragraph 2	General	X				
Paragraph 3	Normative publications and related documents	X				
Paragraph 4	Labelling requirements	X				
Paragraph 6	General administrative and technical requirements	X				
§ 6.7	Occupied bandwidth (or 99% emission bandwidth) and x dB bandwidth	X				
Paragraph 8	Licence-exempt radio apparatus					
§ 8.1	Measurement Bandwidths and Detector Functions	X				
§ 8.2	Pulsed operation	X				
§ 8.3	Prohibition of amplifiers	X				
§ 8.4	User manual notice	X				see certification documents
§ 8.5	Measurement of licence-exempt devices on-site (in-situ)			X		
§ 8.6	Operating frequency range of devices in master/slave networks			X		
§ 8.7	Radio frequency identification (RFID) devices	X				
§ 8.8	AC power line conducted emissions limits	X				Note 1
§ 8.9	Transmitter emission limits	X				
§ 8.10	Restricted frequency bands	X				
§ 8.11	Frequency stability	X				

NAp: Not Applicable NAs: Not Asked

Note 1: the conducted emissions shall be performed in the final product.

6.3 RSS-210 requirements

Test Procedure RSS-210	Description of test	Criteria respected ?				Comment
		Yes	No	NAp	NAs	
Paragraph 5	RSS-Gen compliance	X				
Paragraph 7	Technical Specifications					
7.1	Emission Falling Within Restricted Frequency Bands	X				
7.2	General Field Strength Limits	X				
7.3	Transmitters with wanted and unwanted emissions that are within the general field strength limits	X				
7.4	Cordless Telephones			X		
Annex B	Device Operating in Frequency Bands for Any Application					
Annex B.6	Band 13.110-14.010 MHz					
(a) i	Field strength within the band 13.553-13.567 MHz	X				
(a) ii	Field strength within the bands 13.410-13.553 MHz and 13.67-13.710 MHz	X				
(a) iii	Field strength within the bands 13.110-13.410 MHz and 13.710-14.010 MHz	X				
(a) iv	Field strength outside the band 13.110-14.010 MHz	X				
(b)	Carrier frequency stability	X				

NAp: Not Applicable NAs: Not Asked

7. MEASUREMENT UNCERTAINTY

To declare, or not, the compliance with the specifications, it was not explicitly taken into account of uncertainty associated with the result(s)

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for normal distribution corresponds to a coverage probability of approximately 95%.

Parameter	Emitech Uncertainty
RF power, conducted	± 0.8dB
Radiated emission valid to 26 GHz 9kHz – 30MHz 30MHz – 1GHz 1GHz – 18GHz 18GHz – 40GHz	 ± 2.7 dB ± 5.0 dB ± 5.3 dB ± 6.1 dB
AC Power Lines conducted emissions	± 3.4 dB
Temperature	± 1 °C
Humidity	± 5 %

8. AC CONDUCTED EMISSIONS

Temperature (°C) : 25 **Humidity (%HR):** 50 **Date :** October 10, 2023

Technician : B. VOVARD

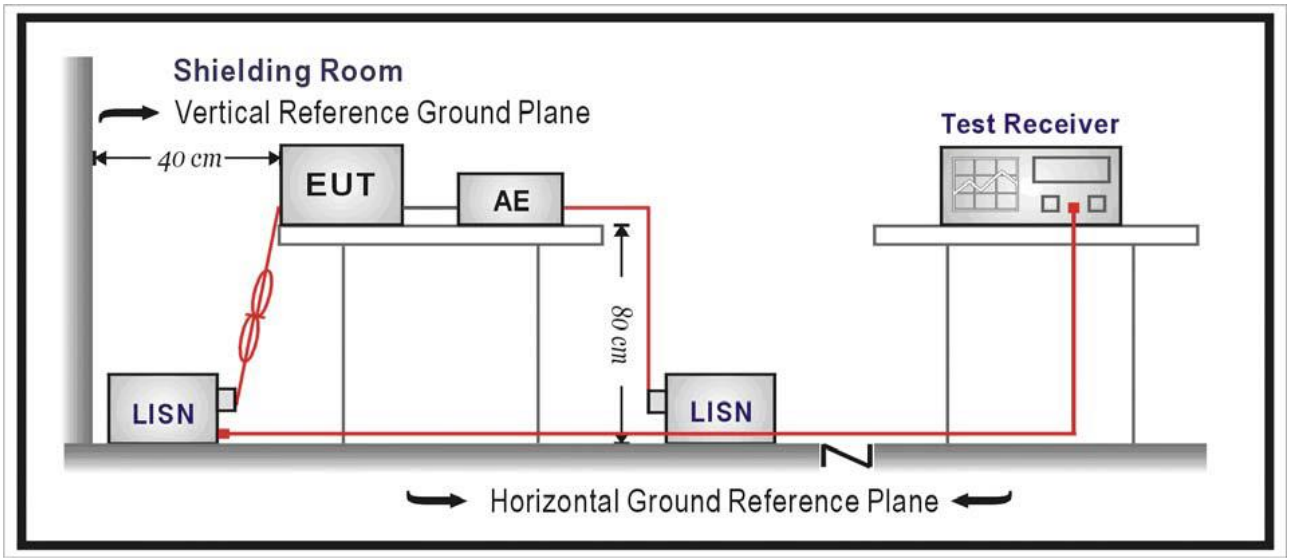
Standard: FCC Part 15
RSS-Gen

Test procedure:
For FCC Part 15: § 15.207
For RSS-Gen: § 8.8
Method of § 6.2 of ANSI C63.10

Software used: BAT-EMC V3.18.0.26

Test set up:

The EUT is isolated and placed on a wooden table, 0.8 m over an horizontal reference plane and 0.4 m from a vertical reference plane. It is powered by an artificial main network placed on the ground reference plane.
The equipment is powered with the AC power operating voltage of 120 V / 60 Hz.



Frequency range: 150 kHz - 30 MHz

Detection mode: Peak / Quasi-peak / Average

Bandwidth: 10 kHz / 9 kHz

Equipment under test operating condition:

The equipment under test is blocked in discontinuous modulated transmission mode, at the highest output power level at which the transmitter is intended to operate.

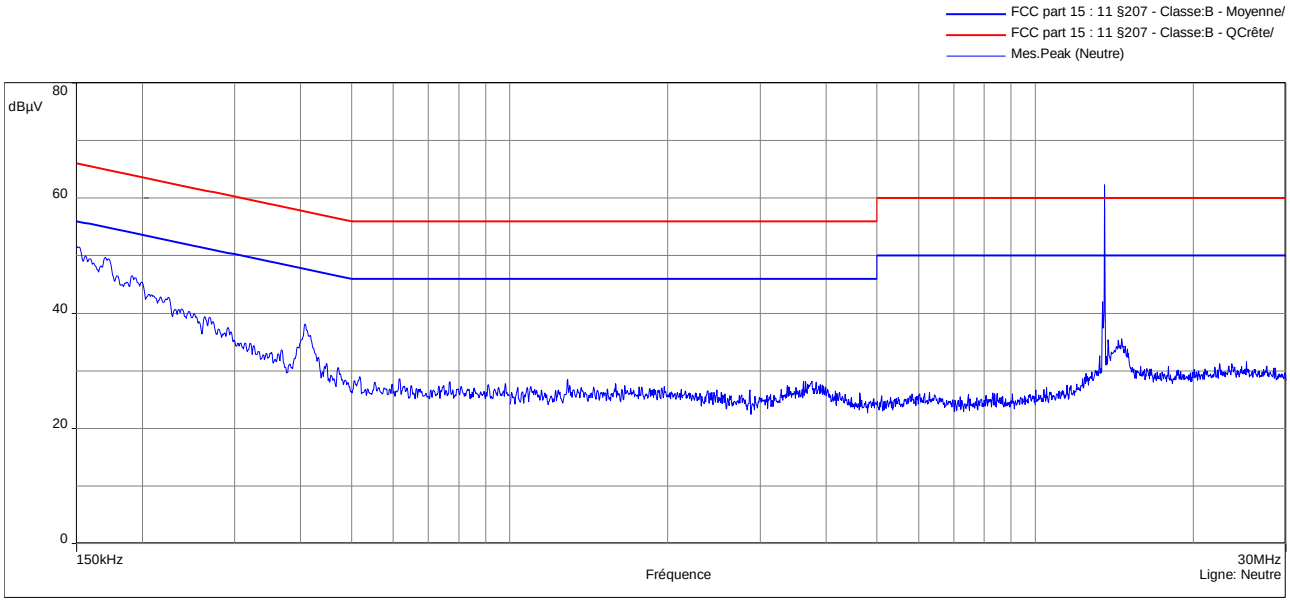
Results:

Sample N° 1:

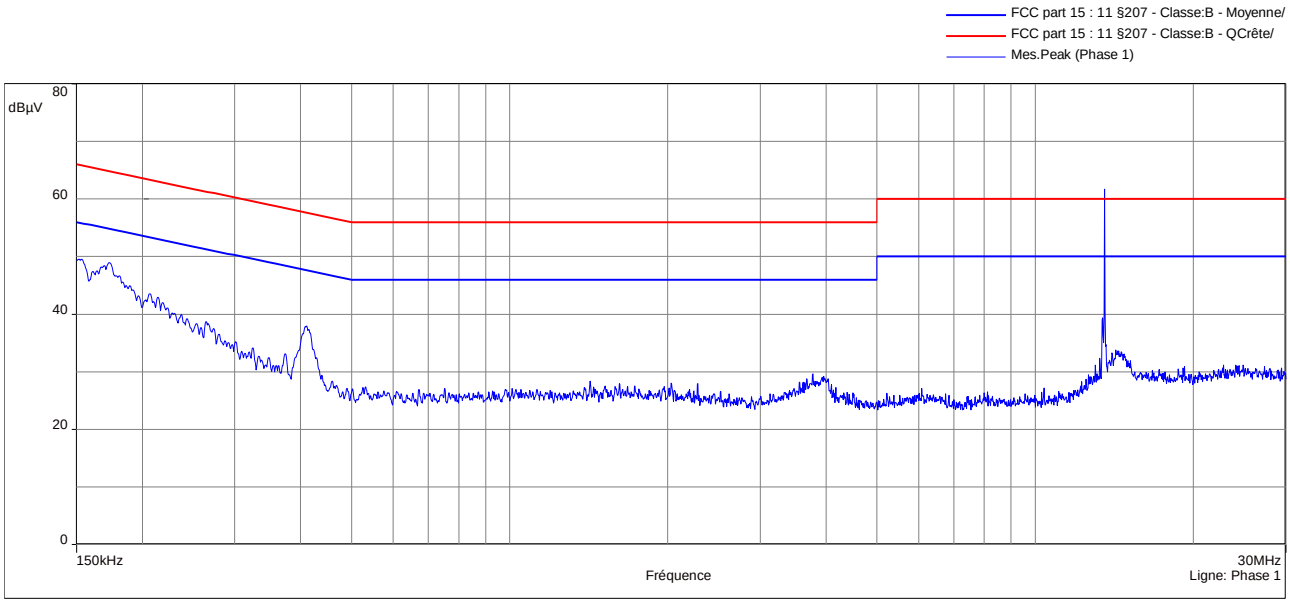
Measurement on the mains power supply:

The measurement is first realized with peak detector.

Curve N° 1: measurement on the Neutral with peak detector



Curve N° 2: measurement on the Line with peak detector



The highest frequencies are then analyzed with Quasi-peak detector and Average detector

Table N° 1: measurement on the Neutral, for the frequency range:

Frequency (MHz)	Quasi-peak (dBµV)	QP Limit (dBµV)	QP margin (dB)
0.152	43.46	65.92	22.46
0.170	43.22	64.96	21.74
0.191	39.20	63.98	24.78
0.408	33.67	57.69	24.02
13.552	39.69	60	20.31
13.558	52.95	60	7.05
13.564	48.50	60	11.50
13.57	26.08	60	33.92

Frequency (MHz)	Average (dBµV)	Average Limit (dBµV)	Average margin (dB)
0.152	26.46	55.92	29.46
0.170	28.88	54.96	26.08
0.191	21.25	53.98	32.73
0.408	26.59	47.69	21.1
13.552	25.62	50	24.38
13.558	34.90	50	15.10
13.564	34.22	50	15.78
13.57	16.95	50	33.05

Table N° 2: measurement on the Line, for the frequency range:

Frequency (MHz)	Quasi-peak (dBµV)	QP Limit (dBµV)	QP margin (dB)
0.153	42.10	65.81	23.71
0.173	42.29	64.81	22.52
0.411	33.63	57.63	24.00
0.430	25.10	57.25	32.15
13.552	39.26	60	20.74
13.558	52.44	60	7.56
13.564	47.84	60	12.16
13.568	31.91	60	28.09

Frequency (MHz)	Average (dBµV)	Average Limit (dBµV)	Average margin (dB)
0.153	23.38	55.81	32.43
0.173	29.21	54.81	25.60
0.411	27.52	47.63	20.11
0.430	18.48	47.25	28.77
13.552	26.24	50	23.76
13.558	34.41	50	15.59
13.564	32.56	50	17.44
13.568	19.64	50	30.36

Test conclusion:

RESPECTED STANDARD

9. OCCUPIED BANDWIDTH

Temperature (°C) : 25 **Humidity (%HR):** 50 **Date :** October 10, 2023
Technician : B. VOVARD

Standard: FCC Part 15
RSS-210

Test procedure:
Method of § 6.9.3 of ANSI C63.10 (99% Measurement)

Test set up:

Test realized in near field.

Settings:

Measure	99% Bandwidth
Center frequency	The centre frequency of the channel under test
Detector	Peak
Span	1.5 to 5 times the OBW
RBW	1% to 5% of the OBW
VBW	3 x RBW
Trace	Max hold
Sweep	Auto

Test operating condition of the equipment:

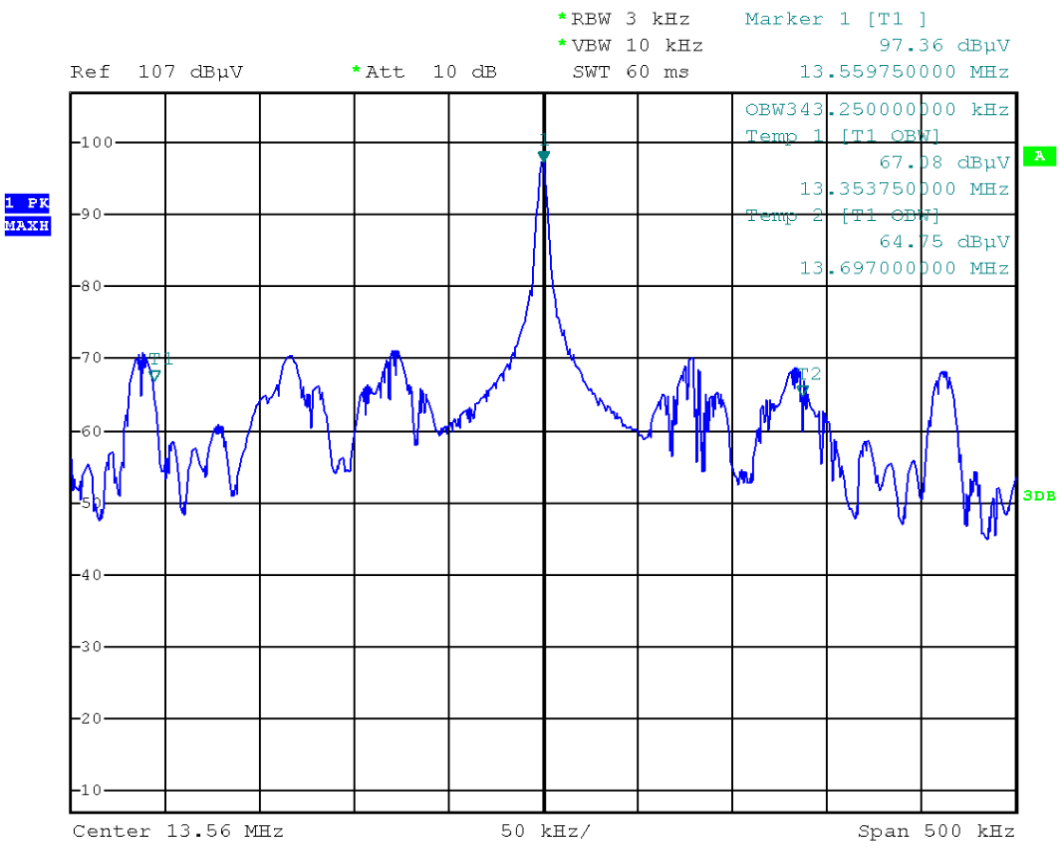
The equipment under test is blocked in discontinuous modulated transmission mode, at the highest output power level at which the transmitter is intended to operate.

Power source: 120 Vac 60 Hz by an external power supply
Percentage of voltage variation during the test (%): ± 1

Results:

Sample N° 1

99% bandwidth



Limit:

Measure realized for reporting only

10. BAND EDGE

Temperature (°C) : 25 **Humidity (%HR):** 50 **Date :** October 10, 2023
Technician : B. VOVARD

Standard: FCC Part 15

Test procedure:
For FCC Part 15: § 15.215
Method of § 6.10.6 of ANSI C63.10

Test set up:

Test realized in near field. All field strength measurements are correlated with the radiated maximum peak output power

Test operating condition of the equipment:

The equipment under test is blocked in discontinuous modulated transmission mode, at the highest output power level at which the transmitter is intended to operate.

Power source: 120 Vac 60 Hz by an external power supply
Percentage of voltage variation during the test (%): ± 1

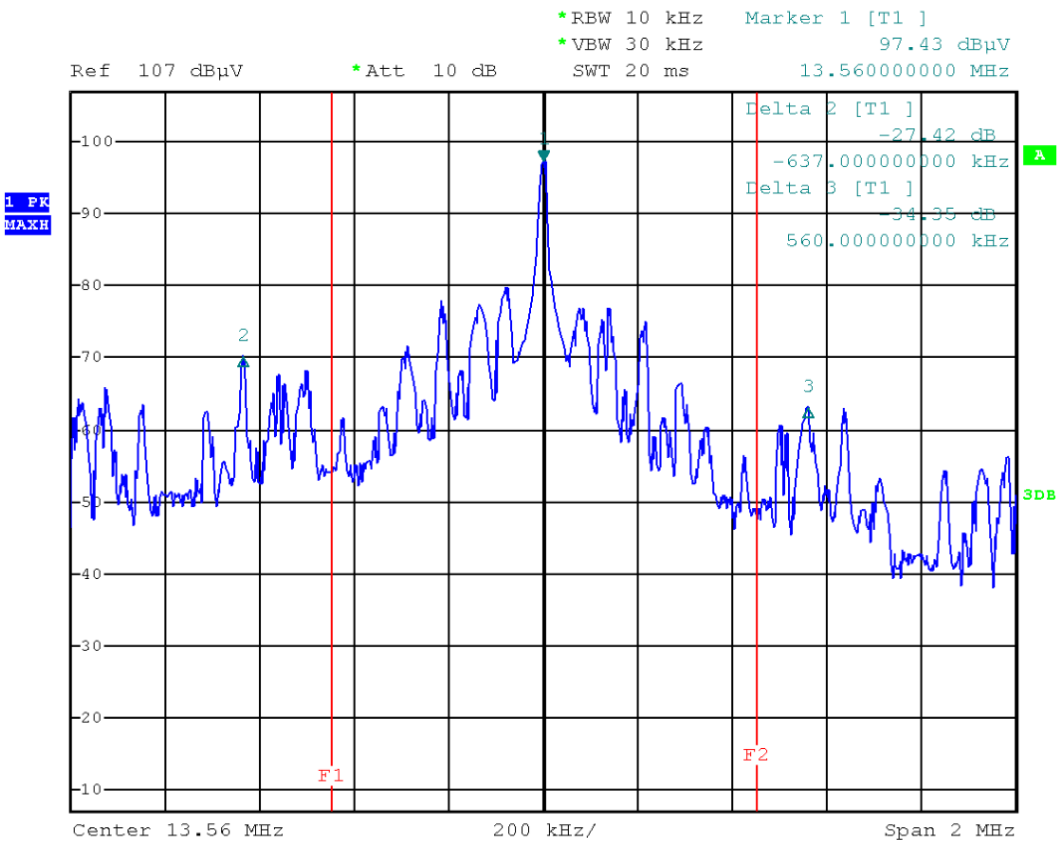
Results:

Lower Band Edge: From 13.090 MHz to 13.110 MHz
Upper Band Edge: From 14.010 MHz to 14.030 MHz

Sample N° 1:

Fundamental frequency (MHz)	Field Strength Level of fundamental (dBµV/m)	Detector (Peak or Average)	Frequency of maximum Band-edges Emission (MHz)	Delta Marker (dB) (1)	Calculated Max Out-of-Band Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
13.56	38.32	Peak	12.923	-27.42	10.90	48.63	37.73
13.56	38.32	Peak	14.12	-34.35	3.97	48.63	44.66

(1) Marker-Delta method



Test conclusion:

RESPECTED STANDARD

11. OPERATION WITHIN THE BAND 13.110 – 14.010 MHZ

Temperature (°C) : 25 **Humidity (%HR):** 47 **Date :** September 28, 2023
Technician : B. VOVARD

Standard: FCC Part 15
RSS-210

Test procedure:
For FCC Part 15: § 15.209, § 15.225 (a), (b), (c), (e)
For RSS-210: § Annex B.6 (a), (b), (c)

Method of § 6.3 of ANSI C63.10
Method of § 6.4 of ANSI C63.10
Method of § 6.8 of ANSI C63.10

Test set up: (Refer Appendix 2)

First an exploratory radiated measurement was performed. During this phase the product is oriented in three orthogonal planes.

Then the final measurement is realized with the product on the most critical orientation.

The system is tested in an open area test site (OATS). The EUT is placed on a rotating table, 0.8 m from a ground plane. Zero degree azimuth corresponds to the front of the equipment under test.

See test setup in appendix 2

The frequency stability measure is realized in near-field with the product in a climatic chamber.

Detection mode: Quasi-peak (F < 1 GHz)

Bandwidth: 9 kHz (150 kHz < F < 30MHz)

Distance of antenna: 10 meters

Antenna height: 1 meter

Antenna polarization: oriented in the vertical plane. The lowest point of the loop is 1m above ground level.

Equipment under test operating condition:

The equipment under test is blocked in discontinuous modulated transmission mode, at the highest output power level at which the transmitter is intended to operate.

Power source: 120 Vac 60 Hz by an external power supply
Percentage of voltage variation during the test (%): ± 1

Results:

Sample N° 1:

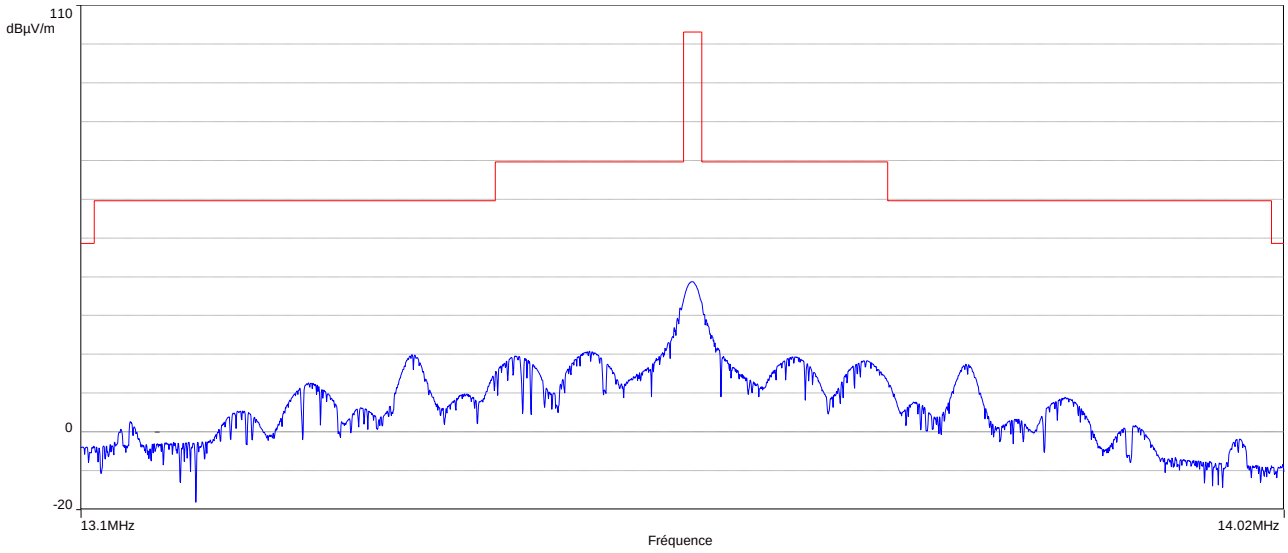
Carrier field strength

	Field strength (dBµV/m) at frequency: 13.56 MHz
Normal test conditions measure at 10 m	38.32
Normal test conditions correlated at 30 m	19.24
Limits at 30m (dBµV/m) (1)	84
Margin (dB)	64.76

Polarization of test antenna: perpendicular at the equipment at 0 degree.
Position of equipment: 3 see photos in appendix 2 (azimuth: 150°)

(1) Field strength extrapolated at 30 meters using 40dB/decade fall off

Field strength within the band 13.110-14.010 MHz



Frequency stability

Results for temperature variation

Realized with a power source at 120 Vac – 60 Hz through a variac

Temperature (°C)	Mesure at startup		Measure at 2 min		Measure at 5 min		Measure at 10 min		Drift limit (kHz)
	Frequency measured (MHz)	Frequency drift (kHz)	Frequency measured (MHz)	Frequency drift (kHz)	Frequency measured (MHz)	Frequency drift (kHz)	Frequency measured (MHz)	Frequency drift (kHz)	
50	13.559626	-0.374	13.559622	-0.378	13.55962	-0.38	13.559626	-0.374	± 1.356 (a)
40	13.559655	-0.345	13.559649	-0.351	13.559649	-0.351	13.559645	-0.355	
30	13.559686	-0.314	13.559690	-0.310	13.559680	-0.320	13.559670	-0.330	
20	13.559673	-0.327	13.559671	-0.329	13.559673	-0.327	13.559666	-0.334	
10	13.559691	-0.309	13.559687	-0.313	13.559689	-0.311	13.559685	-0.315	
0	13.559717	-0.283	13.559717	-0.283	13.559718	-0.282	13.559719	-0.281	
-10	13.559721	-0.279	13.559723	-0.277	13.559723	-0.277	13.559725	-0.275	
-20	13.559733	-0.267	13.559733	-0.267	13.559731	-0.269	13.559737	-0.263	

(a) ±0.01% of the operating frequency

Results for power supply variation

Realized at +20 °C

Power supply (Vac)	Frequency measured (MHz)	Frequency drift (kHz)	Drift limit (kHz)
102	13.559668	-0.332	± 1.356 (b)
120	13.559660	-0.340	
138	13.559677	-0.323	

(b) ±0.01% of the operating frequency

Test conclusion:

RESPECTED STANDARD

12. FIELD STRENGTH OUTSIDE THE BAND 13.110-14.01 MHZ

Temperature (°C) : 25 **Humidity (%HR):** 47 **Date :** September 28, 2023
Technician : B. VOVARD

Standard: FCC Part 15

Standard: FCC Part 15
RSS-210

Test procedure:
For FCC Part 15: § 15.209, § 15.225 (d)
For RSS-210: § Annex B.6 (d)

Method of § 6.3 of ANSI C63.10
Method of § 6.4 of ANSI C63.10
Method of § 6.5 of ANSI C63.10

Test set up: (Refer Appendix 2)

First an exploratory radiated measurement was performed. During this phase the product is oriented in three orthogonal planes.

Then the final measurement is realized with the product on the most critical orientation.

The measure is realized on open area test site under 1 GHz and in anechoic chamber above 1 GHz.

When the system is tested in an open area test site (OATS), the EUT is placed on a rotating table, 0.8m from a ground plane.

When the system is tested in anechoic chamber, the EUT is placed on a rotating table, 1.5 m from a ground plane.

Zero degree azimuths correspond to the front of the device under test.

See test setup in appendix 2

Frequency range: From 9 kHz to 140MHz - 10th harmonic of the highest fundamental frequency (13.56MHz)

Detection mode: Quasi-peak (F < 1 GHz) Peak / Average (F > 1 GHz)

Bandwidth: 200Hz (9 kHz < F < 150kHz)
9 kHz (150 kHz < F < 30MHz)
120 kHz (30 MHz < F < 1 GHz)
1 MHz (F > 1 GHz)

Distance of antenna: 10 meters (in open area test site)

Antenna height: 1 to 4 meters (in open area test site)

Antenna polarization: vertical and horizontal (only the highest level is recorded)

Equipment under test operating condition:

The equipment under test is blocked in discontinuous modulated transmission mode, at the highest output power level at which the transmitter is intended to operate.

Power source: 120 Vac 60 Hz by an external power supply
Percentage of voltage variation during the test (%): ± 1

Results:

Sample N° 1:

Below 30 MHz

Frequencies (MHz)	Detector P QP Av	Antenna height (cm)	Position	RBW (kHz)	Polarization (Parallel Perpendicular Horizontal)	Field strength Measured at 10 m (dBµV/m)	Field strength Computed at 30 m (dBµV/m)	Limits (dBµV/m)	Margin (dB)
27.12	P	100	3	10	Perpendicular	28.53	9.45	29.54	20.09

Above 30 MHz

Frequencies (MHz)	Detector P QP Av	Antenna height (cm)	Position	RBW (kHz)	Polarization H: Horizontal V: Vertical	Field strength Measured at 10 m (dBµV/m)	Field strength Computed at 3 m (dBµV/m)	Limits (dBµV/m)	Margin (dB)
40.68	QP	120	3	120	V	25.84	36.30	40	3.70
54.24	QP	120	3	120	V	29.42	39.88	40	0.12
67.8	QP	120	1	120	V	23.59	34.05	40	5.95
81.36	QP	120	3	120	V	24.73	35.19	40	4.81
122.04	QP	120	3	120	V	29.87	40.33	43.5	3.17

P= Peak, QP=Quasi-peak, Av=Average

Applicable limits:

for 9 kHz ≤ F ≤ 490 kHz :	2400/F(kHz) at 300 meters
for 490 kHz < F ≤ 1.705 MHz :	24000/F(kHz) at 30 meters
for 1.705 MHz < F ≤ 30 MHz :	29.5 dBµV/m at 30 meters
for 30 MHz < F ≤ 88 MHz :	40 dBµV/m at 3 meters
for 88 MHz < F ≤ 216 MHz :	43.5 dBµV/m at 3 meters
for 216 MHz < F ≤ 960 MHz :	46 dBµV/m at 3 meters
Above 960 MHz :	54 dBµV/m at 3 meters

Test conclusion:

RESPECTED STANDARD

□□□ End of report, 2 appendixes to be forwarded □□□

APPENDIX 1: Test equipment list

AC Conducted emission

TYPE	MANUFACTURER	EMITECH NUMBER
Outside room Hors cage	Emitech	10788
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Test receiver ESW44	Rohde & Schwarz	17008
LISN 1600	Thurbly Thandar Instruments	8719
High-pass filter EZ-25	Rohde & Schwarz	11535
Absorber sheath current	Emitech	10523
Cable N-5m RG214	GYL Technologies	8590
Power source 1251RP	California instruments	8508
Multimeter 177	Fluke	14903
Meteo station WS-9232	La Crosse Technology	8750
Software	BAT-EMC V3.18.0.26	0000

Occupied bandwidth

TYPE	MANUFACTURER	EMITECH NUMBER
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Spectrum Analyzer FSP40	Rohde & Schwarz	4088
Attenuator 10dB	Midwest Microwave	8548
Climatic chamber EXCAL² 1411-TA	CLIMATS	16059
Power source 1251RP	California instruments	8508
Multimeter 177	Fluke	14903
Meteo station WS-9232	La Crosse Technology	8750
Software RS Commander	Rohde et Schwarz	//

Band edge

TYPE	MANUFACTURER	EMITECH NUMBER
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Spectrum Analyzer FSP40	Rohde & Schwarz	4088
Attenuator 10dB	Midwest Microwave	8548
Climatic chamber EXCAL² 1411-TA	CLIMATS	16059
Power source 1251RP	California instruments	8508
Multimeter 177	Fluke	14903
Meteo station WS-9232	La Crosse Technology	8750
Software RS Commander	Rohde et Schwarz	//

Operation within the band 13.110 – 14.010 MHz

TYPE	MANUFACTURER	EMITECH NUMBER
Open test site	EMITECH	8732
Turntable and mat controller	EMITECH	8855
Full anechoic chamber	EMITECH	10759
Turntable and mat controller NCD	MATURO	10789
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Test receiver ESW44	Rohde & Schwarz	17008
Spectrum Analyzer FSV40	Rohde & Schwarz	15666
Loop antenna 6502	EMCO	1406
Climats EXCAL² 1411-TA	CLIMATS	16059
Precision thermometer GMH 3710	GHM Greisinger	14716
N-1.5M Cable	SUCOFLEX	9398
N-2M Cable	SUCOFLEX	14303
N-5M Cable	SUCOFLEX	15883
N-2.5M Cable	H & S	15913
Power source 1251RP	California instruments	8508
Multimeter 177	Fluke	14903
Meteo station 608-H1	Testo	7566
Meteo station WS-9232	La Crosse Technology	8750
Meteo station BAR206	Oregon Scientific	14475
Software	BAT-EMC V3.18.0.26	0000
Software	Champ libre Juigné. V3.5	8864

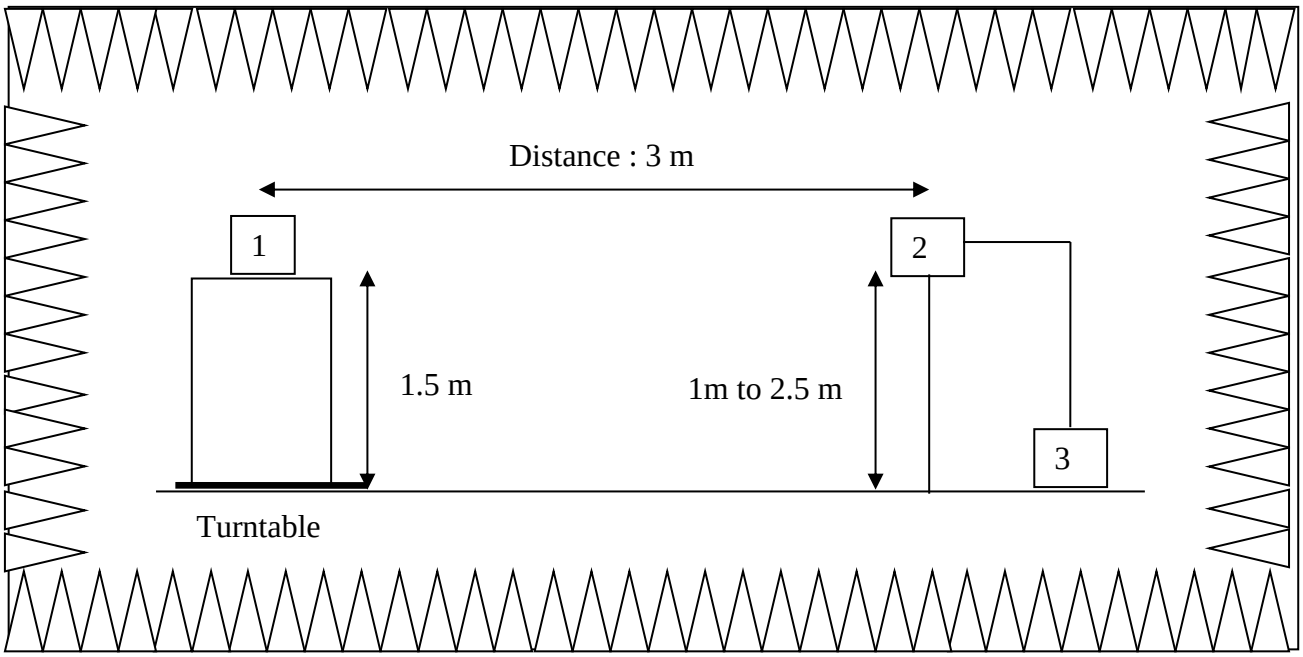
Field strength outside the band 13.110-14.010 MHz

TYPE	MANUFACTURER	EMITECH NUMBER
Open test site	EMITECH	8732
Turntable and mat controller	EMITECH	8855
Full anechoic chamber	EMITECH	10759
Turntable and mat controller NCD	MATURO	10789
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Test receiver ESW44	Rohde & Schwarz	17008
Spectrum Analyzer FSP40	Rohde & Schwarz	4088
Loop antenna 6502	EMCO	1406
Biconical antenna VHA 9103	Schwarzbeck	8528
Biconical antenna 3110	Emco	7240
Log periodic antenna 3147	EMCO	8783
Log periodic antenna HL223	Rohde & Schwarz	7190
Low-noise amplifier ZFL-1000LN	Mini-circuit	10730
Antenna 3117	ETS-Lindgren	10771
Low-noise amplifier S005180M3201	LUCIX Corp.	12590
N-1.5M Cable	SUCOFLEX	9398
N-2M Cable	SUCOFLEX	14303
N-5M Cable	SUCOFLEX	15883
N-2.5M Cable	H & S	15913
Power source 1251RP	California instruments	8508
Multimeter 177	Fluke	14903
Meteo station 608-H1	Testo	7566
Meteo station BAR206	Oregon Scientific	14475
Software	BAT-EMC V3.18.0.26	0000
Software	Champ libre Juigné. V3.5	8864

APPENDIX 2: Radiated Test Setup

Anechoic chamber setup

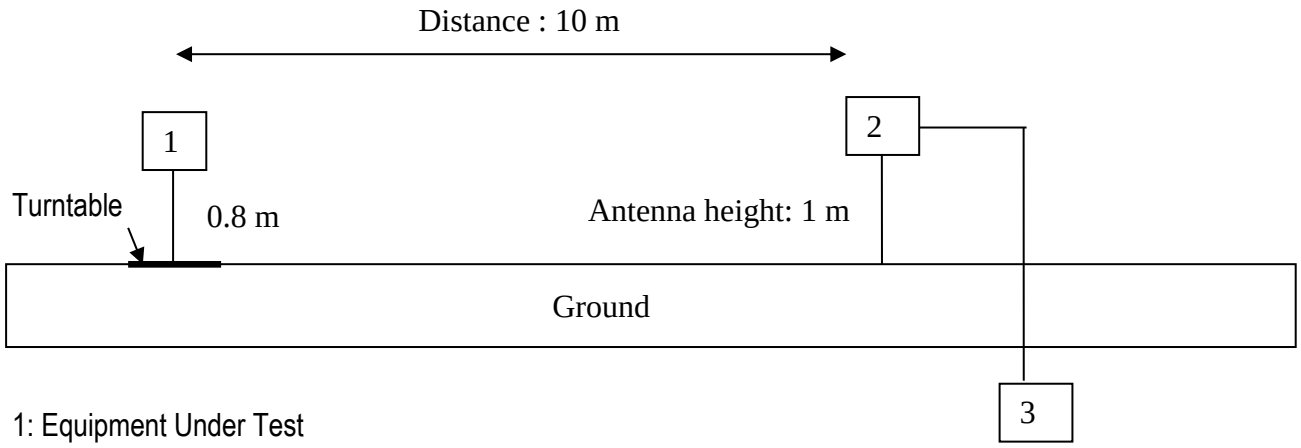
Above 1 GHz



1: Equipment Under Test
2: Measurement antenna
3: Measurement equipment

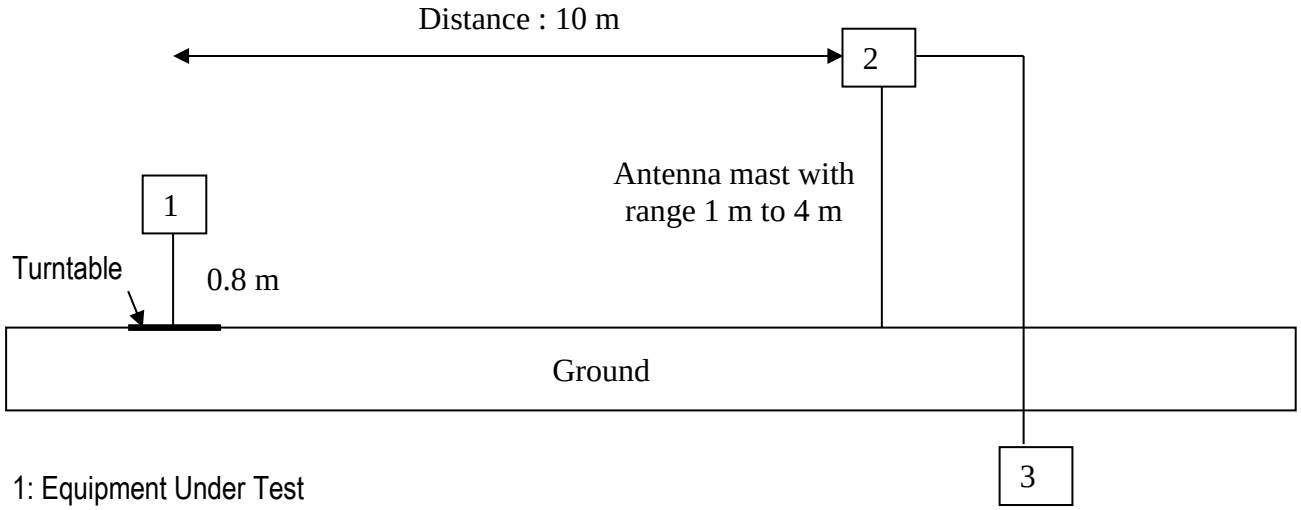
Open area setup

Below 30 MHz



1: Equipment Under Test
2: Measurement antenna
3: Measurement equipment

Between 30 MHz and 1 GHz



1: Equipment Under Test
2: Measurement antenna
3: Measurement equipment