

Technical Requirements

RFP No. 001/MG/0714

List of equipment

Item	Description	Quantity	Technical Requirements
1	Network Analyzer 50GHz	1	TR-001
2	Millimeter wave converter 75-110GHz	Set	TR-002
3	Broadband microwave absorber	Set	TR-003
4	Microwave cables	Set	TR-004
5	Antennae	Set	TR-005
6	RCS Measurement and processing software	1	TR-006
7	System installation and training	1	TR-007

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Technical Requirements

TR-001

Network Analyzer 50GHz

Requirements for Network Analyzer 50GHz

RFP No. 001/MG/0714



1. Information

The Network Analyzer will be supplied to the customer According to the Technical specification. The Network Analyzer must be able to measure phase/vector.

2. Technical Specification

No.	Parameter	Minimum Requirement
1	Configuration	The minimum configuration is: - Four port device - Two built-in generators - Possibility to connect 75-110GHz converters without the need to expand the analyzer hardware
2	Frequency range	10MHz - 50GHz
3	Frequency resolution	$\leq 1\text{Hz}$
4	Measurement Bandwidth	1Hz \div 1Mhz
5	Adjustable output level (without the option of additional silencers, without the option of direct I / O)	From $\leq -30\text{dBm}$ to: $\geq 13\text{ dBm}$ for $50\text{ MHz} \leq f < 20\text{GHz}$ $\geq +12\text{ dBm}$ to $20\text{GHz} \leq f < 35\text{GHz}$ $\geq +10\text{ dBm}$ to $35\text{GHz} \leq f \leq 50\text{GHz}$
6	Dynamics (IF 10Hz, without the option of additional silencers, without the option of direct I / O)	$\geq 125\text{dB}$ for $500\text{MHz} \leq f < 2\text{ GHz}$ $\geq 130\text{ dB}$ for $2\text{ GHz} \leq f < 20\text{GHz}$ $\geq 125\text{dB}$ for $20\text{GHz} \leq f < 24\text{GHz}$ $\geq 120\text{ dB}$ to $24\text{ GHz} \leq f \leq 40\text{GHz}$ $\geq 115\text{dB}$ for $40\text{GHz} \leq f \leq 45\text{GHz}$ $\geq 110\text{dB}$ for $45\text{GHz} \leq f \leq 50\text{GHz}$

7	Connections	50Ω, 2.4mm type, male, with an additional flange reinforced mechanically
8	Measurement speed at (IF 1MHz, CW)	≤ 3.5μs
9	Typical switching time (401 points, full bandwidth)	≤ 32ms (without correction) for IF = 100kHz ≤ 41 ms (calibration TOSM) for IF = 100kHz ≤ 28ms (without correction) for IF = 1MHz ≤ 33 ms (calibration TOSM) for IF = 1MHz
10	BIAS	Connectors for external DC (BIAS) for sockets PORT 1 to 4, (one connector assigned to one port)
11	Control Interface	LAN. GPIB
12	Other requirements	- Calibration Kit female, male - 50GHz

3. Warranty

Minimum 3 years

Technical Requirements

TR-001

Millimeter wave converter 75-110GHz

Requirements for Millimeter wave converter 75-110GHz

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1. Information

The Millimeter wave converter 75-110GHz will be supplied to the customer According to the Technical specification. The Millimeter wave converter 75-110GHz must be compatible with the Network Analyzer as specified in TR-001.

2. Technical Specification

No.	Parameter	Minimum requirement
1	Configuration	Set of two converters 75-110GHz Frequency range with electronic level control, necessary connecting cables to the network analyzer L=1.5m
2	Frequency Range	75GHz – 110GHz
3	Output level (at output of +7dbm from Network Analyzer)	≥ -3 dBm, typ. 0dBm $\geq +12$ dBm to $20\text{GHz} \leq f < 35\text{GHz}$ $\geq +10$ dBm to $35\text{GHz} \leq f \leq 50\text{GHz}$
4	Output attenuation adjustment	Electronic control $\leq 0\text{dB} \div \geq 25\text{dB}$ The possibility of further reduction of the power level by reducing the level of network analyzer
5	System Dynamics (IF=10Hz)	$\geq 95\text{dB}$
6	Other Requirements	Calibration kit The Millimeter converter and Network Analyzer equipment should preferably be from the same manufacturer.

3. Warranty

Minimum 3 years

Technical Requirements

TR-003

Microwave absorbers

Requirements for Broadband Microwave Absorbers

RFP No. 001/MG/0714

1. Information

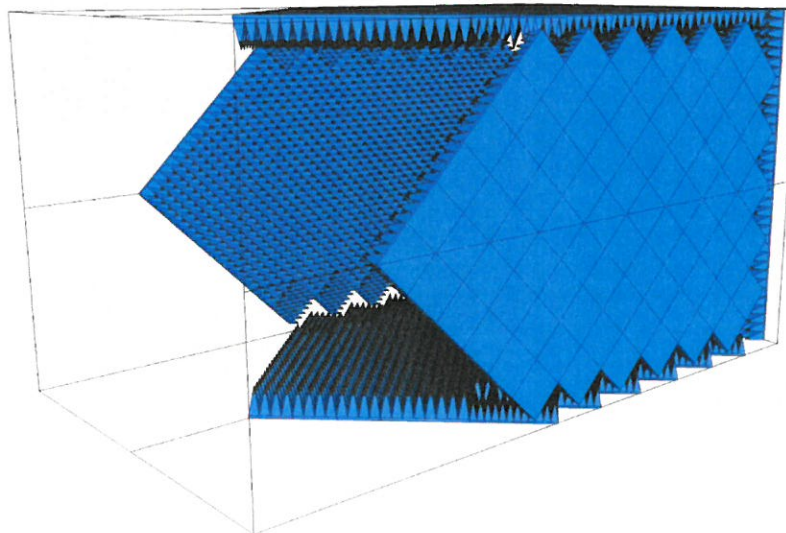
The microwave absorbers will be supplied to the customer in three various types listed in the Technical specification. Together with the absorbers the correct amount of glue for fixing the microwave absorbers will be supplied by the vendor.

The customer intends to purchase microwave absorbers designed to reduce the reflection of microwaves in the anechoic test chamber. The internal dimensions of the test chamber are as follows:

Height	Width	Depth
5.5m	6.0m	10.0m

The customer will perform installation of the microwave absorbers by gluing to the ceiling and walls of the structure, it is required that the vendor supply detailed layout design and mounting instructions. The mounting will be performed in a so called "Diamond" configuration to give best results with RCS measurements.

An illustration of this configuration is shown below:



NOTE: illustration does not show all absorbers required.

2. Technical specification

2.1 Pyramidal Absorber 1

Maximum weight:		3.0Kg					
Maximum dimensions		610mm x 610mm x 460mm					
Electromagnetic properties, minimum attenuation in db							
1GHz	3GHz	5GHz	10GHz	15GHz	24GHz	50GHz	75GHz – 110GHz
-40	-45	-50	-50	-50	-50	-60	-55

2.2 Pyramidal Absorber 2

Maximum weight:		2.5kg					
Maximum dimensions		610mm x 610mm x 310mm					
Electromagnetic properties, minimum attenuation in db							
1GHz	3GHz	5GHz	10GHz	15GHz	24GHz	50GHz	75GHz – 110GHz
-35	-40	-50	-50	-50	-50	-60	-55

2.3 Flat Absorber 1

To be used for filling in corners and difficult to reach areas between the pyramidal absorbers

Maximum dimensions			610mm x 610mm x 50mm		
Electromagnetic properties, minimum attenuation in db					
1GHz	3GHz	5GHz	10GHz	15GHz	24GHz
-30	-30	-30	-30	-30	-30

3. Design

The design and layout of the absorbers is to be provided by the vendor to best suit RCS type measurements within the dimensions of the structure outlined in point **1. Information.**

4. Fire retardancy

It is required that all microwave absorbers meet the following standard for fire retardancy:

DIN 4102 Class B2

5. Warranty

Minimum 5 years

Technical Requirements

TR-004

Microwave Cables

Requirements for Microwave cables

RFP No. 001/MG/0714

1. Information

The Customer Requires that with the system the following cables be supplied by the vendor.

2. Requirement

Cables

No.	Description	Length	Quantity
1	2GHz – 50GHz cable	2.0m	2
2	2GHz – 50GHz cable	10.0m	1

Adapters

No.	Description	Quantity
1	N-Male to 2.4mm Female	2
2	N-Male – 2.92 Female	2

3. Warranty

Minimum 5 years

Technical Requirements

TR-005

Antennae

Requirements for Antennae

RFP No. 001/MG/0714

1. Information

The Antennae required by the customer are listed in the Technical specification. The customer intends to purchase Two (2) of each type of antenna.

2. Technical specification

Item	Description	3dB Beam Width $\pm 1^\circ$	
		H - plane	E - plane
1	1.7 - 2.6 GHz 20 dBi Horn Antenna fitted with an N type connector MOUNTING Mounting Plates fitted at C of G on 2 sides each with 4 holes, diameter 10 mm, 40 mm centres MAXIMUM SIZE 575 mm x 410 mm external aperture x 1200 mm long	14° - 23°	14° - 23°
2	3.9 - 5.9 GHz 20 dBi Horn Antenna fitted with an N type connector	14° - 23°	14° - 23°
3	8.2 - 12.4 GHz 20 dBi Horn Antenna fitted with an N type connector MOUNTING Mounting Plate 50 mm x 50 mm with 4 holes, diameter 4.1 mm, on 38 mm centres. MAXIMUM SIZE 116 x 86 mm external aperture x 263 mm long	14° - 23°	14° - 23°

Item	Description	3dB Beam Width ±1°	
		H - plane	E - plane
4	<p>26.5 - 40 GHz 20 dBi Horn Antenna fitted with a K type connector</p> <p>MOUNTING</p> <p>Mounting bracket with 2 holes, diameter 3.1 mm, on 12 mm centres.</p> <p>MAXIMUM SIZE</p> <p>36 mm x 28 mm external aperture x 100 mm long</p>	14° - 23°	14° - 23°
5	<p>75 - 110 GHz 20 dBi Horn Antenna fitted with a WG27 / WR10 flange</p> <p>MOUNTING</p> <p>UG-387/U flange</p> <p>MAXIMUM SIZE</p> <p>18 x 14 mm external aperture, 45 mm long</p>	14° - 23°	14° - 23°

3. Warranty

Minimum 5 years

Technical Requirements

TR-007

RCS Measurement & Processing Software

Requirements for RCS Measurement & Processing Software

RFP No. 001/MG/0714

- Video generation
- Statistical functions
- Easy integration of plots in report

Presentation

- Synchronization across:
 - Linear range plot
 - Linear azimuth plot
 - Linear frequency distribution plot
 - Scatter plot
 - High Resolution Range plot
 - High Resolution Frequency plot
 - ISAR/Doppler plot
 - Polar plots
 - Camera image capture
- Report generation
 - Automatic/manual

3. Technical support

The vendor shall provide technical support and assistance to the Customer for a minimum period of 24 months after training has been completed.



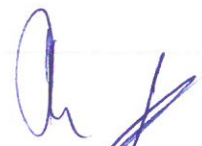
Technical Requirements

TR-007

System Installation and training

Requirements for System Installation and training

RFP No. 001/MG/0714



1. Overview

The Customer requires that the Vendor include in their proposal information regarding the schedules for system installation and for the training of The Customers staff.

The Customer will be responsible for the construction of the structure which will house the Anechoic Chamber, this construction will be made of timber lined internally with aluminium or zinc coated steel.

The Microwave absorbers will be glued to the ceiling and walls by The Customer and it is a requirement that a detailed layout design and installation instruction be provided together with the vendor's offer. The Microwave Absorbers on the floor will not be glued in place to allow for removal providing access to the whole floor space of the chamber.

2. Schedule

The customer requires that the system be delivered, installed and training be performed according to the table below. The vendor shall provide a delivery schedule for all items.

Phase 1	Delivery of Microwave absorbers and glue to Customers facility	The customer will install Microwave absorbers
Phase 2	Delivery of: <ul style="list-style-type: none"> • Network Analyzer • Millimeter wave converter • Microwave cables • Antennae • RCS measurement & Processing software 	Delivery of all components to The Customer
Phase 3	Vendor installation and testing	On site at The Customers facility
Phase 4	Training	On site at The customers Facility